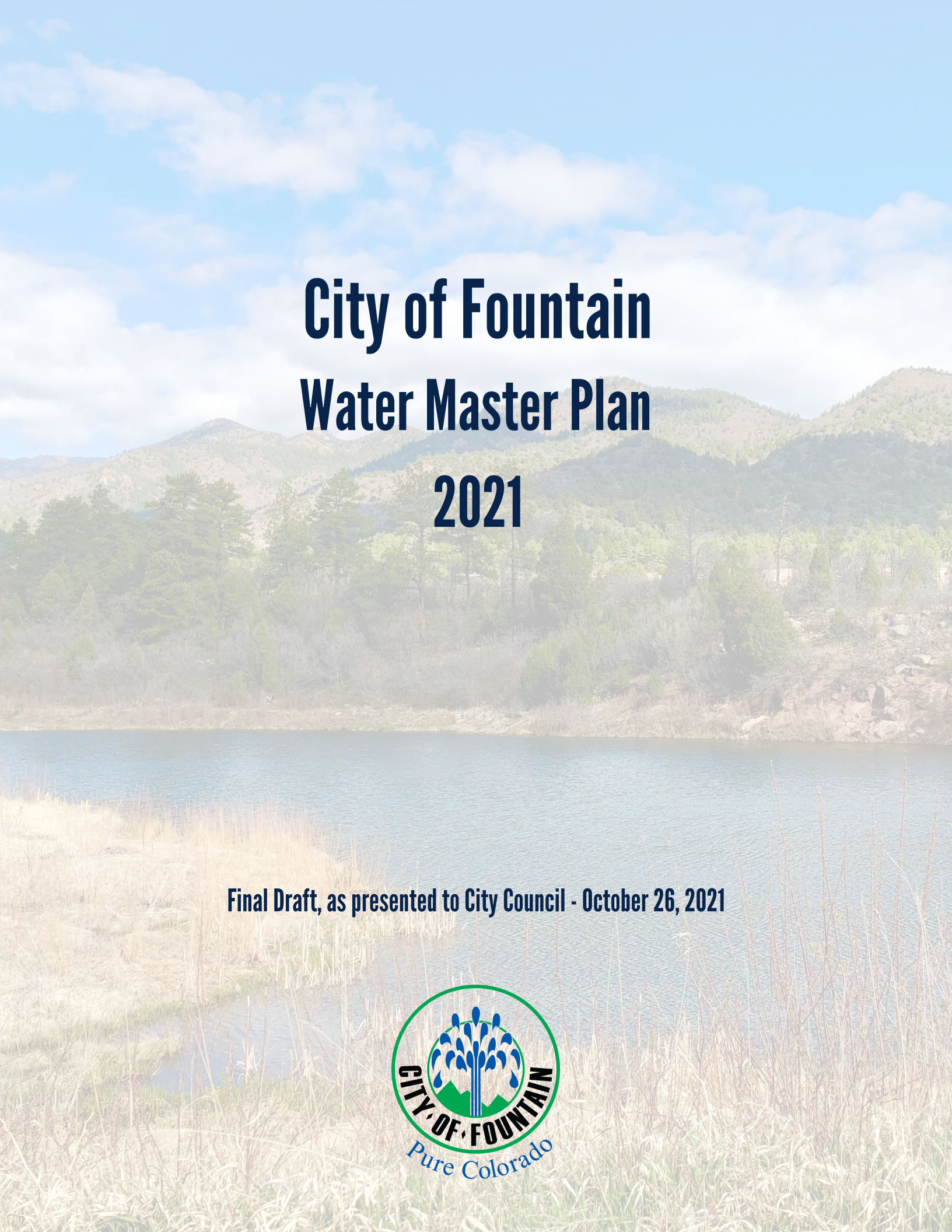

City of Fountain
Water Master Plan
2021

Final Draft, as presented to City Council - October 26, 2021

CITY OF FOUNTAIN
Pure Colorado

2021 City of Fountain Water Master Plan

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CITY OF FOUNTAIN WATER MASTER PLAN 2021
INTRODUCTION

WATER AND GOVERNANCE

There is nothing that is more important to sustaining the life of a community than water. Without water, life ceases to exist. The City of Fountain owns and operates a municipal water system that has provided reliable and high-quality water service to the community for more than a century. It is the City's desire to continue to meet the community's needs and expectations for water service for another century and beyond. Water Master Plan 2021, which is contained in the pages of this document, is a roadmap and guide to meeting those needs and expectations.

As a municipal utility, the City of Fountain water and electric utilities are governed by the City Council. Using information prepared by the City's staff, Council makes policy and financial decisions for the water and electric systems that are in the best interests of the collective community. City staff is committed to consistently providing the Council with the information necessary to make educated decisions on behalf of the community and utilities customers.

THE PLAN

The Water Master Plan 2021 is a directional, not a decisional document. Acceptance and adoption of this plan does not provide new water resources, but is an affirmation by City Council that this is the desired direction for the City's water system going into the future. Further pursuit and implementation of the projects, policies and initiatives outlined in this plan will eventually result in the creation of additional capacity and expansion of the City's potable water system, allowing Utilities to maintain existing levels of service and enhancing the ability to serve new customers.

The Water Master Plan provides the knowledge that is needed to make appropriate, strategic (data driven) and financially sound decisions on how to operate, maintain and expand the City's water system. The Water Master Plan includes a comprehensive evaluation of each element of the water system, a detailed evaluation of the future needs of the existing customers and the

growth to full build out of the system within current service area boundaries, alternative means to meet the identified needs, and recommendations of potential new policies and revisions to existing policies that may be needed to achieve the objectives of the Water Master Plan.

CRITICAL POINTS

At present time, the City of Fountain has sufficient raw water supplies to meet existing demands as well as future growth of nearly double its current size, even in dry years and accounting for anticipated reductions in trans-mountain deliveries of Colorado River Basin water. While the City's water treatment capabilities can meet current demands, there is a looming ceiling in treatment capacity that is fast approaching and will inhibit growth and expansion past that point. The City has incurred a significant amount of debt to achieve the current raw water position and to participate in treatment options that have brought us to the current treatment capabilities, and this debt will severely limit the City's ability to finance system expansions over the next couple of decades.

The ultimate goal is to balance all the elements of the water system with the resources needed to provide service to all properties located within the current service area while allocating the costs of the improvements to those who directly benefit from the improvements.

CITY OF FOUNTAIN WATER MASTER PLAN 2021
PURPOSE

MISSION

The City of Fountain is a Colorado Home Rule City in El Paso County. The Fountain Utilities Department is one component of the City governance, furnishing electric and water services to the community.

The City of Fountain Water Utility mission is to provide safe, reliable, cost-effective water supply as efficiently as possible for our current and future community.

PURPOSE

The purpose of this Water Master Plan is to provide guidance for the sustainable management and operation of all elements of the municipal water system and to meet the needs and expectations of current and future customers that are or will be served by the City's water system.

Previous Water Master Plans have been decisional documents. The 2007 Water Master Plan was a decisional document, analyzing whether the City should continue participating in the Southern Delivery System (SDS) project as the next supply project or develop local wells and treat the well water. That decision led Fountain to participate in the SDS Project. The 2007 Plan also recommended that Fountain pursue an aggressive water conservation program and that Fountain continue its dependence on the Fountain Valley Authority for treated surface water.

The 2021 Water Master Plan is a directional document that includes an assessment of the current status of the water delivery system and current water demands/use, calculation of the expected buildout system demand within the current service area, identification of resources and improvements needed to continue to meet existing rate-payer needs and future rate-payer needs and identification of governing, financial, management and operational policies that will be needed to ensure the sustainability of the City's water system.

TERM OF THE WATER MASTER PLAN

This Water Master Plan is threshold based and is not dependent upon the timing component of growth projections, which is beyond the control of the utility. The system improvements identified in this master plan are tied to specific growth thresholds. For example: when we hit X threshold, Y improvements are needed. This plan addresses each component of the City's water delivery system from water rights to the tap and identifies those resources that will be needed to continue to meet the needs and expectations of existing rate-payers and those resources that will be needed to build out the City's current water service area. For elements of the plan that must be time based, this plan addresses those elements through the year 2050, which coincides with the Colorado Water Plan current study period as well as the Arkansas Basin Implementation Plan being finalized by the Arkansas Basin Round Table.

SECTIONS

This Water Master Plan is structured into the following sections:

Introduction: The Introduction section presents the general direction and the major findings.

Purpose: The Purpose section addresses the why and describes the contents of the sections.

Policies: The Policies section addresses the operation, maintenance, and expansion of the water system and how water is used throughout the community. There are a number of water-related policies that have been adopted by the City Council in the past but recognizing the changing nature of water in Colorado and the west, additional policies are suggested for consideration (and some existing policies are identified as possible candidates for revision) to structure the management, financing and direction for the water utility. Some of these policy considerations will require City Council action, including possible amendments to the Utilities Code and some may be implemented administratively through the provisions in the Utilities Code. After further consideration, some water policy considerations discussed in the Water Master Plan may not be pursued to completion if the merits of the specific policy are deemed to not be worthwhile pursuing.

Water Supply: The Water Supply section addresses the raw (untreated) water including water rights, water sources (both surface water and groundwater), water yield, raw water storage, leased water, and water exchanges.

The water yield considers the expected production of source water in dry, normal and wet years, as well as a computation addressing the depletion of water yield due to changing conditions.

The water yield and the water storage studies consider three scenarios that affect the trans-mountain water deliveries in the future (potential demand management actions by other entities and potential calls on trans-mountain deliveries). These three scenarios are: no curtailment, a moderate curtailment and a severe curtailment of Fryingpan-Arkansas trans-mountain water supply.

The water supply section also addresses the opportunities for fully using the part of the City's water supply that is reusable to extinction (trans-mountain and non-tributary water).

Water Demand: The Water Demand section addresses the increased demand for finished (treated) water, projecting the increase in water use triggered by new development, redevelopment, and the decreased demand from continuing effects of active conservation efforts (both at the system and at the individual customer levels).

The water demand is computed for three different scenarios:
1) the demand created by the existing water users in the City's current water service area (the area within the City of Fountain current city limits that is not served by other water providers);
2) The demand created by increased growth in those areas of the City currently not developed (excluding Kane Ranch); and
3) The demand created by increased growth (scenario 2), including the Kane Ranch.

The water demand section addresses the sources of finished water (both for surface water treatment and groundwater treatment). Topics addressed include redundancy in finished water supply, conversion of finished water for uses (such as outdoor irrigation) that are more appropriately served by untreated water and additional finished water storage.

The water demand section also includes water demand management in addition to conservation. The topics of landscape requirements (this is presented in more detail in the Land Use Planning/Water Resources Planning Section), outdoor irrigation standards, water losses in operations, water scarcity response, water budgeting, irrigation-only water taps, and water waste rules.

Water Delivery: The Water Delivery section addresses the changes to the water infrastructure necessary to continue providing service to the existing water customers and to new customers as vacant land develops. This includes the basic nuts-and-bolts of the water infrastructure (piping, valves, hydrants, pumping stations, pressure regulating structures, finished water storage and water metering). The information developed in this Section will be the basis for a long-term Capital Improvements Plan.

As with the Water Demand section, the Water Delivery section addresses three different scenarios: the water delivery infrastructure needed to appropriately serve all the existing water users in the current water service area, the water delivery infrastructure needed to serve the increased growth in those areas of the City currently not developed and the water delivery infrastructure needed to serve the increased growth in those areas of the City not developed, including the Kane Ranch.

Water Operations: The Water Operations section addresses the programs, personnel and equipment needed to effectively operate the water system.

Land Use Planning and Water Resources Planning: The Land Use and Water Resources Planning section addresses the interaction between land use and water use, how land use regulations impact future water use and how water availability impacts future land use.

Financial Topics: The Financial Topics section addresses the potential sources of revenue and the anticipated expenses necessary to operate the Water Utility.

CITY OF FOUNTAIN WATER MASTER PLAN 2021
POLICY TOPICS

INTRODUCTION

In general, the policy considerations identified in this Master Plan are intended to achieve the highest attainable level of health, safety and welfare for the City's water system:

> Health is paramount to the water system. The livelihood of our community is reliant upon the water produced by the City. Our community's trust in the quality of the product must be absolute.
>
> Safety is absolute to the water system. The physical infrastructure that is necessary to supply, treat and deliver water to the community involves massive, complex and sometimes dangerous equipment and chemicals. Recognition of these inherent dangers to the employees and sometimes to the public is a concern that requires knowledge, extensive planning, execution and continuous diligence.
>
> Welfare is the financial element in this hierarchy. A test for any policy consideration is whether it is financially beneficial or at least financially neutral to the rate payers. The City has a fiduciary responsibility to our customers to manage their water system with professional prudence.

Adoption of this Master Plan does not approve or endorse any of the policy considerations. This Plan is the guide to the Utility as we move forward to better serve Fountain's water customers and community.

Many of these policy considerations have financial elements that may either require additional expenses or may generate additional revenues. Some of the policy considerations are customer-facing and some are entirely internal. Some of these policy considerations may be adopted administratively by the Utilities Director, but many will require action by City Council.

SUMMARY OF POSSIBLE FUTURE POLICY CONSIDERATIONS

The Water Master Plan contains possible policy considerations that are listed by section below:

Water Demand Section:

Evaluate outdoor watering restrictions
Expand using non-potable water for irrigation.
Create a water scarcity response plan.
Develop a water budget pilot program.
Evaluate a separate tap fee schedule and a separate water rate for exterior only services.
Develop a program and possibly regulations to address water waste.

Water Delivery Section:

Develop policies for private water systems.

Land Use Planning and Water Resources Planning Section:

Develop a water saving landscape code for all categories of land use
Evaluate an incentive program for existing properties to upgrade to current interior plumbing standards and new landscape water saving standards.

Finances Section:

Formalize financial guidance standards.
Establish financial policies identified as part of a comprehensive financial analysis.
Review the effectiveness of GID #2.
Designation of certain revenues for specific expenditures.

CITY OF FOUNTAIN WATER MASTER PLAN 2021
WATER DEMAND

WATER DEMAND

The City of Fountain contracted with Black & Veatch to prepare the Technical Memorandum addressing water demand projections. Their Technical Memorandum is presented in this Section.

Black & Veatch worked with Water and Customer Service staff to assemble and analyze the past water usage data. Black & Veatch also worked with the Water and the Planning staff to define the water demand for planned developments and for properties that are available for development, but have no current development submittals. Black & Veatch worked with the Economic Development and the Urban Renewal staff to determine what changes in water demand may ensue from redeveloping existing neighborhoods.

The Conservation and Sustainability Manager worked with Water staff to assemble the report on demand management. Demand management has previously been known as "Water Conservation," but demand management is a more comprehensive approach to this function that has changed Fountain's water usage structurally since the adoption of the previous Master Plan.

DEMAND MANAGEMENT

The City of Fountain has developed a robust water conservation function, reflecting the direction of the 2007 Water Master Plan. Professional staff have been trained in water conservation and Sustainability City staff offer classes in landscaping, directions on efficient outside irrigation, showerhead replacements and bill credit for installing water saving toilets. These are all efforts that have contributed to a steady decrease in per person water demand over the past 15 years.

Part of the reason that water conservation was identified as essential in the 2007 Water Master Plan was that Fountain projected up to five years of double-digit increases in water rates to fund the investment in the Southern Delivery System.

The water conservation efforts have largely succeeded for new developments; the modern water saving fixtures and the reduced turf area at the point of purchase for new homes resulted in new homes consistently using less water than the existing housing stock in Fountain.

Fountain's Water Efficiency Plan was first adopted in 2001 and the most recent version was approved by City Council in 2018. Each successive Water Efficiency Plan has been more effective in reducing the water demand on both the individual and collective scale.

Much of demand management strategy focuses efforts on exterior irrigation because irrigation creates up to 40% of all water demand. Irrigation demand also increases peak usage requiring water delivery infrastructure to be sized to meet these daily and hourly peak demands.

A comprehensive water demand management plan goes beyond implementing the Water Efficiency Plan. A water demand management plan could include landscape requirements, outdoor irrigation standards, water losses in operations, non-potable water irrigation, water scarcity response planning, water budgeting rate structures, irrigation-only water tap fees and rates and water waste rules.

POTENTIAL FUTURE POLICIES AND INITIATIVES

Landscape Requirements: Fountain currently has landscaping requirements embedded in codes and regulations for various types of land development. To create sustainable, attractive and functional landscapes that support the water needs of future customers, but are affordable and implementable in existing mature neighborhoods, a more structured and codified set of landscape requirements should be considered. The Water Resource Planning and Land Use Planning Section identifies and reviews potential strategies for incorporating landscape requirements into demand management for new construction and addresses all uses. While the possible change to the requirements would apply to new development, an incentive program would have to be considered for existing homes and businesses to transition to less water consumptive landscapes.

Outdoor Irrigation Standards: The City Council passes a Resolution annually to encourage observation of voluntary outdoor irrigation standards. Recent studies have indicated that voluntary outdoor irrigation standards have little or no effect on limiting water demand or peaking. In 2019, the City of Colorado Springs adopted a mandatory three days per week Water Restrictions Ordinance that included enforcement provisions. Consideration of adoption of mandatory and continuing water restrictions is one tool that may be effective in limiting demand in high use periods (hot days in the summer) and lowering the water demand peaking.

Mandatory irrigation limitation may only be appropriate for water scarcity response, rather than as a regular business standard.

> Potential Policy Consideration: Evaluate outdoor irrigation restrictions.

Non-Potable Water Irrigation: With few exceptions, lawn and park irrigation in Fountain uses potable, treated water. Both for existing developments and for developments being planned, investigation into the potential for non-potable water use for outdoor irrigation may be considered. If the geology is possible for well(s) to be drilled and raw groundwater used for exterior irrigation, the City may offer a contract for augmentation of well depletions for the development.

> Potential Policy Consideration: Expand the use of non-potable water for outdoor irrigation.

Water Scarcity Response Planning: The City has an administrative peak day water supply plan that was developed in 2013 to address situations when peak demand approaches or exceeds the water system's ability to meet these demands. Water scarcity can be the result of factors other than a drought condition. Water scarcity could be caused by an extended supply shortage, such as a curtailment in supply from the Fryingpan-Arkansas trans-mountain water, an extended service outage for the Fountain Valley Authority or the SDS water system, or a contamination such as the PFAS groundwater contamination. A water scarcity response plan would define trigger points at which defined actions would be taken to address various water scarcity events.

> Potential Policy Considerations: Replace the peak day supply plan with a water scarcity response plan.

Water Budgeting: Water budgeting is defining an estimated maximum amount of water that a property needs when water is managed efficiently. Water budgets may be for exterior water use or for both interior and exterior water use combined. For this program the customer and the City start by setting a maximum monthly water demand for the specific property. The customer has a lower rate for their use below the prescribed water budget and a higher rate for exceeding the prescribed water budget. This method incentivizes the customer to be proactive in managing their water use. Initially, water budgeting could be offered to commercial, industrial and institutional customers under single ownership, and those customers in this category who have irrigation-only meters. If successful, consideration to expanding the program to include residential customers may be appropriate.

Potential policy considerations: Development of a water budget pilot program.

Irrigation-Only Water Taps: For existing properties and proposed developments where the groundwater and soils are incompatible with development of raw water irrigation of large areas, an irrigation only tap, with an irrigation only tap fee and rates would enable the customer to better manage their irrigation use and enable the City to equitably charge for high demand services.

Potential policy considerations: Evaluate a separate tap fee schedule and a separate water rate for exterior irrigation only services.

Water Waste Rules/Program: Water waste is found in many forms including domestic water runoff, pooling water, broken plumbing systems or unattended indoor or outdoor water use. The Utilities Department regularly receives requests to adjust water bills due to plumbing fixture failures or service breaks that lead to excessively high amounts of wasted water.
Some utilities have the capability to identify and monitor high water use (or possibly waste) and can immediately address high water use situations.
The City currently only has the capability to perform meter reads once per month for billing. Many utilities have metering networks that can perform more frequent and recurring readings that log usage data to spans of minutes. Data acquisition with that frequency of metering intervals affords the water provider with significant system planning and monitoring tool, allows more precise system analysis, and enables real-time detection of potential leaks or waste.

Potential policy considerations: Development of a program and possibly regulations to combat water waste.

FINAL

WATER MASTER PLAN – DISTRIBUTION SYSTEM DEMAND PROJECTIONS

VERSION 5.0

B&V PROJECT NO. 409523

PREPARED FOR

City of Fountain

7 FEBRUARY 2022

BLACK & VEATCH

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1.0 INTRODUCTION

The primary objective of the City of Fountain, Colorado (City) 2021 Water Master Plan is to update the 2006 Water Master Plan to incorporate changes to the existing system, identify growth projections and water demands at buildout, and develop recommended improvements. This Section is intended to summarize information on the City's historical water use and projected future water demands based on land use patterns within the City Water Service Area.

2.0 HISTORICAL WATER USE

The population of the City was 29,784 according to the 2019 Census estimate. 2020 Census data was not available at the time of the evaluation. A portion of the City limits and the associated population is outside of the City's Water Service Area and is served by the Widefield Water & Sanitation District.

The City's water system currently includes 8,624 customer meters. Monthly customer billing data was evaluated for 2020. Additional total system monthly billed water use was also available for 2016 through 2019. A summary of the total monthly customer demand is shown in Figure 2-1. Monthly billed water use typically peaks in July or August, due to irrigation demands during the hottest part of the summer. The data also indicates that use in 2020 was slightly higher than the previous years evaluated, likely due to a combination of a relatively hot and dry summer and people at home more due to the pandemic. The demand data for 2020 was therefore conservatively used to develop unit demands for future customer growth.

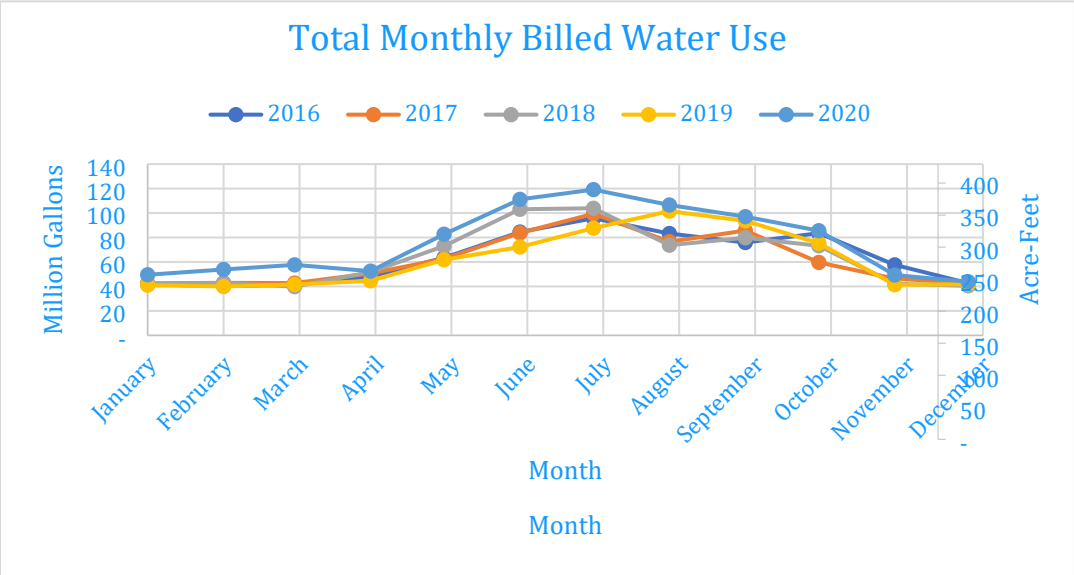

Figure 2-1: Total Monthly Billed Water Use 2016 – 2020

Daily water supply data was also evaluated for 2020. Additional total system monthly supply data was also available for 2017-2019. A summary of the total monthly water supplied to the system is shown in Figure 2-2. The total supply typically trends with the total demand. A comparison of 2020 data indicated that currently the supply is about 17 percent higher than the metered demand. This non-revenue water (NRW) is attributed to hydrant flushing, water main leakage, and aging customer meters.

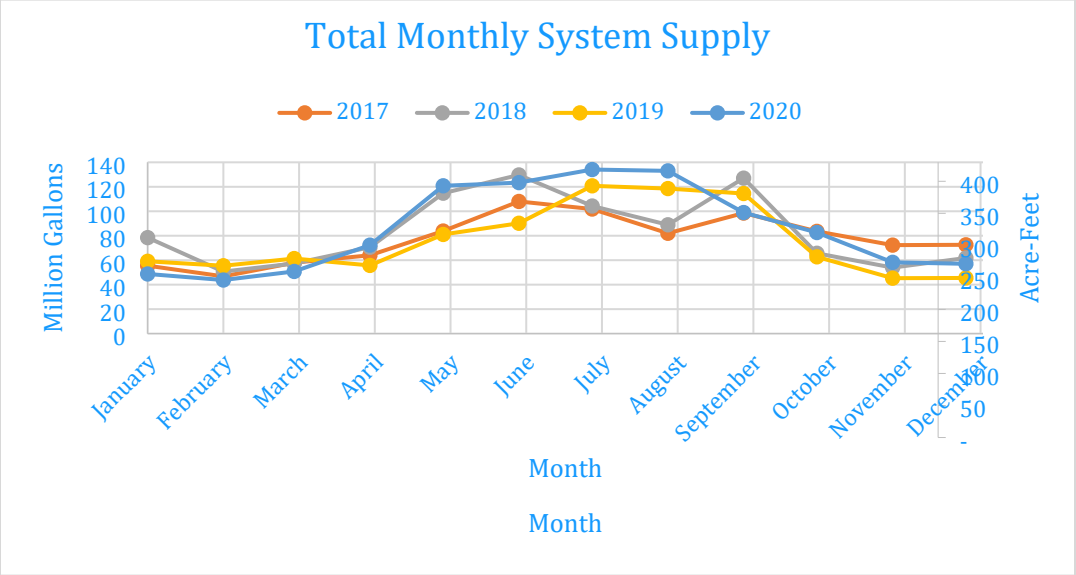

Figure 2-2: Total Monthly System Supply

The annual customer billed water use and total number of customers from 2009 to 2020 is shown in Figure 2-3. The annual billed water use was significantly higher in 2010, 2011, and 2012 due to a prolonged drought in those consecutive years. The total billed water use remained fairly constant between 2013 and 2019, while at the same time the number of customers continued to increase. This is attributed to the success of the City's ongoing water conservation efforts. As noted above, the 2020 demand was higher than previous years, likely due to a combination of a relatively hot and dry summer and people at home more due to the pandemic.

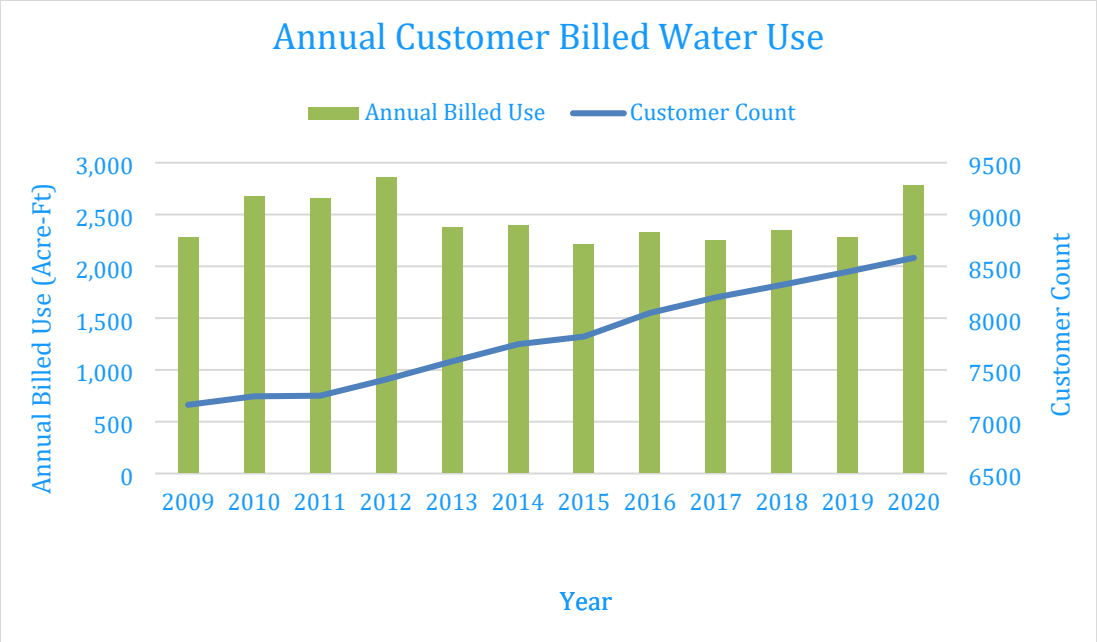

Figure 2-3 Annual Customer Demand (2009-2020)

2.1 AVERAGE DAY DEMANDS

Average day demand (ADD) is the total water demand divided by the number of days in the year. The ADD was determined from the total annual system supply data to accurately account for NRW. ADD is summarized in Table 2-1. While the ADD fluctuates from year to year the 2020 ADD will be conservatively used for evaluation purposes. The current ADD is considerably lower than the 115 gpcd used in the 2006 Water Master Plan, showing that the City has been effective in implementing conservation.

Table 2-1: Summary of Average Day Demand 2017-2020

YEAR	ADD (MILLION GALLONS PER DAY (MGD))	ADD (AC-FT/DAY)	POPULATION[1]	ADD (GALLONS PER CAPITA PER DAY)
2017	2.54	7.80	28,700	88.5
2018	2.75	8.44	29,339	93.73
2019	2.49	7.64	29,784	83.6
2020	2.80	8.59	Not Available	-

[1] Source: Census American Community Survey (ACS) 5-year Estimates

2.2 MAXIMUM DAY DEMANDS

Daily supply data for 2020 was used to determine maximum day demand (MDD). This data includes water delivered from the Fountain Valley Authority (FVA) Pipeline and water pumped from City-owned wells. Supply data was used rather than billed water use to include NRW. As shown in Figure 2-4, the MDD was 5.32 MGD on July 2nd, 2020. This represents a MDD:ADD peaking factor of 1.9. For comparison, this value was compared to MDD:ADD peaking factors of 1.99 and 2.18 used by Pueblo Water and Colorado Springs Utilities, respectively. The 1.9 MDD:ADD peaking factor is appropriate to use on a system-wide basis for the City, however, for individual developments the City may want to use a factor of 2.5 to provide an additional level of conservatism in pipe sizing for smaller areas.

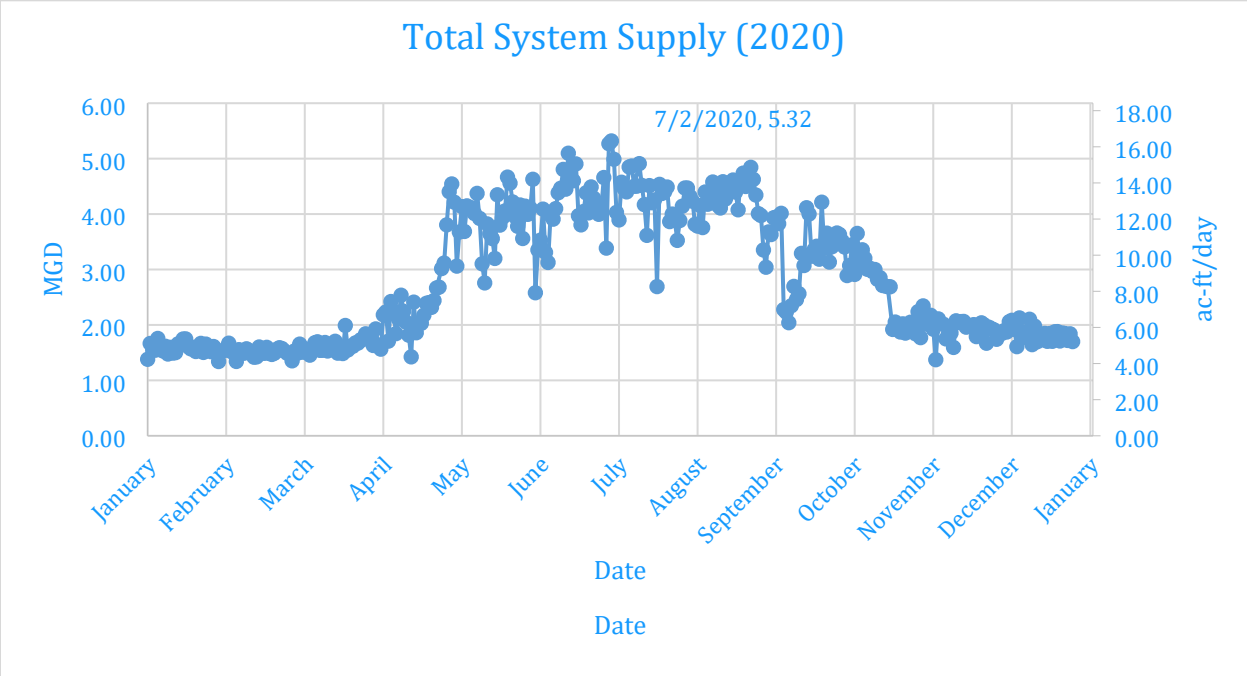

Figure 2-4: Total System Supply (2020)

2.3 DIURNAL CURVE

The City provided SCADA data for the week of July 13, 2020 and July 13th was selected for model calibration. SCADA data of tank levels and water supply from July 13th, 2020 was evaluated to create an hourly system diurnal curve for model calibration. Hourly system-wide demands were calculated by summing the amount of water entering the distribution system with the amount of water added to or subtracted from storage reservoirs during the hour. The System-Wide Diurnal Curve is shown in Figure 2-5. The early morning and evening peaks are indicative of residential irrigation water use. Based on the System-Wide Diurnal Curve, the peak hour demand (PHD):MDD peaking factor is 1.57.

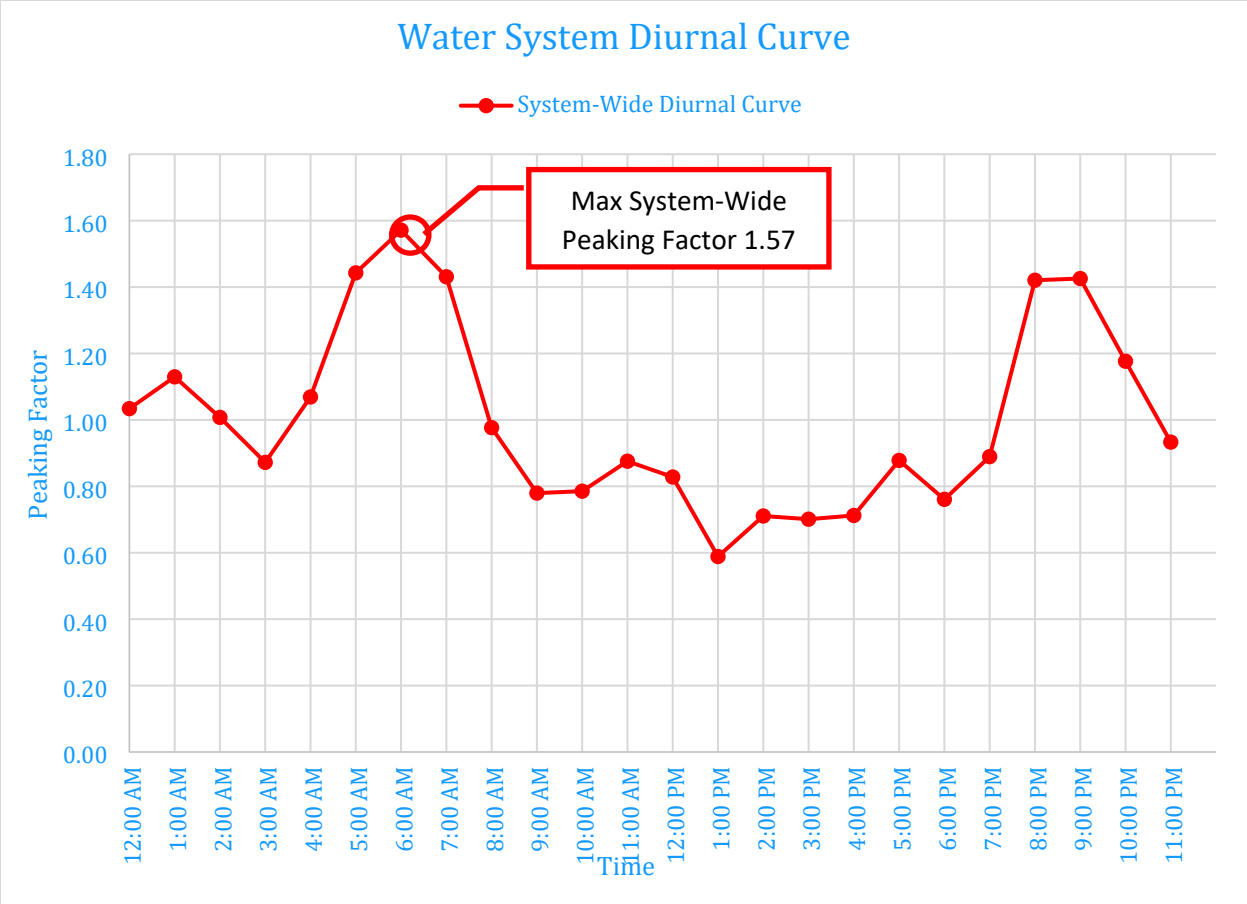

Figure 2-5: Water System Diurnal Curve

2.4 CUSTOMER-SPECIFIC DEMAND VALUES

The City's future water demand evaluation will be based on land use and anticipated development at buildout rather than projected population growth. Therefore, to develop demands for future customers, existing customer billed water use data was compared with the zoning and acreage of the underlying parcel where the existing customer meter is located. For residential and Planned Unit Development (PUD), the ADD was calculated on a per single family home (SFH) basis. For institutional, commercial, and industrial, ADD was calculated on a per acre basis. The average billed water uses by land use include 17 percent for NRW. The City has committed to reducing NRW by addressing meter inaccuracy and water leakage, so the future demands are based on a NRW of 11 percent. The City plans to expand their use of non-potable water for irrigation; however, since the locations of non-potable water use have not been determined, it was assumed, for the water master plan, that all water demands would be met by potable sources. The ADD by land use type for future demands is summarized in Table 2-2 and Table 2-3. The calculations for demand are shown in Appendix A.

Table 2-2: Customer Average Annual Demands by Zoning (Average GPD per SFH)

ZONING	NUMBER OF CUSTOMERS	AVERAGE GPD	AVERAGE GPD PER SFH	11% NRW	DESIGN VALUE, GPD PER SFH	TOTAL USE, AC-FT/YR PER SFH
PUD	5,732	1,509,000	263	292	300	0.34
Residential	2,639	567,800	215	239	250	0.28

gpd – gallons per day
ac-ft/yr – acre-feet per year

Table 2-3 Customer Average Annual Demands by Zoning (Average GPD per Acre)

ZONING	ACRES PER ZONING	AVERAGE GPD	AVERAGE GPD PER ACRE	11% NRW	DESIGN VALUE, GPD/ACRE	TOTAL ANNUAL USE, AC-FT/YR PER ACRE
Commercial and Institutional	171	102,500	600	667	670	0.75
Industrial	371	37,200	100	111	115	0.13

2.5 SUMMARY OF EXISTING SYSTEM DEMANDS

The existing system ADD, MDD, and PHD and Peaking Factors are summarized in Table 2-4. These values will be used for the existing water distribution system evaluation (Scenario 1). These peaking factors will also be used for future demand scenarios and evaluations.

Table 2-4: Summary of Existing System Demand Parameters and Peaking Factors

PARAMETER	VALUE
ADD (MGD)	2.80
ADD (ac-ft/day)	8.59
MDD (MGD)	5.32
MDD (ac-ft/day)	16.33
MDD:ADD Peaking Factor	1.90
MDD:PHD Peaking Factor	1.57
Total Annual Supply Required (ac-ft/yr)	**3,137**

3.0 FUTURE LAND USE AND DEMANDS

This Water Master Plan will evaluate both existing and future scenarios. Scenario 1 includes the existing system evaluation with the demands established previously. The City's future water demand evaluation will be based on build out of the City Water Service Area land use and anticipated development rather than projected population growth. There is significant interest in long-term development that will require water services that must be factored into the City's Water Master Plan. Future water demand will increase due to planned developments, infill, and urban renewal and redevelopment. Two future demand scenarios will be evaluated. Scenario 2 will include all planned developments except for Kane Ranch, as well as all identified infill and urban renewal areas (URAs). Scenario 3 will include all planned developments (including Kane Ranch) as well as all identified infill and URAs.

3.1 PLANNED DEVELOPMENTS

The City has identified several future developments within the City's Water Service Area. A summary of the ADD determined for the planned development areas is shown in Table 3-1.

Water demands for these planned developments was determined based on the following assumptions and methodology:

- The Planned Demand data presented in Table 3-1 is based on developments identified by the City that are anticipated to be constructed and require water service during the planning horizon which is approximately the year 2050.
- The gross acreage of each development was reduced by 20% to account for roadways, drainage easements, and other non-development uses.
- For residential and PUD developments, the remaining 80% of the gross acreage was multiplied by 9 SFH per acre and the number of SFH was multiplied by the usage per customer identified previously (250 gpd for residential and 300 gpd for PUD) to determine the future ADD for each development.
- For Industrial and Commercial developments, the remaining 80% of the gross acreage was multiplied by the usage per acre-day identified previously (670 gpad for commercial and 115 gpad for industrial) to determine the future ADD for each development.

Table 3-1: Summary of Planned Development Water Demands

SCENARIO	ADD (GPD)	ADD (AC-FT/DAY)	MDD (GPD)
Total New Demand (Scenario 2)	4,132,600	12.683	7,851,900
Total New Demand (Scenario 3)	6,632,600	20.355	12,601,900

3.2 INFILL AND URBAN RENEWAL AREA

In addition to the large, planned developments identified by the City, there are several parcels within the City's Water Service Area that are anticipated for infill development within the buildout planning period of the masterplan. These parcels do not currently have water service connections but will

require water service once developed. A summary of the estimated ADD for infill parcels is shown in Table 3-2.

Infill parcels were identified through geographic information system (GIS) tools based on the following methodology:

- Parcels within the City's Water Service Area were compared with customer meter points to identify parcels without an existing water service connection.
- Parcels that were part of a planned development identified by the City were removed to avoid double-counting.
- The remaining parcels were then filtered to remove undevelopable areas within the 100-year floodplains of Fountain Creek and Jimmy Camp Creek.
- The remaining parcels were then manually filtered to remove parcels that are undevelopable due to their shape (very long, thin parcels for drainage ditches, etc.)
- The remaining parcels were then manually filtered to remove parcels identified by the City as having a conservation easement.

The ADD for the identified infill parcels was determined based on the current zoning of the parcel using the same method outlined in Section 3-1 for the planned developments. Very small lots (such as townhome lots) were assumed to be 1 unit, even if they were less than 1/9th of an acre.

Table 3-2: Summary of Infill Parcel Water Demands

ZONING TYPE	TOTAL UNITS/ACRES		ADD (GPD)	ADD (AC-FT/DAY)
Residential	2,463	Units	615,750	1.89
PUD	569	Units	170,700	0.52
Commercial and Institutional	68.7	Acres	46,050	0.14
Industrial	46.1	Acres	5,300	0.02
Total			**837,800**	**2.57**

The City also has four URAs to encourage redevelopment. The URAs are shown in Figure 3-1. The South Academy highlands URA is north of the City's Water Service Area and will be served by the Widefield Water & Sanitation District. The Charter Oak URA is also outside of the City's Water Service Area, but the southern portion of this URA (shown in inset 2 of Figure 3-1) may be served by a City-owned well near Pikes Peak International Raceway that is not connected to the existing water distribution system. Therefore, these URAs will not be included in the distribution system planning portion of the Water Master Plan.

A portion of the Bandley URA is accounted for in a planned development identified previously. City Staff also indicated that the existing water customer within this URA leases approximately 60% of the existing

building space. Therefore, approximately 40% of the area of the existing parcel was used to determine a future water demand for the full utilization of that parcel.

The US 85 URA is partially outside of the City's Water Service Area where it extends north of Mesa Ridge Parkway. South of Mesa Ridge Parkway, the URA contains several of the planned developments previously identified by the City. Projected water demand for those developments is accounted for in Table 3-1. The US 85 URA also contains two planned redevelopment areas, the "Gateway" redevelopment and the "Olde Town" redevelopment. The Gateway redevelopment is located near the Interstate 25 interchange with Santa Fe Ave. Future water demands for the Gateway redevelopment area are accounted for in the City identified development, infill parcels, and existing customer demands. Therefore, no additional demand was added for this redevelopment. Fire flow requirements may be increased in this area due to the density of development and will be evaluated with the fire flow analysis.

The Olde Town Redevelopment is generally located along Santa Fe Ave between Fountain Creek and Comanche Village Drive, as well as along Ohio Avenue between Santa Fe Avenue and Fountain Mesa Road. Most of the future demand anticipated from this redevelopment is captured in the infill parcel demand for vacant lots in this area. However, an existing City lot was recently abandoned and will likely be sold for redevelopment within the planning period. Redevelopment was assumed to be residential, and an associated future water demand was added. Fire flow capacity is also a concern in this area and will be evaluated as part of the fire flow analysis.

Table 3-3: Summary of Additional URA Water Demands

PARCEL	ZONING TYPE	DEVELOPABLE AREA (ACRES)	UNITS	ADD (GPD)
Bandley Full Utilization	Industrial	19.4	-	2,228
City Owned Parcel	Residential	7.68	69	17,250
Total (GPD)				**19,478**
Total (ac-ft/day)				**0.060**

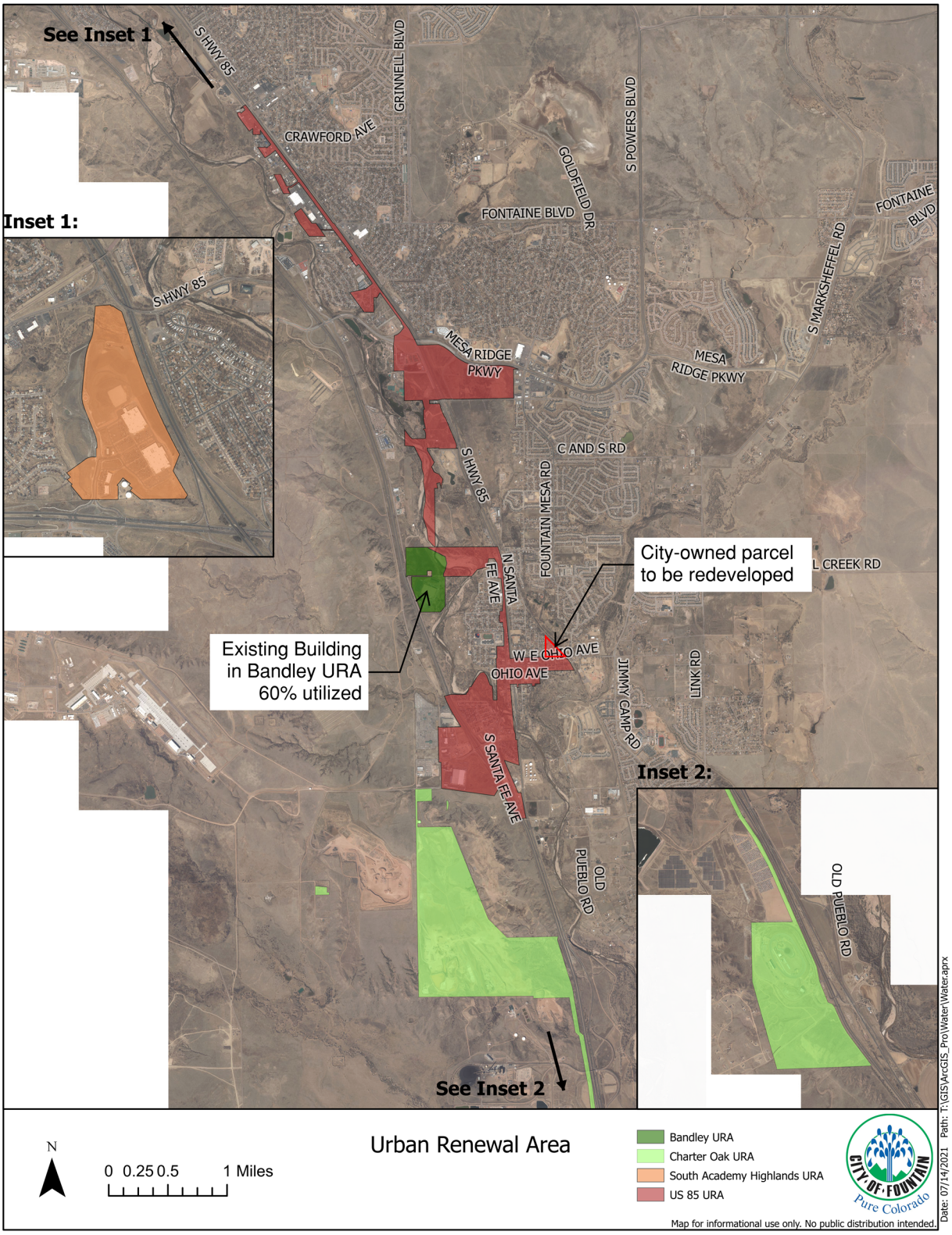

Figure 3-1 Urban Renewal Areas

3.3 SUMMARY OF EXISTING AND FUTURE DEMANDS

Future ADD was determined by adding the demands identified previously to the existing system demands. The future ADD was multiplied by the existing system peaking factors to determine MDD and PHD.

A summary of the existing demands for Scenario 1 and the future demands for Scenario 2 and Scenario 3 are shown in Table 3-5 and Table 3-6. Scenario 2 excludes the Kane Ranch Development identified by the City, while Scenario 3 includes the Kane Ranch Development and associated water demands.

Table 3-4: Total Existing System Demands (Scenario 1)

PARAMETER	DEMAND (MGD)
ADD (MGD)	2.80
MDD (MGD) (1.9 MDD:ADD)	5.32
Total Annual Demand (ac-ft)	**3,137**

Table 3-5: Total Water System Demands (Scenario 2)

PARAMETER	EXISTING DEMAND (MGD)	PLANNED DEVELOPMENT (MGD)	INFILL PARCELS (MGD)	URAS (MGD)	TOTAL DEMAND (MGD)
ADD	2.80	4.13	0.84	0.02	7.79
MDD (1.9 MDD:ADD)	5.32	7.85	1.58	0.03	14.80
Total Annual Demand (ac-ft)	**3,137**	**4,626**	**938**	**22**	**8,726**

Table 3-6: Total Water System Demands (Scenario 3)

PARAMETER	EXISTING DEMAND (MGD)	PLANNED DEVELOPMENT (MGD)	INFILL PARCELS (MGD)	URAS (MGD)	TOTAL DEMAND (MGD)
ADD	2.80	6.63	0.84	0.02	10.29
MDD (1.9 MDD:ADD)	5.32	12.60	1.58	0.04	19.55
Total Annual Demand (ac-ft)	**3,137**	**7,430**	**938**	**22**	**11,527**

For the purposes of distribution system modeling, the new demands identified for each development or infill parcel will be applied to the system in the location of that development or parcel.

3.4 DEMAND DISTRIBUTION BY PRESSURE ZONE

To evaluate the location of water supply and storage, an understanding of the demands by pressure zone is also needed. The allocation of the demand by pressure zone is summarized in Table 3-7 for both ADD and MDD.

Table 3-7 Summary of Demands by Pressure Zone

PRESSURE ZONE	SCENARIO 1	SCENARIO 2	SCENARIO 3
ADD (mgd)			
Low	0.9	2.1	2.1
High	1.4	3.9	4.5
Booster	0.2	0.2	0.2
Little Ranches	0.3	1.6	3.5
ADD Total	**2.8**	**7.8**	**10.3**
MDD (mgd)			
Low	1.7	4.0	4.0
High	2.7	7.5	8.5
Booster	0.3	0.3	0.3
Little Ranches	0.6	3.0	6.8
MDD Total	**5.3**	**14.8**	**19.6**

Note: Although some of Kane Ranch will be served at the Low Zone HGL, all demand will have to go through the Little Ranches Zone and this demand is included in the Little Ranches Zone.

APPENDIX A: CUSTOMER DEMAND CALCULATIONS

Zoning Labels	Count of Zoning_201	Sum of Average GPD	Sum of BV_ACRES
CMU	77.00	25303.00	41.59
LLR	57.00	18858.00	483.02
MF	70.00	21671.61	8.24
MHP	2.00	35638.64	17.45
MHS	181.00	25201.45	26.58
MU	69.00	18608.55	31.16
NC	1.00	46.69	2.64
PI	33.00	178027.36	1025.22
POS	26.00	304889.60	664.81
PUD	5732.00	1508981.39	1644.64
R1	1582.00	311999.62	384.96
RA	285.00	65221.30	305.53
RC	30.00	44456.84	54.99
RMU	462.00	89250.47	117.24
SO	7.00	13811.28	15.79
VC	2.00	320.02	24.59
Grand Total	**8,616**	**2,662,285.83**	**4,848.44**

Code	Description	Category to Use
CMU	Central Mixed Use	Commercial
MU	Mixed Use	Commercial
NC	Neighborhood Commercial	Commercial
RC	Regional Commercial District	Commercial
SO	Small Office	Commercial
VC	Village Center	Commercial
PI	Planned Industrial	Industrial
POS	Parks and Open Space	N/A (No water use)
PUD	Planned Unit Development	PUD
LLR	Large Lot Residential	Residential
MF	Multi-Family	Residential
MHP	Manufactured Housing Park	Residential
MHS	Manufactured Housing Subdivision	Residential
R1	Single-Family Residential	Residential
RA	Residential Agricultural	Residential
RMU	Residential Mixed Use	Residential

Category	# of Customers	Average GPD*	Average GPD per Customer	11% Non-revenue Water	Design Value (GPD/SFH)	Design Value (AF/yr/SFH)
Residential	2621	564397.2	215.34	239.02	250	0.28
PUD	5725	1499345.7	261.89	290.70	300	0.34
Category	**Acres per Category**	**Average GPD***	**Average GPAD**	**11% Non-revenue Water**	**Design Value (GPD/acre)**	**Design Value (AF/yr/acre)**
Commercial	170.75	98753.4	578.33	641.95	670	0.75
Industrial	1025.22	42371.0	41.33	45.88	--	
Industrial Adjusted**	420.22	42371.0	100.83	111.92	115	0.13

*Average GPD only taken over months with billed usage and therefore does not total to the ADD.

**Industrial Adjusted excludes large lot (605 ac) with no water use.

CITY OF FOUNTAIN WATER MASTER PLAN 2021
WATER SUPPLY

WATER SUPPLY

The City of Fountain contracted with W. W. Wheeler & Associates for Water Resource Engineering services for the Water Supply Section of the Water Master Plan. The City also contracted with Alperstein & Covell for Water Legal services to prepare the Technical Memorandum addressing Water Supply Projections. Their joint Technical Memorandum is presented in this Section.

Both firms have been consultants to the City of Fountain for some time, with W. W. Wheeler & Associates providing Water Resources Management (operating water exchanges, water accounting, providing professional analysis of water rights and professional services in Water Court cases) and Alperstein & Covell representing the City in Water Court, both when the City is an Applicant for a Water Right and when the City opposes other Water Rights cases.

The Technical Memorandum notes that the City of Fountain has sufficient raw water supplies to meet existing demands as well as future growth of nearly double its current size, even in dry years and considering anticipated reductions in trans-mountain deliveries of Colorado River Basin water. The City of Fountain faces limitations (not discussed in this Section) to delivering treated water in volumes necessary to supply potential growth in Water Demand.

MEMORANDUM

September 21, 2021

To: Michael R. Fink, P.E., Water Resources Manager
City of Fountain

From: Matt Loose
W. W. Wheeler & Associates, Inc.

Andrea Benson and Cynthia F. Covell
Alperstein & Covell P.C.

No: 0603.00.01 – City of Fountain

Re: Water Supply and Policy Topics Tasks for 2021 Water Master Plan

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This memorandum was prepared for the City of Fountain (City) to support development of the City's 2021 Water Master Plan (Master Plan). Specifically, this memorandum provides the information, analyses, and conclusions from completion of our assigned tasks within the Water Supply and Policy Topics elements of the Master Plan.

We have attached four figures to this memorandum, which show the structures and facilities that are discussed below. Figure No. 1 includes the locations of the City's existing wells, Figure No. 2 includes the locations of the Fountain Mutual Ditch facilities, Figure No. 3 includes the locations of Fountain Creek surface structures below the Fountain Mutual Ditch, and Figure No. 4 includes the location of Pueblo Reservoir.

1.0 Water Supply

1.1 Existing Water Supply Sources. [Task 1]

1.1.1 Wells

Fountain supplies water to its customers from wells, which, together with pipeline deliveries from Pueblo Reservoir, are the source of its water supply. Some, but not all, of the wells have been decreed. Detailed information of each of the wells is included on the attached **Table 1.** Fountain does not use all of the wells at this time; it maintains all of its wells and well locations to provide it with flexibility in order to bring wells online expeditiously when needed. The wells are located as shown on the map attached as **Figure 1**. The wells deplete Fountain Creek and Jimmy Camp Creek, in El Paso County, Colorado. Water

withdrawn from the wells is not reusable; in most cases, water from the wells may be used in the City's distribution system, and the return flows must go back to Fountain Creek from wastewater plants or irrigation return flows.

The portion of the well water that does not return to the creek must be replaced to the creek by an augmentation plan. Fountain has three augmentation plans decreed in Case Nos. W-4396 and W-4559 (consolidated) ("Augmentation Plan I"), Case Nos. 85CW110 and 91CW21 (collectively Augmentation Plan II), and Case No. 01CW146 (Augmentation Plan III), each of which provides augmentation for the specific wells identified in the plan. By an augmentation plan decreed in Case No. 07CW68, Fountain augments depletions from the Venetucci Wells, which Fountain may use by contract as described below.

Fountain also provides augmentation by agreement to some wells that are owned and operated by other users. The School Well and the Aragon Well are owned and operated by Fountain-Fort Carson School District No. 8, and are included in Augmentation Plan II and Augmentation Plan III, respectively. Fountain also augments depletions from the Cumberland Green Well, which is owned and operated by Cumberland Green Metropolitan District, pursuant to an augmentation plan decreed in Case No. 07CW123. The water from these wells is not used in Fountain's water distribution system.

Limitations on the use of the wells are included in the augmentation plans, and discussed generally in Section 1.3. The sources of augmentation supply for these wells include changed surface water supplies, Fryingpan-Arkansas Project water, and Exchanges described below.

1.1.2 Surface Water Supplies

Fountain owns numerous senior water rights decreed for diversion from Little Fountain Creek, Fountain Creek and the Arkansas River, in El Paso, Pueblo and Custer Counties. The surface water rights are described in detail in the attached **Table 2.** All but one of Fountain's surface water supplies were originally decreed for irrigation purposes. The Town

of Fountain Ditch and Pipeline was originally decreed by Fountain for domestic uses, but was changed to augmentation uses in Augmentation Plan I. Fountain or its predecessor has changed the use of all but two of the senior irrigation rights to municipal and augmentation purposes via Water Court change cases. One-half of Fountain's interest in the Laughlin Ditch Priority 17 water right is subject to a pending change application and Fountain's interests in the other half of the Laughlin Ditch and in the Treadwell and Lamb Ditch (Priority 4) are currently being used only for irrigation purposes. The changed surface water supplies are primarily used for augmentation purposes in the augmentation plans described above, but may also be used for municipal purposes either by direct use or after storage. The consumptive use component of the changed irrigation rights may be stored, and some but not all are decreed for initial use and reuse to extinction.

1.1.3 Storage and Contract Water Supplies

- Fountain currently owns one water storage right decreed to the Keeton Lake Reservoir in the amount of 19.85 acre-feet located on Little Fountain Creek. It is our understanding that Fountain does not currently operate this structure for municipal storage purposes.
- Fountain owns land on which it can construct and develop a reservoir, commonly referred to as the Fountain Creek Reservoir, in which certain of Fountain's changed irrigation rights are decreed for storage at that location. The Fountain Creek Reservoir will be an excavated gravel pit, and it is our understanding that it will be capable of storing approximately 6,000 acre-feet. There is no decreed storage right for the Fountain Creek Reservoir.
- Fountain has a contractual right to annual deliveries of Fryingpan-Arkansas Project water ("Project water"). The Fryingpan-Arkansas Project is a federal transmountain water diversion and delivery project which delivers to Pueblo Reservoir surplus water from the Fryingpan River and tributaries on Colorado's western slope, as well as available supplies from the Arkansas River basin. The Project water rights, storage, allocation, and distribution are managed by the Southeastern Colorado Water Conservancy District ("Southeastern"). Fountain is party to a contract by which it purchased 2,000 acre-feet of

Project Water from Southeastern through the auspices of the Fountain Valley Authority, a water authority of which Fountain is a member. The water is conveyed to Fountain from Pueblo Reservoir through the Fountain Valley Conduit. Fountain can also take delivery of non-Project water through the conduit when capacity is available. Fountain is entitled to delivery of up to 2,000 acre-feet of Project water annually via the Fountain Valley Conduit, and use of up to 7,761 acre-feet of reservoir storage capacity in Pueblo Reservoir (for storage of Project water) that is needed to implement Fountain's annual delivery entitlement through the Fountain Valley Conduit.

- Fountain is party to a contract with the United States for the use of excess storage capacity in Pueblo Reservoir ("Long Term Excess Capacity Contract" or "LTEC") which allows storage of up to 2,500 acre-feet of Project water return flows and certain fully-consumable non-Project water in Pueblo Reservoir.
- Fountain is party to a subcontract with Southeastern which allows it to store currently 250 acre-feet of non-Project water in a storage account within Southeastern's Master Contract with the United States for storage of water in Pueblo Reservoir. Fountain can increase this storage amount up to 1,000 acre-feet in the future.
- Fountain is a participant in the Southern Delivery System project which includes Fountain's LTEC contract, and a subcontract with Colorado Springs for conveyance of water stored in Fountain's LTEC contract storage capacity to Fountain via the Southern Delivery System pipeline. By agreement with Colorado Springs, approved by the Bureau of Reclamation, Fountain and Colorado Springs may swap their conveyance capacities in the Fountain Valley Conduit and the Southern Delivery Pipeline so that Fountain can take delivery of water from its LTEC contract account in Pueblo Reservoir through the more-convenient Fountain Valley Conduit.
- Fountain is party to a Sublease Agreement with Security Water District and Widefield Water and Sanitation District whereby Fountain may divert up to 132.8 acre-feet of water annually from one or more wells in the Widefield Aquifer, the Venetucci Wells, as well as from certain wells belonging to Security. Fountain may divert more water from these wells on a temporary basis. The water is not reusable. Like Fountain's other wells, depletions from the Venetucci Wells must be augmented. They are augmented by an augmentation plan decreed in Case No. 07CW68. The Venetucci Wells are shown on **Figure 1**.

- Fountain is party to a lease agreement with Lower Arkansas Valley Super Ditch Company ("Super Ditch"), whereby it currently leases 500 acre-feet per year from irrigators in the Lower Arkansas Valley, and may increase this amount up to a total of 3800 acre-feet. This water is delivered to Pueblo Reservoir, and is transported through the Fountain Valley Conduit to Fountain. Limitations on this supply are described in the agreement and the applicable water court decree in Case No. 10CW4. Decree limitations will likely limit the amount Fountain can lease to 1720 – 2330 acre-feet per year. This water is reusable.

A detailed description of the Contracts and Storage Rights is included in the attached **Tables 3 and 4.**

1.1.4. Exchanges

1.1.4.1 Exchanges to Wells and Fountain Creek Reservoir. An exchange is a statutory mechanism to offset well depletions by replacing the depletions with water supplies that are available downstream of the point of depletion. Some of Fountain's wells deplete Fountain Creek at a location upstream of the location of some or all of Fountain's augmentation supplies, and one augmentation supply, Dr. Rogers Ditch, is located downstream of all of Fountain's wells. In order to use downstream augmentation supplies, Fountain is required to operate decreed exchanges of its water rights to the upstream location of the well depletions. Fountain may also exchange to its wells and to storage in the planned Fountain Creek Reservoir certain reusable return flows and excess augmentation credits that accrue to Fountain Creek. These decreed exchanges are operated within the priority system.

1.1.4.2. Exchanges to Pueblo Reservoir. Similarly, Fountain can store certain augmentation credits and reusable return flows that accrue to Fountain Creek but are not needed when they accrue by exchanging those credits and return flows to storage in Pueblo Reservoir. Fountain has decreed rights of exchange which allow Fountain to operate exchanges to Pueblo Reservoir within the priority system.

1.1.4.3. Exchanges from Initial Storage to Pueblo Reservoir. As further described in Section 1.6.2 below, Fountain's opportunities to operate exchanges to Pueblo Reservoir are limited by the junior priorities of Fountain's exchange rights and Fountain's participation in

the 2004 Regional Intergovernmental Agreement (Regional IGA). Fountain's ability to operate such exchanges can be enhanced by the initial storage of reusable return flows and excess augmentation credits at other locations. Such stored supplies can be subsequently released and exchanged to Pueblo Reservoir when exchange opportunities to Pueblo Reservoir are available.

Development of Fountain Creek Reservoir would provide a facility in the Fountain Creek Basin for initial storage of Fountain's reusable return flows and excess augmentation credits. Fountain has also been participating with other parties to the Regional IGA in the development of Recovery of Yield (ROY) storage facilities in the Arkansas River Basin downstream of Fountain Creek. Such facilities include Holbrook Reservoir and Fossel Reservoir (aka Haynes Creek Reservoir or the ROY Reservoir). Fountain Creek Reservoir would provide a more optimal location than the Arkansas River ROY storage facilities for this purpose, since Fountain Creek Reservoir would be located on Fountain Creek in the general vicinity of Fountain's reusable return flows and augmentation credits. Operations involving Fountain Creek Reservoir would not be subject to (1) transit losses on the Arkansas River below the Fountain Creek confluence and (2) canal losses in delivery systems from the Arkansas River, which would be incurred with the use of ROY storage facilities.

Details of the exchanges decreed to Fountain are included in the attached **Table 5.**

1.2 Existing Water Rights [Task 3] Fountain's water rights are shown on Tables 2 through 5 (Surface Water Supplies) and Table 1 (Wells).

1.3 Yield of Existing Water Rights. [Task 3] The attached Table No. 6 provides the estimated annual yield for each of the City's existing water rights. As indicated in Table No. 6, we have included the estimated annual yield for dry, average and wet years. These values represent the net annual volume of water that is available to the City, after subtracting any obligations to replace historical return flows for changed water rights. In general, the dry year yield of each water right represents that net annual volume estimated to be available during a typical dry year, based on historical conditions. Similarly, the average year yield represents the net annual volume estimated to be available during an average year and the wet year

yield represents that net annual volume estimated to be available during a typical wet year, based on historical conditions.

As described in Section 1.4 below, we have included three scenarios for potential reduction to Fryingpan-Arkansas Project (Fry-Ark Project) water rights due to a Colorado River compact call or cooperative demand management and drought contingency plans developed by the Colorado River compact states. To date, a Colorado River compact call has never been made, so we cannot predict exactly how it would be implemented. However, the transmountain diversion rights for the Fryingpan-Arkansas transmountain diversion project are junior to the 1922 compact. We anticipate that a compact call would have a greater impact on Fryingpan-Arkansas Project water available to the City than the impact of the demand management and drought contingency plans currently in place and being developed by the Colorado River users.

We have also included a 10 percent reduction to the yield of the City's water supply sources to provide an allowance for climate change or other reductions from historical conditions. Finally, our analysis of the City's storage requirements described in Section 2.2 below is based on a sequence of three consecutive dry year yields. In this manner, we have evaluated the yield of the City's existing water rights during a multiple-year drought with consideration of a Colorado River compact call and climate change.

We have separated the City's water rights listed in Table No. 6 into first-use water rights and fully consumable water rights. Deliveries under the first-use water rights are made to the City's system for a one-time use. The City's first-use water rights presently include Fry-Ark Project first-use deliveries and the Stubbs and Miller Ditch water rights. The rest of the City's existing water rights, including return flows attributable to Fry-Ark Project deliveries, are fully consumable rights that may be applied for augmentation of the City's well depletions or delivered to the City for its municipal uses. The return flows generated from such municipal uses are generally available for successive use to extinction.

1.3.1 First-Use Rights. As shown in Table No. 6, the estimated yield of the City's first-use rights varies from 1,366 acre-feet per year during dry years and average years to a maximum

of 2,000 acre-feet per year during a wet year. This difference is due to limitations of the Fry-Ark Project water rights, which cause the average annual yield of the Fry-Ark Project to be roughly two-thirds of the City's 2,000 acre-feet per year conveyance capacity through the Fountain Valley Conduit. The City's conveyance capacity in the Fountain Valley Conduit is based on the City's participation in the Fountain Valley Authority (FVA) in relation to the participation of other participants. The reduction in Fry-Ark Project water rights, therefore, results in an actual yield to Fountain through the Fountain Valley Conduit of about 1,333 acre-feet per year. After five percent transmission and treatment loss, the net delivery of Fry-Ark Project water rights for Fountain's first use is approximately 1,266 acre-feet per year. This average annual delivery of Fry-Ark Project water rights can also be achieved during a dry year because Fountain's Fry-Ark Project storage capacity in Pueblo Reservoir (7,761 acre-feet) can be used to provide carry-over storage of Fry-Ark Project water during years of extended drought. This storage capacity for Fry-Ark Project water rights is an important feature to ensure that the annual deliveries of Fry-Ark Project water for Fountain's municipal use can continue during such critical periods. However, the Fry-Ark Project water rights and storage capacity alone cannot support the maximum annual deliveries of 1,900 acre-feet through the FVA conveyance capacity (2,000 acre-feet per year reduced by five percent) on a sustainable basis. The remaining 634 acre-feet per year (one third of the 1,900 acre-feet per year) delivered from Pueblo Reservoir through the City's FVA capacity are supplied from Fountain's other fully consumable sources stored in Pueblo Reservoir.

1.3.2 Fully Consumable Rights. The estimated yield of the City's existing fully consumable rights varies from 2,932 acre-feet per year during a dry year to 3,549 acre-feet per year during an average year and up to 5,243 acre-feet per year during a wet year. The information confirms that the City's existing water rights portfolio remains generally productive during dry years, with the dry year yield being approximately 83 percent of the average year yield.

The estimated amounts in Table No. 6 do not include the additional yield that is potentially available under the City's Fountain Creek Priority Nos. 4 and 17 water rights. Due to uncertainties involving changes of these water rights to municipal and augmentation use by the City at the present time, we have conservatively excluded these water rights from the

Master Plan evaluations. The water supply yield attributable to these water rights can be incorporated into future water supply planning efforts as the current uncertainties are resolved.

The City entered into a 40-year lease of fully consumable water delivered by Super Ditch This lease agreement extends through year 2057, with the right to renew for an additional 40 years (through year 2097). The annual deliveries under the Super Ditch lease were set to 500 acre-feet per year in Table No. 6, since this this is the amount that is presently delivered to Fountain. In the future, Fountain can elect to increase deliveries pursuant to the schedule in the lease agreement, up to maximum of 3,800 acre-feet per year. Such additional future deliveries are further discussed in Section 2.1 below.

1.4 Yield of Existing Water Supply Sources. [Task 2] The attached Table Nos. 7, 8, and 9 provide the estimated annual yield for the City's existing water supply sources. These tables include both the existing water supplies that are physically available for delivery to Fountain from each source (assuming sufficient production, conveyance and treatment facilities), along with the estimated amount of fully consumable water rights that are required to support such physical deliveries.

1.4.1 Fry-Ark Project Water Rights Curtailment. Table Nos. 7, 8, and 9 are differentiated by the annual volume of deliveries through the Fountain Valley Conduit attributable to Fry-Ark Project water rights. As mentioned in Section 1.3.1 above, the City receives deliveries of up to 1,900 acre-feet per year through its FVA capacity in the Fountain Valley Conduit (after five percent transmission and conveyance loss). The amount of such deliveries that can be provided by Fry-Ark Project water, and the remaining amount that is required to be supplied from Fountain's other water rights, is modified in each table to evaluate curtailment of Fry-Ark Project water rights due to a Colorado River compact call or demand management agreements.

As described in Section 1.3.1, annual deliveries of Fry-Ark Project water have averaged approximately 1,266 acre-feet per year (after five percent transmission and treatment loss), which is approximately two-thirds of the 1,900 acre-feet per year delivered through the City's FVA capacity. Table No. 7 is based on the continued net Fry-Ark Project delivery of 1,266

acre-feet per year through the City's FVA capacity, with the remaining 634 acre-feet per year being supplied from the City's fully consumable rights stored in Pueblo Reservoir.

Table No. 8 is the same as Table No. 7, except that moderate curtailment of Fry-Ark Project water rights is evaluated by reducing the deliveries of Fry-Ark Project water to 950 acre-feet per year (after five percent transmission and treatment loss). This reduced volume is one-half of the 1,900 acre-feet per year delivered through the City's FVA capacity. The remaining 950 acre-feet per year is supplied from the City's fully consumable rights stored in Pueblo Reservoir.

Table No. 9 is the same as Table Nos. 7 and 8, except that severe curtailment of Fry-Ark Project water rights is evaluated by reducing the deliveries of Fry-Ark Project water to 634 acre-feet per year (after five percent transmission and treatment loss). This reduced volume is one-third of the 1,900 acre-feet per year delivered through the FVA capacity. The remaining 1,266 acre-feet per year is supplied from the City's fully consumable rights stored in Pueblo Reservoir.

1.4.2 Fully Consumable Water Rights Requirements. Based on the production of return flows from the City's municipal uses and operational experience, we estimate that approximately 2.0 acre-feet of water deliveries from Fountain's wells (and any future Fountain Creek surface diversions) can be produced from each acre-foot of fully consumable water. We also estimate that approximately 1.5 acre-feet of water deliveries from Pueblo Reservoir can be produced from each acre-foot of fully consumable water. These factors were estimated by the evaluating both (1) the replacement requirements associated with deliveries to Fountain's municipal system, as determined under Fountain's decreed augmentation plans, and (2) the volumes of fully consumable supplies that are delivered to Pueblo Reservoir, conveyed to Fountain's municipal system, and successively used to extinction (by delivery of the return flows attributable to these deliveries back to Pueblo Reservoir and Fountain's municipal system). The greater requirement for fully consumable supplies to support Pueblo Reservoir deliveries is due to evaporation losses at Pueblo Reservoir and losses as water is delivered in Fountain Creek for storage in Pueblo Reservoir by exchange or trade.

1.4.3 Physical Supply. As indicated in Table Nos. 7, 8, and 9, a total of 5,969 acre-feet per year is physically available for delivery to the City (assuming sufficient production, conveyance and treatment facilities). This annual amount of physically available supply is anticipated to be available to the City during dry, average, and wet years. The estimated volume of fully consumable water rights to support such deliveries is approximately 2,825 acre-feet per year with no curtailment of Fry-Ark Project water, 3,036 acre-feet per year with moderate curtailment of Fry-Ark Project water, and 3,246 acre-feet per year with severe curtailment of Fry-Project water.

1.4.4 Yield Based on Fully Consumable Water Rights

As described in Section 1.3 and Table No. 6, the yield of the City's fully consumable water rights varies between dry years, average years, and wet years. In Table Nos. 7, 8, and 9, we have also calculated the water supply yield for Fountain's existing water supplies, as limited by the fully consumable water rights yield during a dry year, average year, and wet year. These calculations assume that Fountain will increase deliveries from Fountain Creek, through increased well production or development of surface diversions and storage, as needed to fully utilize the available fully consumable water rights. The calculated water supply yield volumes were then decreased by 10 percent as a contingency for climate change and other future reductions to the existing portfolio of fully consumable water rights.

1.4.5 Conclusions. The calculated water supply yield of the City's water supply sources is summarized below.

Yield of City's Water Sources
(acre-feet per year)

	Dry Year	Average Year	Wet Year
Physical Availability of Existing Supplies		5,969	
Yield of Fully Consumable Rights			
No Curtailment of Fry-Ark Project Water	5,565	6,676	9,725
Moderate Curtailment of Fry-Ark Project Water	5,186	6,297	9,345
Severe Curtailment of Fry-Ark Project Water	4,807	5,918	8,966

As further described in Section 2.2 below, we have estimated the amount of required storage to achieve the average annual yield of the fully consumable rights on a reliable basis. Assuming that such storage capacity is available, the information presented above indicates that the yield of the City's existing water sources is currently limited to the physically available supplies (5,969 acre-feet per year) with no curtailment and moderate curtailment of the Fry-Ark Project water rights. Even with severe curtailment of Fry-Ark Project water rights, the yield of the City's water sources limited to the existing fully consumable rights (5,918 acre-feet per year) is almost equal to the physically available supplies. These results confirm that the City has a robust portfolio of water rights to support full utilization of the physically available supplies that are presently legally available to the City.

1.5 Primary Initial Use of Water Supply Sources. [Task 4] In general, the City's available water supply sources are delivered from the Arkansas River at Pueblo Reservoir or from Fountain Creek.

At the present time, all of the City's deliveries from Pueblo Reservoir are physically made through the Fountain Valley Conduit, but such deliveries can be made pursuant to both the City's FVA conveyance capacity and the City's Southern Delivery System (SDS) conveyance capacity. Fountain's Southern Delivery System pipeline conveyance capacity is currently made physically available to Fountain within the Fountain Valley Conduit (instead of the SDS pipeline) pursuant to a trade with Colorado Springs Utilities. The Fountain Valley Conduit will be out of service for maintenance and repairs on multiple occasions during the next ten years,

and Fountain will need additional infrastructure to enable it to take deliveries through the SDS Pipeline during the anticipated regular and extended shutdowns of the Fountain Valley Conduit.

The City's existing sources on Fountain Creek presently consist of wells located in the vicinity of Fountain, along with a leased interest in the Venetucci Wells located within the Widefield Aquifer. Fountain is evaluating the future development of Fountain Creek Reservoir along with a surface diversion from Fountain Creek to this reservoir. The Owen and Hall Ditch is presently being considered as the potential location for the surface diversion.

Consistent with the City's historical operations, we recommend that the primary initial use of the City's water sources on the Arkansas River
should be to provide the City's raw water supply deliveries from Pueblo Reservoir through the FVA and SDS conveyance capacities. The existing sources on the Arkansas River include the Fry-Ark Project first-use deliveries, Colorado Canal Company shares, Bell Ditches water rights, and current leased Super Ditch deliveries. Additional water rights that are not specifically identified for storage in Fountain's LTEC or in Pueblo Reservoir under the Southeastern master storage contract may be delivered through the Fountain Valley Conduit with appropriate record keeping and accounting. It may be advisable for the City to seek an "if and when" storage account in Pueblo Reservoir to facilitate management of storage in Pueblo Reservoir.

Similarly, we recommend that the City's water sources on Fountain Creek, which comprise the remainder of Fountain's existing water rights portfolio, be applied first to support the Fountain Creek deliveries. For Fountain Creek deliveries through wells, the Fountain Creek sources can be applied for augmentation of the associated well depletions to Fountain Creek. Assuming the surface diversion and Fountain Creek Reservoir are completed, the Fountain Creek sources can also be applied to provide the City's raw water deliveries from these facilities. To the extent that there are surplus supplies available under the Fountain Creek rights that are not required for the Fountain Creek deliveries, such surplus supplies can continue to be conveyed down Fountain Creek to Pueblo Reservoir (by exchange or trade) to supplement the City's Arkansas River supplies.

1.6 Exchange Rights. [Task 5] Fountain's decreed exchange rights are summarized below, and described in detail in Table 5.

Water right or supply	Exchange from Fountain Creek structures	Exchanges from Arkansas River at or downstream of Fountain Creek Confluence	Exchange to Fountain Wells and Fountain Creek Reservoir	Exchange to Pueblo Reservoir
Chilcott	x		x	x
Colorado Canal		x		x
Dr. Rogers	x		x	x
FMIC	x	x	x	x
Fry Ark Return Flows	x	x	x	x
Miller	x		x	x
ROY Exchange (FMIC and Project Water Return Flows)		x		x
Super Ditch		x		x

1.6.1 Exchanges to Wells and to Storage on Fountain Creek: Water delivered by pipeline from Pueblo Reservoir is reusable. Return flows from this water accrue to Fountain Creek at wastewater plant outfalls and from lawn and park irrigation return flows. The location, amount and timing of these return flows is determined as provided in the decrees based on the amount and use of treated water that is delivered to Fountain's customers. These return flows do not always match well depletions in time or amount, particularly when the wells are not being extensively used. Therefore, these return flows cannot all be exchanged to the wells. Likewise, augmentation credits generated by changed Fountain Creek irrigation rights (Chilcott Ditch shares, Dr. Rogers Ditch, Fountain Mutual Irrigation Company shares and Miller Ditch) do not necessarily accrue to Fountain Creek at the time and in the amount required for exchange to the wells. At this time, Fountain typically has excess augmentation credits and reusable return flows. Fountain's water court decrees allow many of these credits to be stored in the proposed Fountain Creek Reservoir, and later delivered down Fountain Creek and exchanged to Pueblo Reservoir. Conditional exchanges to the wells can be made absolute only if the wells are being extensively used at the times when the return flows and augmentation credits are legally and physically available for exchange.

1.6.2. Exchange to Pueblo Reservoir: In addition to Fountain's decreed exchanges to Pueblo Reservoir, there are many other decreed exchanges to Pueblo Reservoir, most of which are larger and more senior than Fountain's exchanges, thereby limiting Fountain's opportunities to operate its decreed exchanges to Pueblo Reservoir. In addition, Fountain's exchange opportunities are limited by the 2004 Regional Intergovernmental Agreement, in which Fountain and others agreed to forego exchanges in order to make water available to the City of Pueblo Boating Course (a recreational in-channel diversion or RICD). (The Regional IGA provides a mechanism to recover the yield of the foregone exchanges by storing the water downstream on the Arkansas River, and exchanging it up to Pueblo Reservoir at other times.) As can be seen in the above table, Fountain has a number of water rights and supplies that can be exchanged to Pueblo Reservoir. Only a small percentage of these exchanges has been made absolute. To make these exchanges absolute, Fountain must have reusable return flows or excess augmentation credits available for exchange at the confluence of Fountain Creek and the Arkansas River at times when the exchanges can be operated in accordance with their respective decrees and the Regional IGA requirements, and at the same time, Fountain must have storage capacity in Pueblo Reservoir into which the water can be exchanged, and/or the ability to take the water directly into the Fountain Valley Conduit when it is exchanged. Fountain's ability to meet all of these conditions for exchange (and thus make the conditional changes absolute) would be greatly enhanced by construction of Fountain Creek Reservoir. Reusable return flows and excess augmentation credits could be stored in Fountain Creek Reservoir and released when exchange opportunities to Pueblo Reservoir are available. (While the Regional IGA Recovery of Yield program is intended to achieve this goal, the storage sites are fairly distant, resulting in considerable transit loss to store the water.)

1.7 Existing Wells. [Task 6] Fountain's existing and planned wells are identified and described on Table 1. Fountain maintains its existing wells and well locations as a well field, allowing it to withdraw water from different wells at various locations, as needed to meet demand and provide operational flexibility. Fountain does not plan to operate all of its wells all of the time. It is important to note that the withdrawal rates and volumes allowed by well permits and decrees may not be achieved by all of the wells. Limitations on withdrawals from

a particular well may be imposed by water court decrees, and there are also generally limitations on the sustained pumping rate that can be achieved, and limitations imposed by well infrastructure and treatment requirements.

1.8 Raw Water Storage Capacity. [Task 7] Fountain owns Keeton Lake Reservoir and its decreed storage right. Fountain does not own its current raw water storage capacity available in Pueblo Reservoir. Its right to store water in Big Johnson Reservoir is an incident of its ownership of Fountain Mutual Irrigation Company shares, and any contractual storage rights it may obtain for storage of non-FMIC share water. Long-term storage capacity downstream on the Arkansas River may be owned or leased, should Fountain participate in agreements with its ROY partners for such storage capacity. The storage capacities, locations, and relevant decrees and contracts are shown in Table 3. Recommendations and timetables for developing and utilizing storage are set forth in Section 2.2.

2.0 Policy Topics

2.1 Required Additional Water Rights. [Task 8] The attached Table No. 10 provides the estimated schedule of additional fully consumable water rights that will be required as the City's annual demands increase. We have tabulated such requirements starting with an annual demand of 3,000 acre-feet per year and increasing up to an annual demand of 12,000 acre-feet per year. We can extend this table if needed when the Water Demand element of the Master Plan is completed. As shown in this table, the required fully consumable water rights were estimated for the three scenarios involving potential curtailment of Fry-Ark Project water rights, which are discussed in Section 1.4.1 above.

The volumes in Table No. 10 represent the required increase in average-year yield of the City's fully consumable water rights to meet the indicated annual demands. As further described in Section 2.2 below, we have estimated the amount of required storage to achieve the average annual yield of fully consumable rights on a reliable basis. The calculations in Table No. 10 also include a ten percent contingency to the water deliveries from such additional water rights. This contingency was applied in consideration of climate change and other future reductions to the City's fully consumable water rights. As described in Section

1.4.4 above, a ten percent contingency was also applied in the analysis of the City's existing fully consumable water rights.

2.1.1 Water Rights for Pueblo Reservoir Deliveries. For each of the three Fry-Ark Project curtailment scenarios, we have computed the additional fully consumable water rights required to support deliveries from Pueblo Reservoir through the City's FVA and SDS conveyance capacities. Deliveries from Pueblo Reservoir are limited to the following amounts:

1. 1,900 acre-feet per year (after conveyance and treatment loss) through the City's FVA conveyance capacity. As described in Section 1.4.1 above and shown on Table Nos. 7, 8, and 9, deliveries through the FVA conveyance capacity attributable to fully consumable water rights (instead of Fry-Ark Project water) depend on the curtailment of Fry-Ark Project water rights. The portions of the 1,900 acre-feet per year deliveries supported by other fully consumable water rights are 634 acre-feet per year with no curtailment of Fry-Ark Project water rights, 950 acre-feet per year with moderate curtailment of Fry-Ark Project water rights, and 1,266 acre-feet per year with severe curtailment of Fry-Ark Project water rights.

2. 2,500 acre-feet per year through the Southern Delivery System capacity, all of which is supported by the City's fully consumable water rights.

The calculations of water rights required for deliveries from Pueblo Reservoir also assume that the City's existing fully consumable water rights located on the Arkansas River (Colorado Canal shares, Bell Ditch water rights, and the currently leased Super Ditch deliveries), which have an average annual yield of 937 acre-feet per year, will continue to be applied to support Pueblo Reservoir deliveries through the FVA and SDS conveyance capacities.

2.1.2 Water Rights for Fountain Creek Deliveries. For each of the three Fry-Ark Project water curtailment scenarios, we have also computed the additional fully consumable water rights required to support deliveries from Fountain Creek sources. Such deliveries from Fountain Creek sources were scheduled to meet the City's demands that exceed deliveries from Pueblo Reservoir through the FVA and SDS conveyance capacities.

2.1.3 Schedule for Increased Super Ditch Deliveries. As described in Sections 1.2 and 1.3.2 above, the City is presently leasing 500 acre-feet per year from Super Ditch, which is delivered at Pueblo Reservoir. In the future, Fountain can decide to increase deliveries up to 3,800 acre-

feet per year pursuant to the schedule in the lease agreement, although the City would have to accelerate the delivery schedule in order to obtain increased deliveries of 3,800 acre-feet by the deadlines imposed by the exchange decreed in Case No. 10CW4. Fountain will need to determine if this leased water is worth the cost. It is very expensive water, and the per acre-foot cost is made higher by evaporation loss when the water is stored in Pueblo Reservoir. Because the deliveries under this lease are delivered at Pueblo Reservoir, the City could increase annual deliveries under the lease to provide the additional fully consumable water supplies required for Pueblo Reservoir deliveries, as indicated on Table No. 10. This source of supply, however, cannot support deliveries from Fountain Creek sources unless an exchange is operated on Fountain Creek. Operation of such an exchange is subject to curtailment and is less efficient and more expensive than direct use of Fountain Creek water rights to support Fountain Creek deliveries.

While Super Ditch has a contractual obligation to provide deliveries to Fountain at Pueblo Reservoir, we have not evaluated whether Super Ditch will be able to fulfill its obligation to deliver such supplies considering the limited exchange potential on the Arkansas River into Pueblo Reservoir. As a result, we strongly recommend that the City evaluate Super Ditch's ability to actually make such deliveries under the lease agreement prior to increasing the amount of leased Super Ditch deliveries.

2.1.4 Conclusions. As shown on Table No. 10, we do not presently anticipate that the City will require additional water rights until reaching a demand of around 6,000 acre-feet per year, even with severe curtailment of the Fry-Ark Project water rights. This information is consistent with our evaluations of the City's existing water sources yield, as described in Section 1.4 above, and further confirms that the City has a robust portfolio of water rights.

2.2 Required Storage Capacity. [Tasks 1 through 4] The attached Table No. 11 provides the estimated volume of storage capacity required to meet the City's demands. As with the schedule of estimated additional water rights described in Section 2.1, we have tabulated the storage capacity requirements starting with an annual demand of 3,000 acre-feet per year and increasing up to an annual demand of 12,000 acre-feet per year. The storage capacity

requirements were also estimated for the same three scenarios involving potential curtailment of Fry-Ark Project water rights.

We have estimated the amount of required storage capacity to achieve the average annual yield of the City's fully consumable rights on a reliable basis. The dry year yield of the City's existing fully consumable water rights (2,932 acre-feet per year) is approximately 83 percent of the average year yield of these right (3,549 acre-feet per year). For purposes of evaluating storage requirements, we estimated the dry year yield of the City's fully consumable rights will be around 80 percent of the average year yield in future years. Based on this relationship, we evaluated the amount of storage required to achieve the average year deliveries with only the dry year yield of fully consumable water rights for three consecutive years. We also maintained a volume of contingency storage capacity equal to 10 percent of the required total capacity for climate change or other future water supply reductions to the fully consumable water rights. From this evaluation, we determined that the City requires storage capacity equal to approximately 92 percent of the annual deliveries from fully consumable water rights and supplies (i.e. total deliveries minus first-use deliveries from the Fry-Ark Project and Stubbs and Miller Ditch water rights) to sustain the average year deliveries during an extended drought.

As shown on Table No. 11, we have divided the estimated storage capacity requirements between the Pueblo Reservoir Master Account, the Pueblo Reservoir LTEC Account, and Other Storage. These storage requirements are in addition to the fixed Fry-Ark Project storage capacity of 7,761 acre-feet described in Section 1.3.1, which is required to provide average annual deliveries of Fry-Ark Project water for Fountain's first use on a reliable basis.

2.2.1 Pueblo Reservoir Master Account Storage. As indicated in Section 1.8 above, the City presently has 250 acre-feet of available storage capacity under the Pueblo Reservoir Master Account. This capacity can be increased up to 1,000 acre-feet in future years, but it cannot be decreased in future years. The amount of storage capacity required within this account was determined based on deliveries of fully consumable water rights through the City's FVA conveyance capacity, which are discussed in Section 2.1.1 above. We also computed storage capacity within this account that could provide a supplemental supply for Fountain Creek

deliveries (by exchange from the Arkansas River), limited to the maximum contract amount of 1,000 acre-feet.

2.2.2 Pueblo Reservoir SDS Account Storage. As indicated in Section 1.8 above, the City presently has 1,900 acre-feet of available storage capacity under the Pueblo Reservoir SDS Account. This storage contract has pre-defined capacity increases, with the capacity increasing to 2,200 acre-feet of capacity in year 2023. The final increase to the maximum contract capacity of 2,500 acre-feet will occur in year 2025. The amount of storage capacity required within this account was determined based on the required deliveries of up to 2,500 acre-feet per year of fully consumable water rights through the City's SDS conveyance capacity. We also computed storage capacity within this account that could provide a supplemental supply through the City's FVA conveyance capacity and a supplemental supply for Fountain Creek deliveries (by exchange from the Arkansas River), limited to the maximum contract amount of 2,500 acre-feet that will be available in year 2025.

2.2.3 Other Storage. The remaining calculated storage capacity required to support deliveries from the City's fully consumable rights, after deducting the required capacities in the Pueblo Reservoir Master Account and Pueblo Reservoir SDS Account, as well as the Pueblo Reservoir account associated with Fountain's Project Water provided to it as a member of the Fountain Valley Authority, was assigned as Other Storage to be developed. The Other Storage represents the amount of storage required on Fountain Creek to provide reliable deliveries from the Fountain Creek sources.

2.2.3 Conclusions. Under the scenarios with no curtailment, moderate curtailment, and severe curtailment of Fry-Ark Project water rights, the Pueblo Reservoir Master Account and Pueblo Reservoir SDS Account can be used to support deliveries of the maximum contract amounts of FVA and SDS conveyance capacities to Fountain. These results confirm that Other Storage would be required primarily to support deliveries from Fountain Creek sources, so the optimum location for Fountain's development of additional storage capacity is on Fountain Creek. The schedule of required Other Storage capacity in Table No. 11 is, therefore, applicable to the storage required at the Fountain Creek Reservoir being evaluated

by Fountain. Such other storage is not scheduled to be required until Fountain's demand is between 4,500 and 5,000 acre-feet per year.

2.3 Guidance on Future Water Rights Purchases. [Task 5] We recommend that the City purchase water rights on the Arkansas River or water rights on Fountain Creek (in the vicinity of Fountain Creek Reservoir) for the purposes of supporting deliveries from Pueblo Reservoir through the available FVA and SDS conveyance capacities. The scheduled amounts of additional water rights required for this purpose are tabulated in Table No. 10 and discussed in Section 2.1 above. Arkansas River water rights located above Pueblo Reservoir are more optimal for the City's deliveries from Pueblo Reservoir than water rights located below Pueblo Reservoir, due to limitations on exchanges to Pueblo Reservoir. Because water rights located downstream of Pueblo Reservoir (including increased Super Ditch lease deliveries) are subject to limited exchange potential on the Arkansas River, we strongly recommend that the City evaluate the ability to deliver any specific water supplies to Pueblo Reservoir prior to purchasing specific water rights located below Pueblo Reservoir (or leasing additional Super Ditch deliveries).

We recommend that the City pursue purchases of Fountain Creek water rights in the vicinity of Fountain Creek Reservoir for the purpose of supporting deliveries from Fountain Creek sources. The scheduled amounts of required additional water rights for this purpose are also tabulated in Table No. 10 and discussed in Section 2.1. While water rights on the Arkansas River (including increases in Super Ditch lease deliveries) could be exchanged up to the locations of the Fountain Creek diversions (including the proposed Fountain Creek Reservoir), the ability to exchange such deliveries may not be completely reliable. In addition, water rights below Pueblo Reservoir are subject to limitations on exchanges to Pueblo Reservoir, and to evaporation losses while stored in Pueblo Reservoir. As a result, acquiring Arkansas River water supplies to support Fountain Creek diversions by exchange is less certain and less efficient than using Fountain Creek water rights for this purpose. In other words, the best use of Arkansas River rights is to support raw water deliveries from Pueblo Reservoir through the FVA and SDS conveyance capacities, and the best use of the Fountain Creek water rights is to support diversions on Fountain Creek.

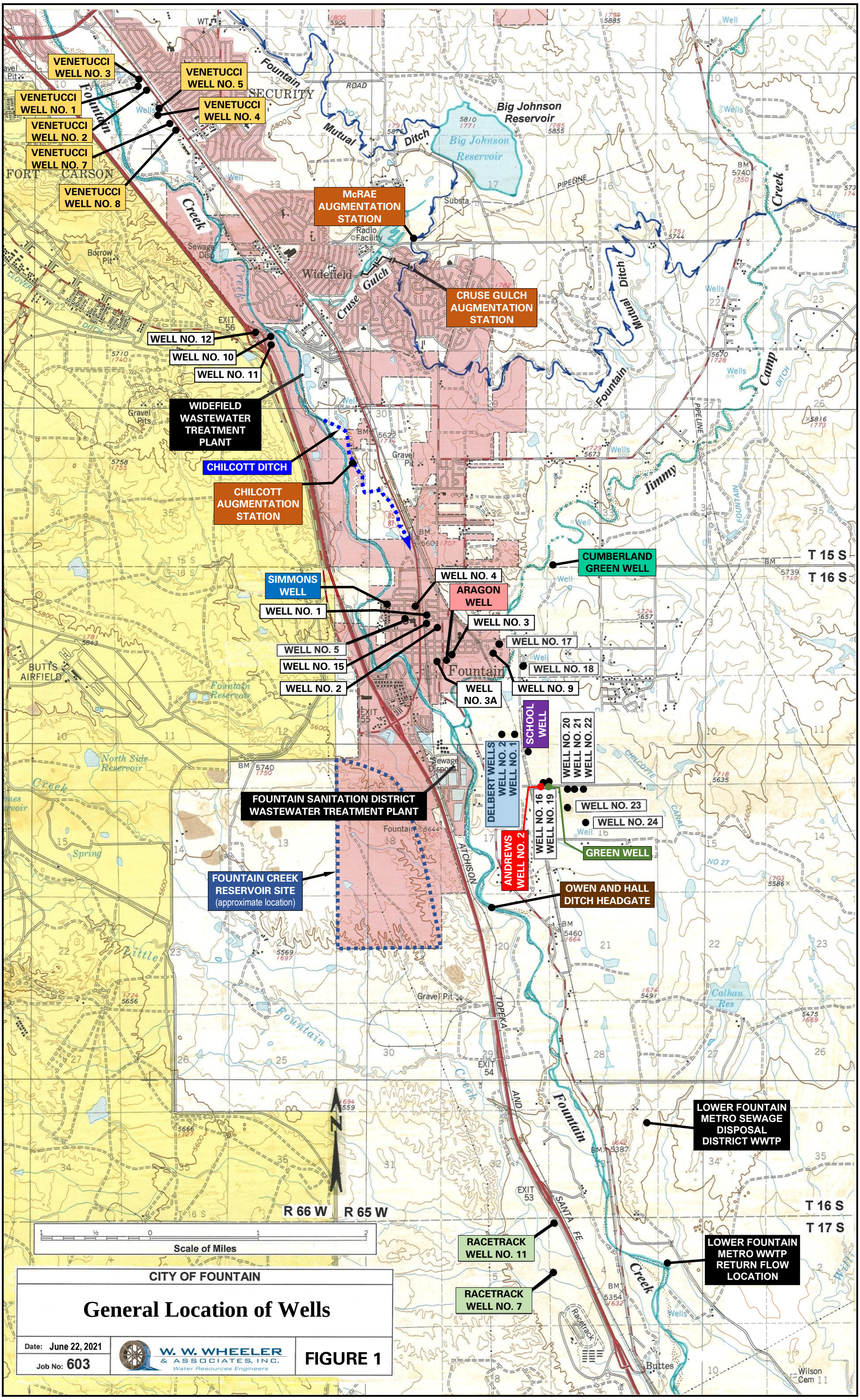
2.4 Recommended Future Water Court Applications. [Task 6] At this time, we recommend the City consider filing water court applications that will ensure maximization of use of the City's existing water rights and supplies. Such applications may include: (1) Application to confirm ability reuse to extinction certain fully consumable water rights and return flows; (2) Application confirming delivery and storage of water rights and sources in Fountain Creek Reservoir, which may or may not include exchanges; (3) Application seeking approval of an exchange of water released from Pueblo Reservoir or delivered by Super Ditch to a point upstream on Fountain Creek, including an exchange to Fountain Creek Reservoir. (4) Due to the historic call regime we do not at this time recommend filing an application for a junior water right for storage in Fountain Creek Reservoir.

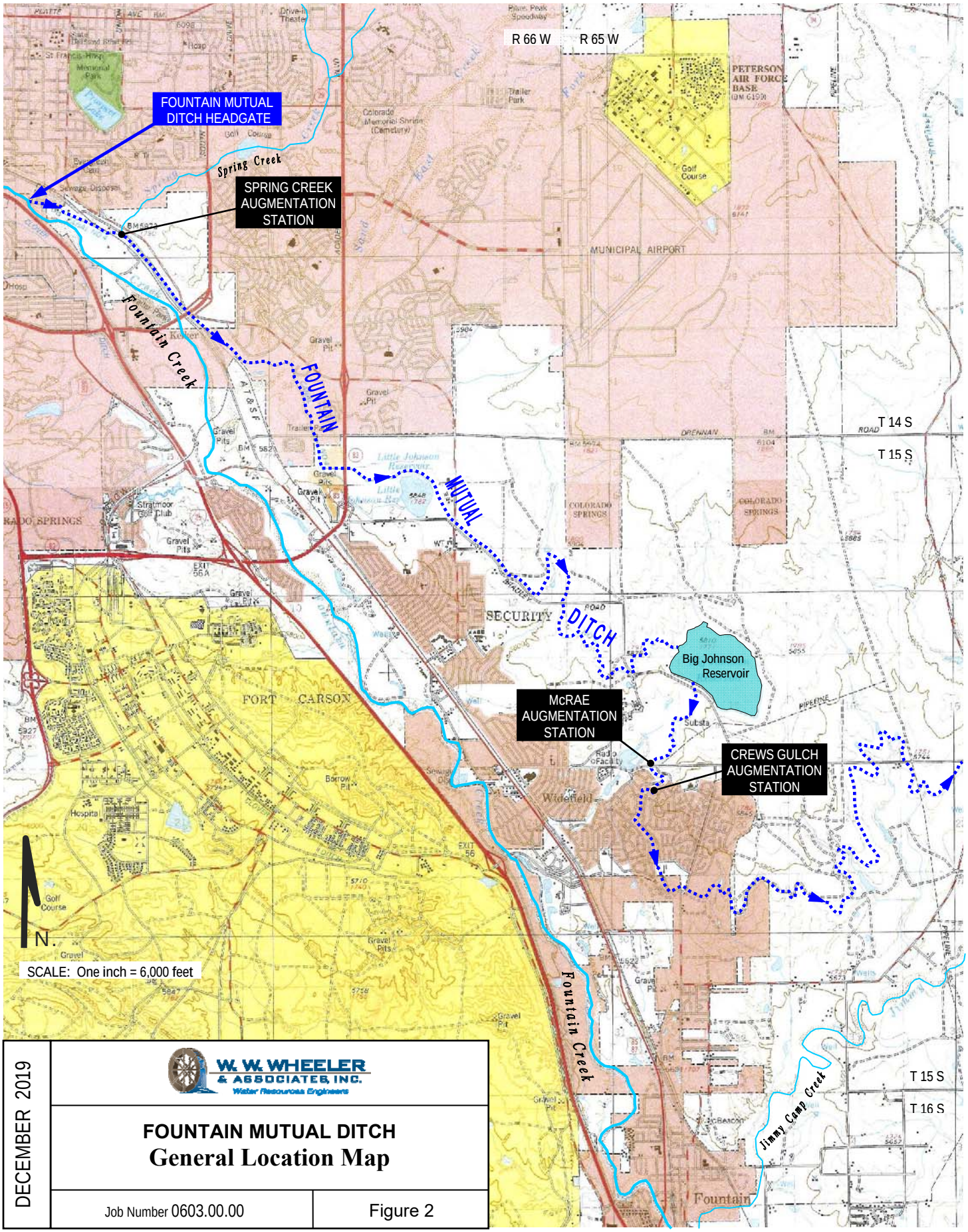
2.5 Water Rights Operations and Accounting for Making the Conditional Water Rights Absolute. [Task7] As discussed in Sections 1.2 and 1.6 above, the City has appropriated conditional water rights that involve exchanges on the Arkansas River to Pueblo Reservoir and exchanges on Fountain Creek to locations of well depletions and the surface diversion for Fountain Creek Reservoir. We recommend that, as part of the ongoing water rights operations and accounting activities, the City attempt to operate each of these exchanges every year. Such operations would include advanced written notice to, and approval from, the Water Commissioner and documentation of the exchange operations within the City's water rights accounting. At the start of each year, we further recommend the City's water rights accountant prepare a memorandum summarizing the conditional exchanges that were operated in the preceding year, along with the exchanges that were not available for operation during the year. These actions will keep the City proactively on-track to make conditional water rights absolute as expediently as possible subject to stream conditions, the City's demands and diversion capacities, and development of Fountain Creek Reservoir.

3.0 Limitations and Future Updates

We have included contingencies within our calculations of the City's existing water supply yield, required future water rights, and required storage capacities to consider reductions to water supplies due to climate change and other future changes. We have also evaluated these parameters for different scenarios involving Fry-Ark Project water rights curtailment due to a Colorado River call or demand management. Because the amounts of future reductions

to water supplies relative to historical conditions is not presently known, our analysis is subject to this inherent uncertainty. It is possible that the volume of required future water rights and storage capacities may be greater than we have estimated, even with the contingencies. Accordingly, we recommend that this analysis continue to be revisited and updated on a regular basis as future drought conditions evolve and more information is known.


VENETUCCI WELL NO. 3
VENETUCCI WELL NO. 1
VENETUCCI WELL NO. 2
VENETUCCI WELL NO. 7
VENETUCCI WELL NO. 8
VENETUCCI WELL NO. 5
VENETUCCI WELL NO. 4
McRAE AUGMENTATION STATION
CRUSE GULCH AUGMENTATION STATION
WELL NO. 12
WELL NO. 10
WELL NO. 11
WIDEFIELD WASTEWATER TREATMENT PLANT
CHILCOTT DITCH
CHILCOTT AUGMENTATION STATION
SIMMONS WELL
WELL NO. 1
WELL NO. 5
WELL NO. 15
WELL NO. 2
WELL NO. 4
ARAGON WELL
WELL NO. 3
WELL NO. 17
WELL NO. 18
WELL NO. 9
WELL NO. 3A
SCHOOL WELL
DELBERT WELLS WELL NO. 2 WELL NO. 1
WELL NO. 20 WELL NO. 21 WELL NO. 22
WELL NO. 23
WELL NO. 24
GREEN WELL
ANDREWS WELL NO. 2
WELL NO. 16 WELL NO. 19
CUMBERLAND GREEN WELL
OWEN AND HALL DITCH HEADGATE
FOUNTAIN SANITATION DISTRICT WASTEWATER TREATMENT PLANT
FOUNTAIN CREEK RESERVOIR SITE (approximate location)
LOWER FOUNTAIN METRO SEWAGE DISPOSAL DISTRICT WWTP
LOWER FOUNTAIN METRO WWTP RETURN FLOW LOCATION
RACETRACK WELL NO. 11
RACETRACK WELL NO. 7
Big Johnson Reservoir
Fountain
Widefield
SECURITY
FORT CARSON
BUTTS AIRFIELD
Mutual Ditch
Cruse Gulch
Fountain Creek
Jimmy Camp Creek
Calhan Res
North Side Reservoir
Fountain Reservoir
Gravel Pits
Sewage Disposal
Radio Facility
Substa
PIPELINE
ROAD
T 15 S
T 16 S
T 17 S
R 66 W
R 65 W
N
Scale of Miles
CITY OF FOUNTAIN
General Location of Wells
Date: June 22, 2021
Job No: 603
W. W. WHEELER & ASSOCIATES, INC.
Water Resources Engineers
FIGURE 1



DECEMBER 2019

W. W. WHEELER & ASSOCIATES, INC.
Water Resources Engineers

FOUNTAIN MUTUAL DITCH
General Location Map

Job Number 0603.00.00 | Figure 2

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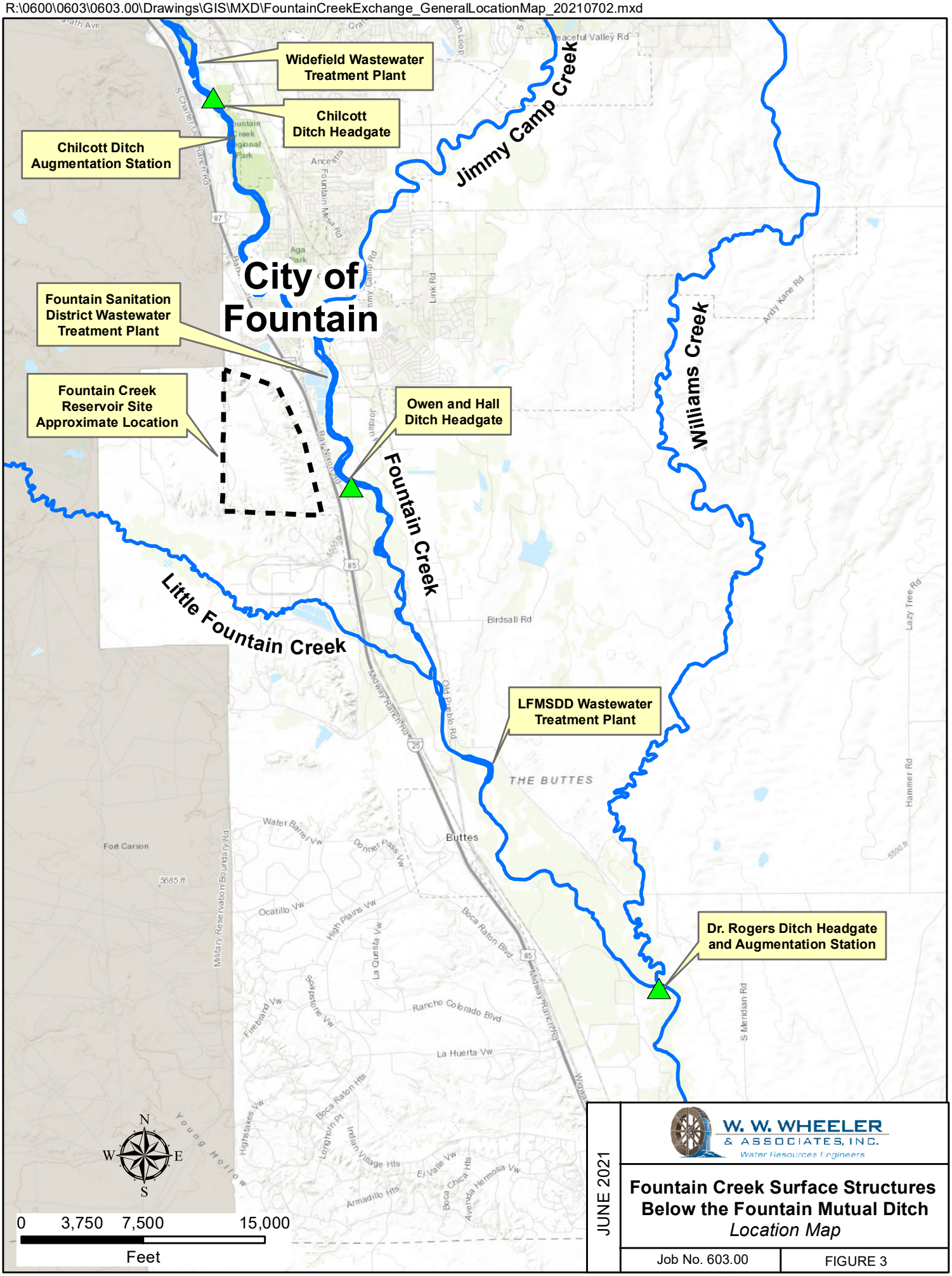

JUNE 2021

W. W. WHEELER & ASSOCIATES, INC.
Water Resources Engineers

Fountain Creek Surface Structures Below the Fountain Mutual Ditch
Location Map

Job No. 603.00 | FIGURE 3

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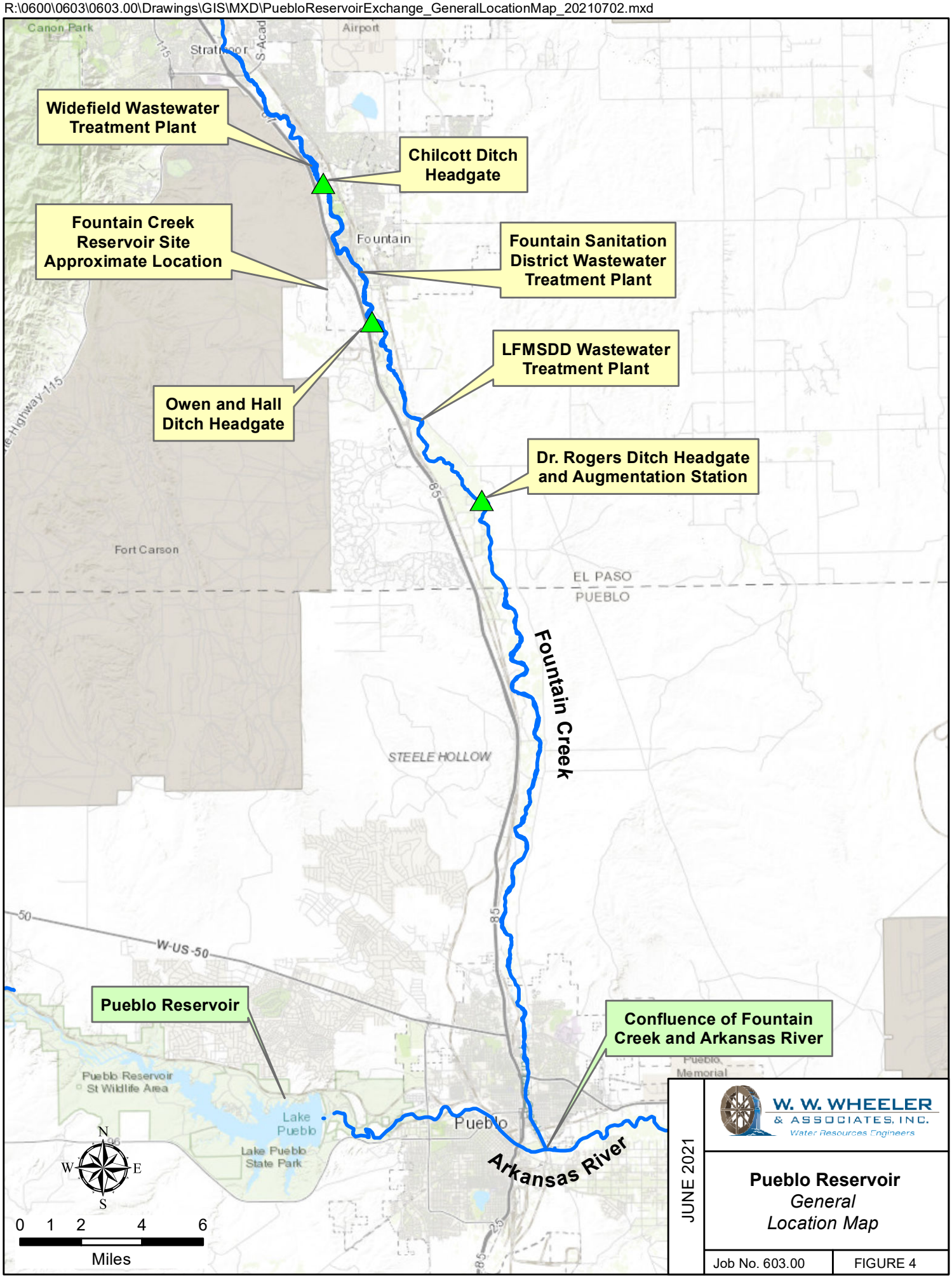

JUNE 2021

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Water Resources Engineers

Pueblo Reservoir
General
Location Map

Job No. 603.00 | FIGURE 4

Table 1
Summary of City of Fountain Wells

Name and Permit Number	WDID	Location (all wells located in El Paso County)	Decree(s)	Decreed Pumping Rate	Permitted Pumping Rate	Annual Pumping Limit	Permit Change of Ownership	Abandoned Permit	Current Status[1]
City of Fountain Well No. 1 Permit No. 19875-S-R *(Replaced 19875-S)*	1005516	600' west from East Sec. line and 2400' S. from N. Sec. line of Sec. 6, T. 16 S., R. 65 W. of the 6th P.M.	W-4396 W-4559 W-0428	3105 gpm 6.9 cfs	3105 gpm	Annual limit not found in permit or decree	Registered to Fountain	19875-S abandoned & plugged on 10/22/19	Redrilled and equipment installation in progress
City of Fountain Well No. 2 Permit No. 2345-F-R *(Replaced 2345-F)*	1005517	400' west from East Sec. line and 2900' S. from N. Sec. line of Sec. 6, T. 16 S., R. 65 W. of the 6th P.M.	W-4396 W-4559 W-0427 85CW110	2592 gpm 5.76 cfs	2592 gpm	4186 AF	Registered to Fountain	Abandoned & plugged report NOT found for 2345-F	Presently used
City of Fountain Well No. 3 Permit No. 61121-F *(Replaced 10272-F)*	1005518	4800' west from East Sec. line and 4300' S. from N. Sec. line of Sec. 5, T. 16 S., R. 65 W. of the 6th P.M.	W-4396 W-4559 W-0429	2880 gpm 6.4 cfs	2880 gpm	4645 AF	Registered to Fountain	10272-F abandoned & plugged 2/12/10	Presently used
City of Fountain Well No. 4 Permit No. 19875-R-R (Expired 8/26/75) *(Replaced 19875-R (1)*	1005519	1100' west from East Sec. line and 2100' S. from N. Sec. line of Sec. 6, T. 16 S., R. 65 W. of the 6th P.M.	W-4396 W-4559 W-0430	900 gpm 2.0 cfs	900 gpm	500 AF	Registered to Fountain	Plugged /abandoned report NOT found for 19875-R (1)	Planned to be reactivated
City of Fountain Well No. 5 Permit No. 62052-F *(Replaced 6920-F-R)*	1005520	A replacement well was drilled in 2004, and located in the SW1/4 NE 1/4 of Section 6, T. 16 S., R. 65 W. of the 6th P.M. at a location 2498 feet from the North section line and 1642 feet from the East section line of Sec. 6	W-4396 W-4559 W-0425	126 gpm .28 cfs	126 gpm (6920-F-R) 1000 gpm 62052-F expanded use	1610 AF	Registered to Fountain	6920-FR abandoned & plugged 7/15/16	Replacement well construction and test report 8/4/04; permit 62052-F issued 12/15/04
City of Fountain Well No. 9 (aka Metcalf Well) Permit No. 15860-FR *(Replaced 15860-F which replaced 6919 at 550 gpm & 6921 at 220 gpm)*	1005389	2600' west from East Sec. line and 4300' S. from N. Sec. line of Sec. 5, T. 16 S., R. 65 W. of the 6th P.M.	W-4396 W-4559 W-0424 W-0426 85CW110	750 gpm	750 gpm	Annual amount in combination with all other wells in plans for augmentation shall not exceed replacement water available under case nos. W-4396, W-4559, and 85CW110	Registered to Fountain	15860-F plugged/ abandoned 10/19/12	Presently used (redrilled); prior 15860-F replaced 6919 at 550 gpm & 6921 at 200 gpm

City of Fountain Well No. 10 Permit No. 15908-R *(Lucas Well No. 1 in decree)*	1005390	2900' west from East Sec. line and 4700' S. from N. Sec. line of Sec. 24, T. 15 S., R. 66 W. of the 6th P.M.	W-4396 W-4559 W-2834	500 gpm 1.12 cfs	500 gpm	Annual limit not found in permit or decree	Permit lists D.L. Lucas. Decree lists Fountain as applicant		Well no longer exists.
City of Fountain Well No. 11 *(Lucas Well No. 2 in decree)*	1005391	2900' west from East Sec. line and 4900' S. from N. Sec. line of Sec. 24, T. 15 S., R. 66 W. of the 6th P.M.	W-4396 W-4559 W-2835	100 gpm .224 cfs	No permit	Annual limit not found in decree	No Permit. Decree lists Fountain as applicant		Well no longer exists.
City of Fountain Well No. 12 Permit No. 20661-F *(Lucas Well No. 3 in decree)*	1005392	3600' west from East Sec. line and 4200' S. from N. Sec. line of Sec. 24, T. 15 S., R. 66 W. of the 6th P.M.	W-4396 W-4559 W-2836	200 gpm .444 cfs	200 gpm	100 AF	Registered to Fountain		Well no longer exists.
City of Fountain Well No. 15 *(Aga Well "not registered" in decree)*	1005393	600' west from East Sec. line and 2800' S. from N. Sec. line of Sec. 6, T. 16 S., R. 65 W. of the 6th P.M.	W-4396 W-4559 W-2837	120 gpm .266 cfs	No Permit	Annual limit not found in decree	No Permit. Decree lists Fountain as applicant		Well no longer exists.
School Well[2] Permit No. 1-35174-F	1005395	NE1/4 of the SE1/4 of Section 8, T. 16 S., R. 65 W. of the 6th P.M. at a point 1950 feet from the south section line and 1150 feet from the east section line of Section 8.	85CW110 91CW21	550 gpm 1.22 cfs	550 gpm		Registered to El Paso School Dist. #8		Not presently used
Aragon Well[2] Permit No. 78567-F *(Replaced 74482-F that replaced 45244-F-R that replaced 45244-F)*	1005970	SW1/4 of the SW1/4 of Section 5, T. 16 S., R. 65 W. of the 6th P.M. at a point 900 feet from the south section line and 100 feet from the west section line of Section 5.	01CW146	50 gpm (0.11 cfs)	50 gpm .11 cfs	10 AF	Registered to Fountain Ft. Carson School Dist. #8	45244-F plugged and abandoned 6/27/02 45244-F-R plugged and abandoned 4/15/11 No abandoned report for 74482-F	Presently used
Racetrack Well No. 7 Permit No. 5195-FR *(Redrill of 5195-F)* *(Formerly Hanna Ranch Well No. 7)*	1005620	SW1/4 of the SW1/4 of Section 4, T. 17 S., R. 65 W. of the 6th P.M. at a point 2,654 feet from the north section line and 186 feet from the west section line of Section 4.	W-1528 W-4376 85CW110 01CW146	1073 gpm (2.39 cfs)	1073 gpm (900 gpm claimed by pump test)	100 AF	Registered to Fountain	Report shows 5195-F-R plugged and abandoned March 1999	Presently used

								but must mean 5195-F	
Racetrack Well No. 11 Permit No. 47897-F *(Redrill of 6921-F)* *(Formerly Hanna Ranch Well No. 11)*	1005624	NW1/4 of the NW1/4 of Section 4, T. 17 S., R. 65 W. of the 6th P.M. at a point 310 feet from the north section line and 242 feet from the west section line of Section 4	W-1528 W-4376 85CW110 01CW146	907 gpm (2.02 cfs)		100 AF	Registered to Fountain	6921-F plugged & abandoned March 1999	Presently used
City of Fountain Well No. 16 (No permit)	1005445	SE1/4 of the NE1/4 of Section 8, T. 16 S., R. 65 W. of the 6th P.M. at a point 100 feet from the south section line and 260 feet from the east section line of Section 8	01CW146	600 gpm (1.34 cfs) (planned)			Decree lists Fountain as applicant		Not constructed
City of Fountain Well No. 17 Permit No. 056286-F	1006167	NW1/4 of the SE1/4 of Section 5, T. 16 S., R. 65 W. of the 6th P.M. at a point 1,740 feet from the south section line and 2,470 feet from the east section line of Section 5	01CW146	500 gpm (1.11 cfs)	500 gpm 1.11 cfs	806 AF	Registered to Fountain		Not constructed
City of Fountain Well No. 18 Permit Application Receipt No. 3601238	1006386	SE1/4 of the SE1/4 of Section 5, T. 16 S., R. 65 W. of the 6th P.M. at a point 550 feet from the south section line and 1300 feet from the east section line of Section 5	01CW146	600 gpm (1.34 cfs) (planned)			Decree lists Fountain as applicant		Constructed but not put into production due to 600-foot spacing issue with well permit application.
City of Fountain Well No. 19 (No permit)	1006462	SW1/4 of the SW1/4 of Section 9, T. 16 S., R. 65 W. of the 6th P.M. at a point 190 feet from the south section line and 10 feet from the west section line of Section 9	01CW146	600 gpm (1.34 cfs) (planned)			Decree lists Fountain as applicant		Not constructed
City of Fountain Well No. 20[3] Permit No. 68056-F *(Re-permitted for cancelled 66363-F Johnson Well and cancelled 19176-S Marshall Well No. 2)*	1005647	NW1/4 of the NW1/4 of Section 16, T. 16 S., R. 65 W. of the 6th P.M. at a point 70 feet from the north section line and 940 feet from the west section line of Section 16	01CW146	600 gpm (1.34 cfs)	600 gpm	100 AF	Registered to Fountain		Recently reactivated for raw water deliveries.

City of Fountain Well No. 21[3] (No permit)	1006463	NE1/4 of the NW1/4 of Section 16, T. 16 S., R. 65 W. of the 6th P.M. at a point 70 feet from the north section line and 1,340 feet from the west section line of Section 16	01CW146	600 gpm (1.34 cfs) (planned)			Decree lists Fountain as applicant		Not constructed
City of Fountain Well No. 22[3] (No permit)	1006464	NE1/4 of the NW1/4 of Section 16, T. 16 S., R. 65 W. of the 6th P.M. at a point 70 feet from the north section line and 1,740 feet from the west section line of Section 16	01CW146	600 gpm (1.34 cfs) (planned)			Decree lists Fountain as applicant		Not constructed
City of Fountain Well No. 23[3] (No permit)	1006465	NW1/4 of the NW 1/4 of Section 16, T. 16 S., R. 65 . of the 6th P.M., at a point 870 feet from the north section line and 870 feet from the west section line of Section 16	01CW146	600 gpm (1.34 cfs) (planned)			Decree lists Fountain as applicant		Not constructed
City of Fountain Well No. 24[3] (No permit)	1006466	SE 1/4 of the NW1/4 of Section 16, T. 16 S., R. 65 W. of the 6th P.M., at a point 1,740 feet from the north section line and 1,740 feet from the west section line of Section 16	01CW146	600 gpm (1.34 cfs) (planned)			Decree lists Fountain as applicant		Not constructed
Delbert Wells Well No. 1 Permit No.R-20110-R-RF *(Replaced R-20110-1)*	1005253	NW1/4 of the SE1/4 of Section 8, T. 16 S., R. 65 W. of the 6th P.M. at a point 2,570 feet from the south section line and 1,550 feet from the east section line of Section 8	W-2273 01CW146	654 gpm (1.46 cfs)	500? gpm	225 AF	Permit lists Delbert Wells; Decree lists Fountain as applicant	R-20110-1 Plugged and abandoned 6/72, replaced with R-20110-R-RF	Not presently used
Delbert Wells Well No. 2 Permit No. R-20110-2	1005254	NW1/4 of the SE1/4 of Section 8, T. 16 S., R. 65 W. of the 6th P.M. at a point 2,550 feet from the south section line and 2,150 feet from the east section line of Section 8	W-2273 01CW146	490 gpm (1.09 cfs)	275 gpm	No annual limit found	Permit lists Delbert Wells; Decree lists Fountain as applicant;		Not presently used
Venetucci Well No. 4 New Permit No. 67705-F *(Original 18664-R)*	1005404	SE1/4 SW1/4 of Section 11, T. 15 S., R. 66 W. of the 6th P.M.	Case Nos. 103-111 (W.D. 2); 07CW68	2.78 cfs	1250 gpm	1238 AF combined annual limit for Venetucci 4, 5, 7 & 8	Registered to Fountain		Not presently used due to groundwater contamination
Venetucci Well No. 5 New Permit No. 67706-F *(Original 17490-U)*	1005405	SE1/4 SW1/4 of Section 11, T. 15 S., R. 66 W. of the 6th P.M.	Case Nos. 103-111 (W.D. 2); 07CW68	2.78 cfs	1250 gpm	1238 AF combined annual limit for Venetucci 4, 5, 7 & 8	Registered to Fountain		Not presently used due to groundwater contamination
Venetucci Well No. 7	1005930	SW1/4 SE1/4 of Section 11, T. 15 S., R. 66 W. of the 6th P.M.	W-568; 07CW68	2.67 cfs	1200 gpm	1238 AF combined annual limit for	Registered to Fountain		Not presently used due to

New permit No. 68685-F *(Original 4869-F)*						Venetucci 4, 5, 7 & 8			groundwater contamination
Venetucci Well No. 8 New Permit No. 67707-F *(Original 4907-F)*	1005408	SW1/4 SE1/4 of Section 11, T. 15 S., R. 66 W. of the 6th P.M.	Case Nos. 103-111 (W.D.2); 07CW68	2.56 cfs	1150 gpm	1238 AF combined annual limit for Venetucci 4, 5, 7 & 8	Registered to Fountain		Not presently used due to groundwater contamination
Venetucci Well No 1 Permit Nos. 17490-R; 4835-F	1005401	NE1/4 SW1/4 of Section 11, T. 15 S., R. 66 W. of the 6th P.M.	Case Nos. 103-111 (W.D. 2); 07CW68	2.562 cfs	1150 gpm	306 AF	Registered to Pikes Peak Community Foundation		Not presently used
Venetucci Well No 2 Permit Nos. 17490-S; 4915-F	1005402	NE1/4 SW1/4 of Section 11, T. 15 S., R. 66 W. of the 6th P.M.	Case Nos. 103-111 (W.D. 2); 07CW68	2.784 cfs	1250 gpm	332 AF	Registered to Pikes Peak Community Foundation		Not presently used
Venetucci Well No. 3 Permit No. 17490-T	1005403	SE1/4 NW1/4 of Section 11, T. 15 S., R. 66 W. of the 6th P.M.	Case Nos. 103-111 (W.D. 2); 07CW68	1.78 cfs 1.559 cfs	800 gpm	212 AF	Registered to Pikes Peak Community Foundation		Not presently used
Cumberland Green Well[2] Permit No. 81737-F *(Replaced 15748-F)*	1005315	SW1/4SW1/4 of Section 33, T. 15 S., R. 65 W. of the Sixth P.M., 6.53 feet from the South section line, and 238.9 feet from the West section line in said Section 33	07CW123 W-590	1.01 cfs	455 gpm	320 AF	Registered to Cumberland Green Metro District	15748-F abandoned & plugged 8/29/07	Presently used
Andrews Well No. 2[4] (No permit)	1005273	NE1/4 NE1/4, Sec. 17, T. 16 S. R. 65 W. of 6th P.M, 400 feet West of the East Section Line, and 30 feet South of the North Section Line of Section 17	Case W-3169	650 gpm. (also 1000 gpm conditional right cancelled 8/6/86)			Registered to Karl Andrews Companies Inc		Not presently used (purchased and tested)
Green Well[4] (aka Masse Well) Permit No. 16454-F *(16943 Permit No. in decree W-2105)*	1005271	NE1/4 NE1/4, Sec. 17, T. 16 S., R. 65 W. of 6th P.M., 20 feet from the North section line and 34 feet from the East section line	Case W-2105	900 gpm	1,200 gpm max sustained; 600 gpm rate claimed	16 AF	Registered to Clyde Green		Not presently used (purchased and tested)
Simmons Well[4] Permit No. 1830-R	1005266	SE1/4 NW1/4, Sec. 6, T 16 S., R 65 W. of 6th P.M.	W-2419	550 gpm 1.22 cfs	600 gpm	No annual limit found	Registered to Arliss Simmons		Not presently used (purchased and tested)

Notes:

1. Fountain is maintaining all well locations to have flexibility with its well supply development to achieve production, recovery, and treatment as needed in the future.
2. The School Well, Aragon Well, and Cumberland Green Well are owned and operated by others. Fountain provides augmentation of these wells pursuant to agreements with the well owners.
3. Fountain's ability to construct and operate these five new wells (Fountain Well Nos. 20, 21, 22, 23, and 24) was acquired by purchase of the Marshall Well Nos. 1 and 2 and West Turf Farm Well Nos. 1, 2, and 3 from CV Moonlit Family Partnership LLLP in 2007. Except for Well No. 20, which is at the location of Marshall Well No. 2, the planned locations of Fountain's new wells are different than the locations of the purchased wells.
4. The Andrews Well No. 2, Green Well, and Simmons Well are not presently included in any of Fountain's existing augmentation plans.

Table 2
City of Fountain Current Surface Water Supplies and Augmentation Plans[1]

Water Rights/Name	Source	Amount/Consumptive Use Portion	Uses	Appropriation Date	Decrees Approving Fountain's Municipal Use	Related Augmentation Plan Decrees	Retained Jurisdiction
Chilcott Ditch (10.25 shares)	Fountain Creek	387 acre-feet per year and 257.5 maximum average for consecutive 20-year period	Direct municipal use, augmentation, storage and exchange with right to use and reuse to extinction; water delivered to Chilcott Ditch headgate and released to Fountain Creek via Chilcott Ditch aug station (subject to operating agreement with Chilcott Ditch Company); storage in any structures legally available to Fountain; see also Exchange Chart	February 15, 1882 and December 18, 1905	06CW119 dated August 11, 2009 and 09CW103 dated June 4, 2015	Aug Plan III (01CW146); Venetucci Wells (07CW68); and Cumberland Green Well (07CW123)	5 years from the date Fountain notifies opposers it has used 75% of the CU credits in the plan for augmentation
Chilcott Ditch (15.5 shares)	Fountain Creek	585.0 acre-feet per year and 389.4 maximum annual average for consecutive 20-year period	Direct municipal use, augmentation, storage and exchange with right to use and reuse to extinction; Water delivered to Chilcott Ditch headgate and released to Fountain Creek via Chilcott Ditch aug station (subject to operating agreement with Chilcott Ditch Company); storage in any structures legally available to Fountain; see also Exchange Chart	February 15, 1882 and December 18, 1905	10CW99 dated December 10, 2014	Aug Plan III (01CW146); Venetucci Wells (07CW68); and Cumberland Green Well (07CW123)	5 years from the date on which Fountain serves written notice of its use of 75% the depletion credits for augmentation and exchange to Pueblo Reservoir pursuant to the decree
Colorado Canal	Arkansas River	512.5 shares	Storage in Lake Henry Reservoir or Lake Meredith Reservoir for release to maintain historic return flows; and use the remainder either directly or by exchange or substitution for irrigation, domestic, municipal, commercial industrial and all other beneficial uses at any location; see also Exchange Chart	6/9/1890	84CW62, 84CW63 and 84CW64	NA	20 years after shares converted to non-irrigation use

[1] **See also Table 1 of wells owned by Fountain covered by respective augmentation plans.**

Table 2
City of Fountain Current Surface Water Supplies and Augmentation Plans[1]

Water Rights/Name	Source	Amount/Consumptive Use Portion	Uses	Appropriation Date	Decrees Approving Fountain's Municipal Use	Related Augmentation Plan Decrees	Retained Jurisdiction
Crabb Ditch	Fountain Creek	52.8 acre-feet per year and 352 maximum consecutive 10-year period	Direct municipal use, augmentation, and storage with right to use and reuse to extinction; Water delivered to Chilcott Ditch headgate and released to Fountain Creek via Chilcott Ditch aug station (subject to carriage agreement with Chilcott Ditch Company); storage in any structures legally available to Fountain	2/15/1882	08CW115 dated April 8, 2015	Aug Plan III (01CW146); Venetucci Wells (07CW68); and Cumberland Green Well (07CW123)	5 years from the date Fountain notifies opposers it has used 75% of the CU credits in the plans for augmentation
Dr. Rogers Ditch	Fountain Creek	410.78 acre-feet maximum annual; and 4003.41 acre-feet maximum consecutive 20-year period	Direct municipal use, augmentation, storage and exchange with right to use and reuse to extinction; Water delivered to Dr. Rogers Ditch headgate and released to Fountain Creek via aug station; storage in Pueblo Reservoir, Fountain Reservoir or ROY storage structures; see also Exchange Chart	3/1/1866	15CW3068 dated April 2, 2019	Aug Plan III (01CW146); Venetucci Wells (07CW68); and Cumberland Green Well (07CW123)	5 years from the date on which Fountain serves written notice of its first use of the depletion credits for augmentation or exchange pursuant to the decree
FMIC Ditch (137 shares)	Fountain Creek	Variable, but on average 0.7 acre-feet per year	All municipal including augmentation; see also Exchange Chart for Case No. 01CW108	Various	85CW110 (Aug Plan II) dated October 26, 1987	85CW110 (Aug Plan II)	Expired 6 years after date of decree
FMIC Ditch (190 shares)	Fountain Creek	Variable, but 133 acre-feet average annual (0.7 acre feet per share)	Direct municipal use, augmentation, storage and exchange with right to sue and reuse to extinction; Water delivered to FMIC Ditch headgate and released to Fountain Creek via aug station; storage in Pueblo Reservoir, Fountain Creek Reservoir or ROY storage structures; see also Exchange Chart	Various	01CW146 (Aug Plan III)	01CW146 (Aug Plan III)	5 years from the date on which Fountain serves written notice on the Court and opposers herein of its first use of 75% of the New Fountain Mutual Shares for augmentation or exchange
FMIC Ditch (221 shares)	Fountain Creek	Variable, but on average 0.7 acre-feet per year	All municipal including augmentation; see also Exchange Chart for Case No. 01CW108	Various	W-4396 and W-4559 (Aug Plan I)	W-4396 and W-4559 (Aug Plan I)	Expired 5 years after date of decree
Fountain Ditch and Pipeline	Little Fountain Creek	0.5 cfs (on avg. 80-160 acre-feet)	Augmentation	4/1/1913 (also operated pursuant to futile call)	W-4396 and W-4559 (Aug Plan I)	W-4396 and W-4559 (Aug Plan I)	Expired 5 years after date of decree

Table 2
City of Fountain Current Surface Water Supplies and Augmentation Plans[1]

Water Rights/Name	Source	Amount/Consumptive Use Portion	Uses	Appropriation Date	Decrees Approving Fountain's Municipal Use	Related Augmentation Plan Decrees	Retained Jurisdiction
Laughlin Ditch Enlargement - Priority 17	Fountain Creek	4.25 cfs	2.125 cfs irrigation; 2.125 cfs pending application for decree to change to all municipal uses and augmentation and exchange	December 31, 1863	2020CW3182, Pending	Aug Plan III (01CW146); Venetucci Wells (07CW68); and Cumberland Green Well (07CW123)	Unknown
Miller Ditch	Fountain Creek	392 acre-feet maximum annual; 332 acre-feet maximum April - October deliveries; 2,850 acre-feet maximum in any consecutive 10-year period	Direct municipal use, augmentation, storage and exchange; water delivered to Chilcott Ditch headgate and released to Fountain Creek via Chilcott Ditch aug station (subject to carriage agreement with Chilcott Ditch Company); storage in any structures legally available to Fountain; see also Exchange Chart	December 31, 1863	08CW114 dated March 11, 2015	Aug Plan III (01CW146); Venetucci Wells (07CW68); and Cumberland Green Well (07CW123)	5 years from date Fountain has used 390 AF in any year and has operated the exchange to Pueblo Reservoir
Stubbs and Miller	Fountain Creek – Transferred to Wells	100 acre-feet	Municipal	12/31/1861	W-4396 and W-4559 (Aug Plan I)	W-4396 and W-4559 (Aug Plan I)	Expired 5 years after date of decree
Treadwell and Lamb Ditch - Priority 4	Fountain Creek	2.73 cfs	Irrigation	September 12, 1861	NA	NA	NA
W.A. Bell Ditch No. 1, W.A. Bell Ditch No. 2, and W.A. Bell Ditch No. 3	Alvarado Creek and Venable Creek, tributary to Grape Creek, tributary to the Arkansas River	Total amount combined with all three W.A. Bell Ditch water rights: 338 acre-feet max annual 4,950 acre-feet maximum in consecutive 20 year period	All municipal uses with right to use and reuse to extinction (no augmentation); delivered to Fountain via storage in Pueblo Reservoir and Fountain Valley Conduit	08/31/1871, 06/01/1871, and 05/01/1875	2008CW47 dated August 18, 2015	N/A (any augmentation use must be pursuant to subsequent decree)	5 years after Fountain/Widefield deliver a total of 236 acre-feet of water to Pueblo Reservoir pursuant to the decree over a period of two irrigation seasons (May – October)
Womack Ditch	Little Fountain Creek	1.0 or 0.5	Augmentation	12/31/1866	W-4396 and W-4559 (Aug Plan I)	W-4396 and W-4559 (Aug Plan I)	Expired 5 years after date of decree

Table 3

Fountain Storage Rights and Capacities

July 2021

	Keeton Lake Reservoir	Big Johnson Reservoir	Pueblo Reservoir	Downstream Arkansas ROY Storage
Available capacity	19.85 a.f.	Based on allocation to shareholders. Ftn has 640 shares	7761 a.f. (Project Water) 2500 a.f. (LTEC) 250 a.f. (subcontract with SE) Temporary use of Lower Ark capacity to store Super Ditch water (currently 500 a.f./year)	Temporary contract for Holbrook Fossel reservoir (if purchased by ROY parties): 4.76% of capacity
Owned by Ftn	Yes	No	No	No
Authorization of Use	Ownership	FMIC shareholder	Fountain Valley Authority member; LTEC; Subcontract with SECWCD	Participation in ROY storage as party to Regional IGA
Location	A point whence the SE corner of Sec. 2, T. 16 S., R. 67 W. bears S. 53°56' E a distance of 2,846 feet.	Sections 8, 17 and 18, Township 15 South, Range 65 West, 6th P.M.; UTM coordinates: Northing (UTMy) 4288847 and Easting (UTMx) 526240 (Zone 13)	Pueblo Reservoir is located in all or portions of Sections 7, 18-22, and 25-36 of Township 20 South, Range 66 West of the 6th P.M, and Sections 1-5, and 9-11 of Township 21 South, Range 66 West of the 6th P.M, and Sections 5, 8, 9, 13-16, and 22-25 of Township 20 South, Range 67 West of the 6th P.M., all in Pueblo County, Colorado.	Various
Relevant decrees	Case No. 13801 W-4396	85CW110; 01CW108 01CW146, 19CW3082 (pending)	84CW62, 84CW63, 84CW64 (Colo. Canal) 01CW108 (Excess credits and reusable Fry Ark return flows) 09CW103; 10CW99 (Chilcott); 15CW3068 (Dr. Rogers); 85CW110 (FMIC); 01CW108 (FMIC	06CW120 (FMIC and reusable Fry Ark return flows – 01CW108 and 01CW146)

			and Reusable Fry Ark Return Flows), 01CW146 (FMIC); 06CW120 (exchange of FMIC and Project Water Return Flows from downstream locations) 08CW47 (Bell Ditches)	
Relevant Contracts	None	None	Fountain Valley Authority (7761 a.f.) LTEC (2500 a.f.) Subcontract: (250 a.f.)	Regional IGA; and related agreements

TABLE 4

CITY OF FOUNTAIN CONTRACT WATER SUPPLIES

	Fry-Ark Project (first use water) (1)	Fry-Ark Project (reusable return flows) (2)`	Venetucci Wells/Security Wells (3)	Super Ditch (4)
Source of supply	Water rights decreed by Southeastern Colorado WCD for Fry-Ark Project and allocated on the basis of the Operating Principles Fryingpan Arkansas Project (1959); Southeastern's Water Allocation Principles; Southeastern's Water Allocation Policy (amended 2013)	Return flows from first use Project water used by Fountain in distribution system and for irrigation and purchased by Fountain	Widefield Aquifer	Water provided to lease-fallowing program by irrigators in the Lower Arkansas Valley
Amount available	FVA: 2000 a.f./year (actual appx: 1266 a.f./year)	Actual amount based on Fountain's use of first use water BOR LTEC: Up to 2,500 a.f. of Project Water Return Flows and non Project water may be stored in Pueblo Reservoir SECWCD Subcontract: 250 a.f. of Project Water Return Flows and non Project water may be stored in Pueblo Reservoir (ability to increase) SDS Conveyance Contract: Water stored in LTEC can be conveyed through SDS or FVC per Subagreement; Other non-project water through FVC	Maximum Permanent Sublease Quantity = 132.8 a.f./year (10% of Maximum Lease Quantity available to Widefield & Security) Temporary Sublease Quantity = 1328 a.f./year	Currently: 500 a.f./year; Fountain may request incremental increases, with max 3800 a.f./year by 2046, but likely maxt will be 2330 a.f./year

From where and how delivered	Delivered from Pueblo Reservoir via FVC	Return flows from Fountain Creek WWTPs and LIRFs	Via Venetucci Wells Nos. 1, 2, 3 (and enlargements of 1, 2, 3), 4, 5, 7, 8	Delivered by exchange to Pueblo Reservoir, and to Fountain via FVC
Uses	Municipal; fully consumable	Augmentation; exchange to wells and Pueblo Reservoir; fully consumable	Municipal	Municipal; fully consumable
Relevant contracts	Fountain Valley Conduit: Subcontract between SECWCD and FVA, Colorado Springs, Fountain, Security, Stratmoor and Widefield, July 10, 1979, for conveyance of up to 2,000 a.f./year of Project and non-Project Water	SDS Conveyance Contract and Subagreement (max 5.625 capacity available to Ftn in FVC to meet peak day demand.) Storage contracts: LTEC with BOR: Contract 11XX6C004 (2500 a.f. Project Water return flows and non-Project water) Subcontract with SECWCD: 250 a.f. (may be increased)	Amended and Restated Water Rights Sublease dated 03/27/12 (amending and restating 12/15/06, with Security Water District and Widefield W&SD as lessors; (Primary lease dated 12/15/06 between Security and Widefield as lessees, and Pikes Peak Community Foundation as lessor)	Amended and Restated Water Lease dated 10/17/18 (amending and restating 03/13/12 Original Lease)
Duration of contract	FVA: 40 years (2019 - extended to 2059?)	LTEC with BOR: 40 years (2050) Conveyance Contract: 12/31/2049 Subagreement: 12/31/2049 SECWCD Subcontract: 40 years (2056)	Perpetual	40 years (10/31/2057) Right to renew for a second 40-year term
Relevant decrees	Fry Ark Project Rights held by SEWCD: Western slope: CA 4613 (08/03/59); W-829-76 (11/27/79); 83CW252 (05/31/85); Eastern slope: B-42135 (06/25/62); CA 5141 (07/09/69); 80CW6 (10/23/80)	85CW110; 01CW108	augmented pursuant to 07CW68	Exchange decreed 10CW4

Table 5

CITY OF FOUNTAIN EXCHANGES

July 2021

Water right or supply	Exchange From	Exchange To	Rate (cfs)	Absolute (A) Conditional (C)	Relevant Decrees and Appropriation Dates
Colorado Canal (512.5 shares)	Lake Henry, Lake Meredith (via Holbrook Canal, or Ft Lyon storage canal, or direct release to Arkansas)	Pueblo Reservoir	756.28	752.23 A 4.05 C	84CW62, 84CW63, 84CW64; Appropriation date: 04/14/1981 Subject to the 2004 Regional IGA
Chilcott Excess Aug Credits (10.25 shares)	Chilcott aug station, LIRFs, WWTPs, Fountain Creek Reservoir releases	Pueblo Reservoir; Venetic point of depletion on Fountain Creek; Cumberland Green point of depletion on Jimmy Camp Crk. Wells in reach (Aragon, Racetrack 7 & 11, Wells 16-24, Delbert Wells 1 & 2)	Within 19 cfs rate to Pueblo Reservoir 3.6 cfs to wells	Wells: C Pueblo Reservoir: C	09CW103 Appropriation date to Pueblo Reservoir: 8/11/2009 Appropriation date to wells: 12/28/2006 Pueblo Res exchange subject to 2004 Regional IGA
Chilcott Excess Aug Credits (15.5 shares)	Chilcott aug station, LIRFs, WWTPs, Fountain Creek Reservoir releases	Pueblo Reservoir; Venetucci point of depletion on Fountain Creek; Cumberland Green point of depletion on Jimmy Camp Crk. Wells in reach (Aragon, Racetrack 7 & 11, Wells 16-24, Delbert Wells 1 & 2)	Within 19 cfs rate to Pueblo Reservoir 2.8 cfs to wells	Wells: C Pueblo Reservoir: C	10CW99 Appropriation date to Pueblo Reservoir: 12/28/2006 Appropriation date to wells: 12/28/2006 Pueblo Res exchange subject to 2004 Regional IGA

Dr. Rogers	Aug station at Dr Rogers headgate; LIRFs, Fountain San District WWTP, LFMSSD WWTP; releases from Fountain Creek Reservoir	Pueblo Reservoir; Venetucci point of depletion on Fountain Creek; Cumberland Green point of depletion on Jimmy Camp Crk. Wells in reach (Aragon, Racetrack 7 & 11, Wells 16-24, Delbert Wells 1 & 2)	Within 19 cfs rate to Pueblo Reservoir To wells: Within 11 cfs rate decreed in 01CW146 and 85CW110	Wells: C Pueblo Reservoir: C	15CW3068 Appropriation date for all exchanges: 12/29/2015 Pueblo Res exchange subject to 2004 Regional IGA
FMIC Shares: (137 Shares)	Wastewater effluent (from Fountain San District WWTP and Widefield WWTP); LIRFs	Fountain Wells 1-15	11 cfs	A	85CW110 Appropriation date: 09/13/1985
FMIC Shares (221 from W-4396; 137 shares from 85CW110)	Crews Gulch aug station; Fountain San District WWTP; Widefield WWTP; LFMSDD WWTP; LIRFs; Downstream storage pursuant to 06CW120	Pueblo Reservoir	19 cfs (01CW108) (Other exchanges included within this rate)	A 3.09 C 15.91	01CW108 01CW108 exchange: Appropriation date: 03/27/2001 06CW120 ROY exchange: 05/27/2004 Subject to 2004 Regional IGA
FMIC Shares (190 shares)	(Exchange to wells):Sewered and non-sewered return flows after delivery of stored FMIC credits from Pueblo Reservoir to Distribution System Exchange to Pueblo Reservoir: Crews Gulch aug station; Spring Creek aug station; other FMIC aug station; LIRFs, Fountain San District WWTP, Widefield WWTP, LFMSDD WWTP Downstream storage pursuant to 06CW120	Fountain Wells: Aragon, Racetrack 7 and 11; Wells 16-24; Delbert Wells #1 and #2	11 cfs to wells (sewered and non-sewered return flows only) Within 19 cfs rate to Pueblo Reservoir	Wells: C Pueblo Reservoir: C	01CW146 01CW146: Appropriation date for exchange to wells: 12/28/2001 01CW146: Appropriation date for exchange to Pueblo Res: 03/27/2001 06CW120: 05/27/2004 Exchange to Pueblo Reservoir subject to 2004 Regional IGA

Fry Ark Return Flows (85CW110)	Wastewater effluent (from Fountain San District WWTP and Widefield WWTP); LIRFs	Fountain Wells 1-15	11 cfs	A	85CW110 Appropriation date: 09/13/1985
Fry Ark Return Flows (01CW108)	Crews Gulch aug station; Fountain San District WWTP; Widefield WWTP; LFMSDD WWTP; LIRFs; Downstream storage pursuant to 06CW120	Pueblo Reservoir	19 cfs	A 3.09 C 15.91	01CW108 01CW108 exchange: Appropriation date: 02/10/1939 (measured municipal return flows); 01/12/1989 (LIRFs) 06CW120 ROY exchange: 05/27/2004 Subject to 2004 Regional IGA
Miller Ditch	Chilcott Ditch aug station, LIRFs, WWTPs pursuant to 01CW108;	Pueblo Reservoir pursuant to 01CW108	Pueblo Reservoir: 19 cfs together with other exchanges	A 3.09 C 15.91	08CW114 Exchange to Pueblo Reservoir: 12/31/2008 subject to 2004 Regional IGA
ROY Exchange	Exchange to recover yield from foregone exchanges identified in 2004 Regional IGA (84CW62, 01CW108 and 01CW146)	Pueblo Reservoir	Shared exchange	C	06CW120 Appropriation date: 05/27/2004
Super Ditch	Exchange of water Fountain has leased from Super Ditch; exchange from and between various downstream Arkansas River locations	Pueblo Reservoir	Shared exchange	A 0.955 cfs for Fountain	10CW4 Appropriation dates: 03/13/2012 (Fountain First Priority – 2000 a.f.) 10/17/2018 (Fountain Second Priority – 1800 a.f.)

Table 6
City of Fountain Water Rights Yield

	A	B	C	D	E
			Annual Yield (acre-feet)		
	Water Right	**Water Court Case No.**	**Dry Year**	**Average Year**	**Wet Year**
	1st Use Water Rights				
1	Fryingpan-Arkansas Project Water 1st Use	85CW110	1,266.0	1,266.0	1,900.0
2	Stubbs and Miller Ditch	W-4396 and W-4559	100.0	100.0	100.0
	Total 1st-Use Rights		**1,366.0**	**1,366.0**	**2,000.0**
	Fully-Consumable Rights				
3	Fryingpan-Arkansas Project Return Flows	85CW110	880.6	880.6	1,321.5
4	221 Fountain Mutual Irrigation Company Shares	W-4396 and W-4559	154.7	154.7	221.0
5	137 Fountain Mutual Irrigation Company Shares	85CW110	95.9	95.9	137.0
6	190 Fountain Mutual Irrigation Company Shares	01CW146	133.0	133.0	190.0
7	92 Fountain Mutual Irrigation Company Shares	19CW3082 (pending)	64.4	64.4	92.0
8	Little Fountain Pipeline (Keeton Reservoir)	W-4396 and W-4559	78.0	160.0	229.0
9	512.5 Colorado Canal Company Shares	84CW62, 84CW63, and 84CW64	0.0	208.0	483.0
10	Miller Ditch	08CW114	285.0	285.0	392.0
11	10.25 Chilcott Ditch Shares	09CW103	213.0	252.3	382.1
12	15.50 Chilcott Ditch Shares	10CW99	322.1	381.5	577.8
13	Crabb Ditch	08CW115	35.2	35.2	52.8
14	Fountain Creek Priority No. 4	N/A			
15	2.125 cfs Fountain Creek Priority No. 17	19CW3081 (pending)			
16	2.125 cfs Fountain Creek Priority No. 17	N/A			
17	W. A. Bell Ditches	08CW47	0.0	228.5	315.0
18	Dr. Rogers Ditch	15CW3068	170.4	170.4	349.7
19	Super Ditch Current Leased Deliveries	N/A	500.0	500.0	500.0
20	**Total Fully-Consumable Rights**		**2,932.3**	**3,549.5**	**5,242.9**

Column Notes:

A In addition to the listed water rights, the City operates decreed and undecreed wells to supply water to its customers.

B Water Court decrees for the changes of water rights and augmentation plans authorizing the City's use of the listed water rights.

C Net annual volume (after deducting historical return flow obligations) available to Fountain during a typical dry year, based on historical records.

D Net annual volume (after deducting historical return flow obligations) available to Fountain during an average year, based on historical records.

E Net annual volume (after deducting historical return flow obligations) available to Fountain during a typical wet year, based on historical records.

Row Notes:

1 For the Fry-Ark Project, limitations of the Western Slope water rights cause the average annual yield to be roughly two-thirds of the 2,000 acre-feet per year delivered through the Fountain Valley Authority capacity in the Fountain Valey Conduit, for an actual yield of about 1,333 acre-feet per year. After five percent transmission and treatment loss, the net delivery of Fry-Ark Project water for Fountain's first use is approximately 1,266 acre-feet per year. The return flows from this source are considered to be fully-consumable supplies described in No. 3 below. Due to Fry-Ark Project storage in Pueblo Reservoir, the average annual delivery of 1,266 acre-feet per year can be achieved in dry years.

2 Pursuant to decree in Case Nos. W-4396 and W-4559, Fountain can pump up to 100 acre-feet per year from its wells under these water rights.

3 Calculated based on dry year, average year, and wet year deliveries in Row No. 1 above and the replacement percentages decreed in Case No. 85CW110.

4-7 Recent changes of FMIC shares, including the decree in Case No. 01CW146 and the proposed decree in Case No. 19CW3082, have limited the 20-year total credit to 14 acre-feet per share, or 0.70 acre-feet per year per share, and the maximum annual credit to 1.00 acre-feet per share. Due to FMIC's storage in Big Johnson Reservoir for FMIC shares, the average annual yield of 0.70 acre-feet per share can be achieved in dry years.

8 There have been no Little Fountain Pipeline deliveries since 2015. Average year yield is based on the 2002-2014 deliveries, dry year yield is based on the 2002 deliveries, and wet year yield is based on the 2005 deliveries.

9 The average annual Colorado Canal yield was previoulsy estimated by Wheeler and confirmed by actual deliveries to Fountain (at Pueblo Resevoir) during 2016-2020. The wet year delivery is based on the 2016 delivery to Fountain. There can be no deliveries in a dry years due to the junior nature of the Colorado Canal water right, even though there is 342 acre-feet of storage available in the Colorado Canal system. For example, there were no deliveries during 2018.

10 The decrees in Case No. 03CW59 and Case No. 08CW114 limit the 10-year consumptive use credit to 285 acre-feet per year and the maximum annual credit to 392 acre-feet per year. The average annual yield of 285 acre-feet per year can be achieved during a dry year.

11-12 The decrees in Case No. 06CW119, Case No. 09CW103 and Case No. 10CW99 limit the net consumptive use credits (irrigation season credits less non-irrigation season return flow obligations) to an average of 24.61 acre-feet per year and the maximum annual net credits to 37.28 acre-feet per share. Based on Fountain's 2012 water rights accounting, the net credits are reduced to approximatley 20.78 acre-feet per share during a typical dry year.

13 The decree in Case No. 08CW115 limits the 10-year average consumptive use credit to 35.2 acre-feet per year and the maximum annual consumtpive use credit to 52.8 acre-feet per year. There are no return flow obligations during the non-irrigation season. Based on historical diversion records and Fountain's 2020 accounting records, the average annual yield of 35.2 acre-feet per year can be acheieved during a typical dry year.

14-16 This analysis for Fountain's 2021 Master plan has conservatively excluded any potential yield associated with Fountain's Priority Nos. 4 and 17 water rights due to uncertainties associated with changes of these water rights.

17 The decree in Case No. 08CW47 limit the net consumptive use credits (irrigation season credits minus non-irrigation season return flow obligations) to an average of 239.3 acre-feet per year and the maximum annual net credit to 329.8 acre-feet per year. These amounts were reduced by transit losses to Pueblo Reservoir of approximately 4.5 percent, which is the transit loss percentage presently assessed by the Division Engineer's Office, for a net average credit of 228.5 acre-feet per year and maximum annual credit of 315.0 acre-feet per year at Pueblo Reservoir. There are no credits available during dry years due to low flows on Venable Creek and Alvarado Creek.

18 The decree in Case No. 15CW3068 limits the net consumptive use credits (irrigation season credits minus non-irrigation season return flow obligations) to an average of 170.4 acre-feet per year and the maximum annual net credit to 349.7 acre-feet per year. Based on review of historical diversion records, the average annual yield can be achieved in dry years.

19 Fountain presently leases 500 acre-feet per year of fully-consumable water delivered at Pueblo Reservoir. This amount can be increased over time accouding to the schedule in the October 2018 amended and restated water lease between Lower Arkansas Valley Super Ditch Company and Fountain. The maximum leased amount is 3,800 acre-feet per year, which would be available by year 2046.

20 This row represents the total volume of fully-consumable supplies available for Fountain's initial use. As described in Table Nos. 7, 8, and 9, the physical water deliveries that can be achieved with the fully-consumable supplies exceed these totals, since the return flows are available for successive use to extinction.

Table 7
City of Fountain Current Water Sources Yield with No Curtailment of Fry-Ark Project Deliveries
(values in acre-feet per year)

		A	B	C
	Water Supply Source	**Annual Physical Supply Amount**	**Fountain Fully Consumable Water Required**	**Cumulative Fully Consumable Water Required**
1	Fry-Ark Project Water through Fountain Valley Conduit	1,266	0	0
2	Other Fully Consumable Water through Fountain Valley Conduit	634	423	423
3	Fully Consumable Water through Southern Delvery System	2,500	1,668	2,090
4	Stubbs and Miller Ditch Rights through Fountain Creek Wells	100	0	2,090
5	Fountain Creek Wells Augmented by Fully Consumable Rights	1,356	678	2,768
6	Venetucci Wells	113	57	2,825
7	**Subtotal for Existing Physical Supplies**	5,969	2,825	
	Dry-Year			
8	**Water Suppy Yield Limited by Available Fully-Consumble Water Rights**	6,184	2,932	
9	**Water Suppy Yield with 10 Percent Contingency**	5,565		
	Average-Year			
10	**Water Suppy Yield Limited by Available Fully-Consumble Water Rights**	7,418	3,549	
11	**Water Suppy Yield with 10 Percent Contingency**	6,676		
	Wet-Year			
12	**Water Suppy Yield Limited by Available Fully-Consumble Water Rights**	10,805	5,243	
13	**Water Suppy Yield with 10 Percent Contingency**	9,725		

Column Notes:

A Annual supply that is physically available for delivery to Fountain, assuming sufficient production, conveyance and treatment facilities

B Annual amount of Fountain's fully consumable water to support the delivery amounts in Column A. Based on Fountain's production of return flows and operational experience, Wheeler estimates that approximately 2.0 acre-feet of water deliveries from Fountain's wells or future Fountain Creek surface supplies can be produced from each acre-foot of fully consumable water. Wheeler estimates that approximately 1.5 acre-feet of water deliveries from Pueblo Reservoir can be produced from each acre-foot of fully consumable water. This estimate asssumes that Fountain will have sufficent physical production, conveyance and treatment capacities from a combination of Fountain Creek and Arkansas River facilities to achieve these delivery volumes.

C Cumulative total for Column B.

Row Notes:

1 For the Fry-Ark Project, limitations of the Western Slope water rights cause the average annual yield to be roughly two-thirds of the 2,000 acre-feet per year delivered through the Fountain Valley Authority capacity in the Fountain Valey Conduit, for an actual yield of about 1,333 acre-feet per year. After five percent transmission and treatment loss, the net delivery of Fry-Ark Project water for Fountain's first use is approximately 1,266 acre-feet per year.

2 The remaining 667 acre-feet per year delivered through the Fountain Valley Conduit is supplied out of Fountain's other fully consumable sources stored at Pueblo Reservoir. After five percent loss, the net delivery amount is approximately 634 acre-feet per year.

3 Fountain’s share of capacity in SDS is 2,500 acre-feet per year of treated water delivered to Fountain's municipal water system. These deliveries to Fountain are physically conveyed from Pueblo Resrvoir through the Fountain Valley Conduit under a trade with Colorado Springs Utilities.

4 Pursuant to decree in Case Nos. W-4396 and W-4559, Fountain can pump up to 100 acre-feet per year from its wells under these water rights.

5 The City estimated a sustainable and reliable delivery rate of 1.30 MGD (1,456 acre-feet per year). This volume was reduced by the 100 acre-feet of pumping under the Stubbs and Miller Ditch water rights.

6 Venetucci Wells diversions under Fountain's long-term sublease of the water available to Security and Widefield's under a long-term lease with the Pikes Peak Community Foundation. This estimated amount is based on Fountain's long term sub-leased portion (10 percent) of the annual municipal pumping limit under the Widefield Aquifer stiulation (1,125 acre-feet per year assuming water is exported and there is continued irrigation by the Pikes Peak Community Foundation). These wells can temporarily pump an additional 10 percent from the Widefield Aquifer, but such additional pumping is conservatively excluded from this table because it is unknown if the increased pumping allowance will be permanent.

7 Sum of Row Nos. 1 through 6. The physically available supply of 5,969 acre-feet per year would require approximatley 2,825 acre-feet per year of fully cocnsumable water, which is less than the averge yield of fully consumable supplies presently available to Fountain.
8 Water supply deliveries that can be supported by the dry year yield of fully consumable supplies presently available to Fountain (2,932 acre feet per year identfied in Table No. 1). This value assumes that additional water supply deliveries will be developed in the Fountain Creek Basin from either wells or a surface diversion.
9 Column No. 8 reduced by ten percent contingency for reduction in yield due to climate change or other future conditions
10 Water supply deliveries that can be supported by the average year yield of fully consumable supplies presently available to Fountain (3,549 acre-feet per year identfied in Table No. 1). This value assumes that additional water supply deliveries will be developed in the Fountain Creek Basin from either wells or a surface diversion.
11 Column No. 10 reduced by ten percent contingency for reduction in yield due to climate change or other future conditions
12 Water supply deliveries that can be supported by the wet year yield of fully consumable supplies presently available to Fountain (5,243 acre-feet per year identfied in Table No. 1). This value assumes that additional water supply deliveries will be developed in the Fountain Creek Basin from either wells or a surface diversion.
13 Column No. 12 reduced by ten percent contingency for reduction in yield due to climate change or other future conditions

Table 8
City of Fountain Current Water Sources Yield with Moderate Curtailment of Fry-Ark Project Deliveries
(values in acre-feet per year)

		A	B	C
	Water Supply Source	**Annual Physical Supply Amount**	**Fountain Fully Consumable Water Required**	**Cumulative Fully Consumable Water Required**
1	Fry-Ark Project Water through Fountain Valley Conduit	950	0	0
2	Other Fully Consumable Water through Fountain Valley Conduit	950	634	634
3	Fully Consumable Water through Southern Delvery System	2,500	1,668	2,301
4	Stubbs and Miller Ditch Rights through Fountain Creek Wells	100	0	2,301
5	Fountain Creek Wells Augmented by Fully Consumable Rights	1,356	678	2,979
6	Venetucci Wells	113	57	3,036
7	**Subtotal for Existing Physical Supplies**	5,969	3,036	
	Dry-Year			
8	**Water Suppy Yield Limited by Available Fully-Consumble Water Rights**	5,762	2,932	
9	**Water Suppy Yield with 10 Percent Contingency**	5,186		
	Average-Year			
10	**Water Suppy Yield Limited by Available Fully-Consumble Water Rights**	6,997	3,549	
11	**Water Suppy Yield with 10 Percent Contingency**	6,297		
	Wet-Year			
12	**Water Suppy Yield Limited by Available Fully-Consumble Water Rights**	10,384	5,243	
13	**Water Suppy Yield with 10 Percent Contingency**	9,345		

Column Notes:

A Annual supply that is physically available for delivery to Fountain, assuming sufficient production, conveyance and treatment facilities

B Annual amount of Fountain's fully consumable water to support the delivery amounts in Column A. Based on Fountain's production of return flows and operational experience, Wheeler estimates that approximately 2.0 acre-feet of water deliveries from Fountain's wells or future Fountain Creek surface supplies can be produced from each acre-foot of fully consumable water. Wheeler estimates that approximately 1.5 acre-feet of water deliveries from Pueblo Reservoir can be produced from each acre-foot of fully consumable water. This estimate asssumes that Fountain will have sufficent physical production, conveyance and treatment capacities from a combination of Fountain Creek and Arkansas River facilities to achieve these delivery volumes.

C Cumulative total for Column B.

Row Notes:

1 For the Fry-Ark Project, limitations of the Western Slope water rights cause the average annual yield of these water rights to be limited to roughly two-thirds of the 2,000 acre-feet per year delivered through the Fountain Valley Authority capacity in the Fountain Valey Conduit, for an actual yield of about 1,333 acre-feet per year. We have further assumed that moderate curtailment of the Western Slope water rights in response to a Colorado River compact call or demand management will further reduce the average annual yield of the Fry-Ark Project to one-half of the 2,000 acre-feet delivered through the Fountain Valley Conduit, for a reduced actual yield of about 1,000 acre-feet per year. After five percent transmission and treatment loss, the net Fry-Ark Project water delivery for Fountain's first use, as reduced for a moderal compact call or demand managment scenario, is approximately 950 acre-feet per year.

2 The remaining 1,000 acre-feet per year delivered through the Fountain Valley Conduit is supplied out of Fountain's other fully consumable sources stored at Pueblo Reservoir. After five percent loss, the net delivery amount is approximately 950 acre-feet per year.

3 Fountain’s share of capacity in SDS is 2,500 acre-feet per year of treated water delivered to Fountain's municipal water system. These deliveries to Fountain are physically conveyed from Pueblo Resrvoir through the Fountain Valley Conduit under a trade with Colorado Springs Utilities.

4 Pursuant to decree in Case Nos. W-4396 and W-4559, Fountain can pump up to 100 acre-feet per year from its wells under these water rights.

5 The City estimated a sustainable and reliable delivery rate of 1.30 MGD (1,456 acre-feet per year). This volume was reduced by the 100 acre-feet of pumping under the Stubbs and Miller Ditch water rights.

6 Venetucci Wells diversions under Fountain's long-term sublease of the water available to Security and Widefield's under a long-term lease with the Pikes Peak Community Foundation. This estimated amount is based on Fountain's long term sub-leased portion (10 percent) of the annual municipal pumping limit under the Widefield Aquifer stiulation (1,125 acre-feet per year assuming water is exported and there

is continued irrigation by the Pikes Peak Community Foundation). These wells can temporarily pump an additional 10 percent from the Widefield Aquifer, but such additional pumping is conservatively excluded from this table because it is unknown if the increased pumping allowance will be permanent.

7 Sum of Row Nos. 1 through 6. The physically available supply of 5,969 acre-feet per year would require approximatley 3,036 acre-feet per year of fully cocnsumable water, which is less than the averge yield of fully consumable supplies presently available to Fountain.

8 Water supply deliveries that can be supported by the dry year yield of fully consumable supplies presently available to Fountain (2,932 acre-feet per year identfied in Table No. 1). This value assumes that additional water supply deliveries will be developed in the Fountain Creek Basin from either wells or a surface diversion.

9 Column No. 8 reduced by ten percent contingency for reduction in yield due to climate change or other future conditions

10 Water supply deliveries that can be supported by the average year yield of fully consumable supplies presently available to Fountain (3,549 acre-feet per year identfied in Table No. 1). This value assumes that additional water supply deliveries will be developed in the Fountain Creek Basin from either wells or a surface diversion.

11 Column No. 10 reduced by ten percent contingency for reduction in yield due to climate change or other future conditions

12 Water supply deliveries that can be supported by the wet year yield of fully consumable supplies presently available to Fountain (5,243 acre-feet per year identfied in Table No. 1). This value assumes that additional water supply deliveries will be developed in the Fountain Creek Basin from either wells or a surface diversion.

13 Column No. 12 reduced by ten percent contingency for reduction in yield due to climate change or other future conditions

Table 9
City of Fountain Current Water Sources Yield with Severe Curtailment of Fry-Ark Project Deliveries
(values in acre-feet per year)

		A	B	C
	Water Supply Source	**Annual Physical Supply Amount**	**Fountain Fully Consumable Water Required**	**Cumulative Fully Consumable Water Required**
1	Fry-Ark Project Water through Fountain Valley Conduit	634	0	0
2	Other Fully Consumable Water through Fountain Valley Conduit	1,266	844	844
3	Fully Consumable Water through Southern Delvery System	2,500	1,668	2,512
4	Stubbs and Miller Ditch Rights through Fountain Creek Wells	100	0	2,512
5	Fountain Creek Wells Augmented by Fully Consumable Rights	1,356	678	3,190
6	Venetucci Wells	113	57	3,246
7	**Subtotal for Existing Physical Supplies**	5,969	3,246	
	Dry-Year			
8	**Water Suppy Yield Limited by Available Fully-Consumble Water Rights**	5,341	2,932	
9	**Water Suppy Yield with 10 Percent Contingency**	4,807		
	Average-Year			
10	**Water Suppy Yield Limited by Available Fully-Consumble Water Rights**	6,575	3,549	
11	**Water Suppy Yield with 10 Percent Contingency**	5,918		
	Wet-Year			
12	**Water Suppy Yield Limited by Available Fully-Consumble Water Rights**	9,962	5,243	
13	**Water Suppy Yield with 10 Percent Contingency**	8,966		

Column Notes:

A Annual supply that is physically available for delivery to Fountain, assuming sufficient production, conveyance and treatment facilities

B Annual amount of Fountain's fully consumable water to support the delivery amounts in Column A. Based on Fountain's production of return flows and operational experience, Wheeler estimates that approximately 2.0 acre-feet of water deliveries from Fountain's wells or future Fountain Creek surface supplies can be produced from each acre-foot of fully consumable water. Wheeler estimates that approximately 1.5 acre-feet of water deliveries from Pueblo Reservoir can be produced from each acre-foot of fully consumable water. This estimate asssumes that Fountain will have sufficent physical production, conveyance and treatment capacities from a combination of Fountain Creek and Arkansas River facilities to achieve these delivery volumes.

C Cumulative total for Column B.

Row Notes:

1 For the Fry-Ark Project, limitations of the Western Slope water rights cause the average annual yield to be roughly two-thirds of the 2,000 acre-feet per year delivered through the Fountain Valley Authority capacity in the Fountain Valey Conduit, for an actual yield of about 1,333 acre-feet per year. We have further assumed that severe curtailment of the Western Slope water rights in response to a Colorado River compact call or demand management will further reduce the average annual yield of the Fry-Ark Project to one-third of the 2,000 acre-feet delivered through the Fountain Valley Conduit, for a reduced actual yield of about 667 acre-feet per year. After five percent transmission and treatment loss, the net Fry-Ark Project water delivery for Fountain's first use, as reduced for a severe compact call or demand managment scenario, is approximately 634 acre-feet per year.

2 The remaining 1,333 acre-feet per year delivered through the Fountain Valley Conduit is supplied out of Fountain's other fully consumable sources stored at Pueblo Reservoir. After five percent loss, the net delivery amount is approximately 1,266 acre-feet per year.

3 Fountain’s share of capacity in SDS is 2,500 acre-feet per year of treated water delivered to Fountain's municipal water system. These deliveries to Fountain are physically conveyed from Pueblo Resrvoir through the Fountain Valley Conduit under a trade with Colorado Springs Utilities.

4 Pursuant to decree in Case Nos. W-4396 and W-4559, Fountain can pump up to 100 acre-feet per year from its wells under these water rights.

5 The City estimated a sustainable and reliable delivery rate of 1.30 MGD (1,456 acre-feet per year). This volume was reduced by the 100 acre-feet of pumping under the Stubbs and Miller Ditch water rights.

6 Venetucci Wells diversions under Fountain's long-term sublease of the water available to Security and Widefield's under a long-term lease with the Pikes Peak Community Foundation. This estimated amount is based on Fountain's long term sub-leased portion (10 percent) of the annual municipal pumping limit under the Widefield Aquifer stiulation (1,125 acre-feet per year assuming water is exported and there

is continued irrigation by the Pikes Peak Community Foundation). These wells can temporarily pump an additional 10 percent from the Widefield Aquifer, but such additional pumping is conservatively excluded from this table because it is unknown if the increased pumping allowance will be permanent.

7 Sum of Row Nos. 1 through 6. The physically available supply of 5,969 acre-feet per year would require approximatley 3,246 acre-feet per year of fully cocnsumable water, which is less than the average yield of fully consumable supplies presently available to Fountain.

8 Water supply deliveries that can be supported by the dry year yield of fully consumable supplies presently available to Fountain (2,932 acre-feet per year identfied in Table No. 1). This value assumes that additional water supply deliveries will be developed in the Fountain Creek Basin from either wells or a surface diversion.

9 Column No. 8 reduced by ten percent contingency for reduction in yield due to climate change or other future conditions

10 Water supply deliveries that can be supported by the average year yield of fully consumable supplies presently available to Fountain (3,549 acre-feet per year identfied in Table No. 1). This value assumes that additional water supply deliveries will be developed in the Fountain Creek Basin from either wells or a surface diversion.

11 Column No. 10 reduced by ten percent contingency for reduction in yield due to climate change or other future conditions

12 Water supply deliveries that can be supported by the wet year yield of fully consumable supplies presently available to Fountain (5,243 acre-feet per year identfied in Table No. 1). This value assumes that additional water supply deliveries will be developed in the Fountain Creek Basin from either wells or a surface diversion.

13 Column No. 12 reduced by ten percent contingency for reduction in yield due to climate change or other future conditions

Table 10
Schedule of Required Additional Fully Consuable Water Rights

1	2	3	4	5	6	7	8	9	10	11	12	13
	Required Deliveries from Additional Fully Consumable Rights (acre-feet per year)			Additional Fully Consumable Water Rights Required (average-year yield in acre-feet)								
				Fry-Ark Project Water No Curtailment			Fry-Ark Project Water Moderate Curtailment			Fry-Ark Project Water Severe Curtailment		
Demand (acre-feet per year)	Fry-Ark Project Water No Curtailment	Fry-Ark Project Water Moderate Curtailment	Fry-Ark Project Water Severe Curtailment	Additional Rights for FVA and SDS	Additional Rights for Fountain Creek Sources	Total Additional Rights	Additional Rights for FVS and SDS	Additional Rights for Fountain Creek Sources	Total Additional Rights	Additional Rights for FVA and SDS	Additional Rights for Fountain Creek Sources	Total Additional Rights
3,000	0	0	0	0	0	0	0	0	0	0	0	0
3,500	0	0	0	0	0	0	0	0	0	0	0	0
4,000	0	0	0	0	0	0	0	0	0	0	0	0
4,500	0	0	0	0	0	0	0	0	0	0	0	0
5,000	0	0	0	0	0	0	0	0	0	0	0	0
5,500	0	0	0	0	0	0	0	0	0	0	0	0
6,000	0	0	92	0	0	0	0	0	0	61	0	61
6,500	0	226	647	0	0	0	150	0	150	432	0	432
7,000	360	781	1,203	240	0	240	521	0	521	802	0	802
7,500	915	1,337	1,758	610	0	610	892	0	892	1,173	0	1,173
8,000	1,471	1,892	2,314	981	0	981	1,262	0	1,262	1,543	0	1,543
8,500	2,026	2,448	2,869	1,154	148	1,302	1,365	201	1,566	1,575	254	1,829
9,000	2,582	3,003	3,425	1,154	426	1,580	1,365	479	1,843	1,575	531	2,107
9,500	3,137	3,559	3,980	1,154	704	1,858	1,365	756	2,121	1,575	809	2,385
10,000	3,693	4,114	4,536	1,154	982	2,135	1,365	1,034	2,399	1,575	1,087	2,662
10,500	4,249	4,670	5,092	1,154	1,259	2,413	1,365	1,312	2,677	1,575	1,365	2,940
11,000	4,804	5,226	5,647	1,154	1,537	2,691	1,365	1,590	2,954	1,575	1,643	3,218
11,500	5,360	5,781	6,203	1,154	1,815	2,969	1,365	1,868	3,232	1,575	1,920	3,496
12,000	5,915	6,337	6,758	1,154	2,093	3,246	1,365	2,145	3,510	1,575	2,198	3,774

Column Notes:

1 Total demand for deliveries to Fountain.
2 (Col. 1 - 6,676 acre-feet average-year yield of existing water rights (with 10 percent contingency)) / 90 percent for contingency
3 (Col. 1 - 6,297 acre-feet average-year yield of existing water rights (with 10 percent contingency)) / 90 percent for contingency
4 (Col. 1 - 5,918 acre-feet average-year yield of existing water rights (with 10 percent contingency)) / 90 percent for contingency
5 Additional fully consumable water rights to provide deliveries of 634 acre-feet year from Pueblo Reservoir within the Fountain Valley Authority capacity and 2,500 acre-feet per year from Pueblo Reservoir within the SDS capacity. This calculation subtracts the average annual yield of 937 acre-feet per year from existing water rights located on the Arkansas River.
6 Additional fully consumable water rights to provide the remaining deliveries using Fountain Creek sources.
7 Total additional fully consumable water rights to provide the required deliveries from Pueblo Reservoir and Fountain Creek sources: Col. 5 + Col. 6
8 Additional fully consumable water rights to provide deliveries of 950 acre-feet year from Pueblo Reservoir within the Fountain Valley Authority capacity and 2,500 acre-feet per year from Pueblo Reservoir within the SDS capacity. This calculation subtracts the average annual yield of 937 acre-feet per year from existing water rights located on the Arkansas River.
9 Additional fully consumable water rights to provide the remaining deliveries using Fountain Creek sources.
10 Total additional fully consumable water rights to provide the required deliveries from Pueblo Reservoir and Fountain Creek sources: Col. 8 + Col. 9
11 Additional fully consumable water rights to provide deliveries of 1,266 acre-feet year from Pueblo Reservoir within the Fountain Valley Authority capacity and 2,500 acre-feet per year from Pueblo Reservoir within the SDS capacity. This calculation subtracts the average annual yield of 937 acre-feet per year from existing water rights located on the Arkansas River.
12 Additional fully consumable water rights to provide the remaining deliveries using Fountain Creek sources.
13 Total additional fully consumable water rights to provide the required deliveries from Pueblo Reservoir and Fountain Creek sources: Col. 11 + Col. 12

Table 11
Schedule of Required Storage

1	2	3	4	4A	5	6	7	8	8A	9	10	11	12	12A	13	14	15	16	17
	Deliveries from Fully Consumable Water Rights (acre-feet per year)			Required Storage-No Fry-Ark Project Curtailment (acre-feet)					Required Storage-Moderate Project Curtailment (acre-feet)					Required Storage-Severe Project Curtailment (acre-feet)					
Demand (acre-feet per year)	Fry-Ark Project Water No Curtailment	Fry-Ark Project Water Moderate Curtailment	Fry-Ark Project Water Severe Curtailment	Project Water Account	Pueblo Reservoir Master Account	Pueblo Reservoir SDS Account	Other Storage	Total	Project Water Account	Pueblo Reservoir Master Account	Pueblo Reservoir SDS Account	Other Storage	Total	Project Water Account	Pueblo Reservoir Master Account	Pueblo Reservoir SDS Account	Other Storage	Total	2 Years of Demand (acre-feet)
3,000	1,634	1,950	2,266	7,761	250	1,253	0	9,264	7,761	250	1,544	0	9,555	7,761	250	1,835	0	9,846	6,000
3,500	2,134	2,450	2,766	7,761	250	1,713	0	9,724	7,761	250	2,004	0	10,015	7,761	250	2,295	0	10,306	7,000
4,000	2,634	2,950	3,266	7,761	250	2,173	0	10,184	7,761	414	2,300	0	10,475	7,761	705	2,300	0	10,766	8,000
4,500	3,134	3,450	3,766	7,761	583	2,300	0	10,644	7,761	874	2,300	0	10,935	7,761	1,000	2,465	0	11,226	9,000
5,000	3,634	3,950	4,266	7,761	1,000	2,343	0	11,104	7,761	1,000	2,500	134	11,395	7,761	1,000	2,500	425	11,686	10,000
5,500	4,134	4,450	4,766	7,761	1,000	2,500	303	11,564	7,761	1,000	2,500	594	11,855	7,761	1,000	2,500	885	12,146	11,000
6,000	4,634	4,950	5,266	7,761	1,000	2,500	763	12,024	7,761	1,000	2,500	1,054	12,315	7,761	1,000	2,500	1,345	12,606	12,000
6,500	5,134	5,450	5,766	7,761	1,000	2,500	1,223	12,484	7,761	1,000	2,500	1,514	12,775	7,761	1,000	2,500	1,805	13,066	13,000
7,000	5,634	5,950	6,266	7,761	1,000	2,500	1,683	12,944	7,761	1,000	2,500	1,974	13,235	7,761	1,000	2,500	2,265	13,526	14,000
7,500	6,134	6,450	6,766	7,761	1,000	2,500	2,143	13,404	7,761	1,000	2,500	2,434	13,695	7,761	1,000	2,500	2,725	13,986	15,000
8,000	6,634	6,950	7,266	7,761	1,000	2,500	2,603	13,864	7,761	1,000	2,500	2,894	14,155	7,761	1,000	2,500	3,185	14,446	16,000
8,500	7,134	7,450	7,766	7,761	1,000	2,500	3,063	14,324	7,761	1,000	2,500	3,354	14,615	7,761	1,000	2,500	3,645	14,906	17,000
9,000	7,634	7,950	8,266	7,761	1,000	2,500	3,523	14,784	7,761	1,000	2,500	3,814	15,075	7,761	1,000	2,500	4,105	15,366	18,000
9,500	8,134	8,450	8,766	7,761	1,000	2,500	3,983	15,244	7,761	1,000	2,500	4,274	15,535	7,761	1,000	2,500	4,565	15,826	19,000
10,000	8,634	8,950	9,266	7,761	1,000	2,500	4,443	15,704	7,761	1,000	2,500	4,734	15,995	7,761	1,000	2,500	5,025	16,286	20,000
10,500	9,134	9,450	9,766	7,761	1,000	2,500	4,903	16,164	7,761	1,000	2,500	5,194	16,455	7,761	1,000	2,500	5,485	16,746	21,000
11,000	9,634	9,950	10,266	7,761	1,000	2,500	5,363	16,624	7,761	1,000	2,500	5,654	16,915	7,761	1,000	2,500	5,945	17,206	22,000
11,500	10,134	10,450	10,766	7,761	1,000	2,500	5,823	17,084	7,761	1,000	2,500	6,114	17,375	7,761	1,000	2,500	6,405	17,666	23,000
12,000	10,634	10,950	11,266	7,761	1,000	2,500	6,283	17,544	7,761	1,000	2,500	6,574	17,835	7,761	1,000	2,500	6,865	18,126	24,000

Column Notes:

1 Total demand for deliveries to Fountain.
2 Col. 1 - 1,266 acre-feet per year Fry-Ark Project Water 1st use deliveries - 100 acre-feet per year Stubbs and Miller Ditch diversions
3 Col. 1 - 950 acre-feet per year Fry-Ark Project Water 1st use deliveries - 100 acre-feet per year Stubbs and Miller Ditch diversions
4 Col. 1 - 634 acre-feet per year Fry-Ark Project Water 1st use deliveries - 100 acre-feet per year Stubbs and Miller Ditch diversions
4A Fixed capacity of 7,761 acre-feet available for storage of Fry-Ark Project Water. This capacity is required to provide carry-over storage during years of an extended drought to ensure that the average deliveries of Project Water continue during dry years. In other words, this large storage capacity is required to achieve the Project Water 1st use deliveries of 1,266 acre-feet per year (applied in Col. 2) on a reliable basis.
5 Storage required, along with SDS Account storage, to provide reliable deliveries of 634 acre-feet year from Pueblo Reservoir within the Fountain Valley Authority capacity and to support additional Fountain Creek diversions by exchange. The current storage volume is 250 acre-feet and can be increased up to 1,000 acre-feet.
6 Storage required to provide reliable deliveries of up to 2,500 acre-feet per year within the SDS capacity. This storage is also required, along with the Master Account storage, to provide reliable deliveries of 634 acre-feet per year within the Fountain Valley Authority capacity and to support additional Fountain Creek diversions by exchange. The storage volume is limited by contract to 2,500 acre-feet beginning in year 2025.
7 Remaining storage required after deducting Pueblo Reservoir storage accounts: Col. 8 - 4A - Col. 5 - Col. 6.
8 Total storage required to provide reliable deliveries in Col. 2: Col. 4A + Col. 2 x 0.92.
8A Fixed capacity of 7,761 acre-feet available for storage of Fry-Ark Project Water. This capacity is required to provide carry-over storage during years of an extended drought to ensure that the average deliveries of Project Water continue during dry years. In other words, this large storage capacity is required to achieve the Project Water 1st use deliveries of 950 acre-feet per year (applied in Col. 3) on a reliable basis.
9 Storage required, along with SDS Account storage, to provide reliable deliveries of 950 acre-feet year from Pueblo Reservoir within the Fountain Valley Authority capacity and to support additional Fountain Creek diversions by exchange. The current storage volume is 250 acre-feet and can be increased up to 1,000 acre-feet.
10 Storage required to provide reliable deliveries of up to 2,500 acre-feet per year within the SDS capacity. This storage is also required, along with the Master Account storage, to provide reliable deliveries of 950 acre-feet per year within the Fountain Valley Authority capacity and to support additional Fountain Creek diversions by exchange. The storage volume is limited by contract to 2,500 acre-feet beginning in year 2025.
11 Remaining storage required after deducting Pueblo Reservoir storage accounts: Col. 12 - Col. 8A - Col. 9 - Col. 10.
12 Total storage required to provide reliable deliveries in Col. 3: Col. 8A + Col. 3 x 0.92.
12A Fixed capacity of 7,761 acre-feet available for storage of Fry-Ark Project Water. This capacity is required to provide carry-over storage during years of an extended drought to ensure that the average deliveries of Project Water continue during dry years. In other words, this large storage capacity is required to achieve the Project Water 1st use deliveries of 634 acre-feet per year (applied in Col. 4) on a reliable basis.
13 Storage required, along with SDS Account storage, to provide reliable deliveries of 1,266 acre-feet year from Pueblo Reservoir within the Fountain Valley Authority capacity and to support additional Fountain Creek diversions by exchange. The current storage volume is 250 acre-feet and can be increased up to 1,000 acre-feet.
14 Storage required to provide reliable deliveries of up to 2,500 acre-feet per year within the SDS capacity. This storage is also required, along with the Master Account storage, to provide reliable deliveries of 1,266 acre-feet per year within the Fountain Valley Authority capacity and to support additional Fountain Creek diversions by exchange. The storage volume is limited by contract to 2,500 acre-feet beginning in year 2025.
15 Remaining storage required after deducting Pueblo Reservoir storage accounts: Col. 16 - 12A - Col. 13 - Col. 14.
16 Total storage requried to provide reliable deliveries in Col. 4: Col. 12A + Col. 4 x 0.92.
17 Storage capacity equal to two years of demand: 2 x Col. 1.

FOUNTAIN WATER MASTER PLAN 2021
WATER DELIVERY

INTRODUCTION

Water delivery includes: water treatment, treated water storage, transmission and distribution. Water delivery planning is necessary to identify the replacement, upgrade and expansion of the infrastructure and facilities necessary to continue to provide service to the existing customers and to provide service to new customers as vacant land develops. The information developed in this section will be used as a basis to establish a long-term capital improvements plan.

The City of Fountain contracted with Black & Veatch for Water Resource Engineering services for the Water Delivery Section of the Water Master Plan. Black & Veatch's Technical Memorandum, Water Distribution System Master Plan – 2021 Update, is included in this Section.

WATER DELIVERY SCENARIOS FOR PLANNING

As with the Water Demand section, the Water Delivery section includes three different scenarios, all of which are contained within the current water system service area:

Scenario 1: The water delivery infrastructure needed to continue to serve the existing water users;

Scenario 2: The water delivery infrastructure needed to serve the currently undeveloped areas of the City, excluding the Kane Ranch; and

Scenario 3: The water delivery infrastructure needed to serve the currently undeveloped areas of the City, including the Kane Ranch.

WATER TREATMENT PLANNING

Fountain's treated water supply can satisfy the current annual demand and the current peak day demand. However, the City is approaching the limit of the water system's capability to supply the treated water required to meet the City's peak daily demand. Additional treated water will soon be necessary to meet the growth projections. Satisfying this demand requires planning for new water treatment, which requires comprehensive planning, extensive permitting, professional design and funding. In order to meet the estimated demand at build out, it is likely that multiple water treatment projects will be necessary.

Potential Water Treatment Opportunities: Five opportunities have been identified as potential treated water sources; these are defined in Scenario 2 as Projects 2.18, 2.19, 2.20, 2.21 and 2.29.
Recommendation: It is recommended that each of these potential sources of treated water be thoroughly evaluated and the most cost-effective and timely of the projects be developed for implementation. It is expected that multiple projects will be addressed concurrently.
Potential policy considerations: No immediate policy issues have been identified.

SCENARIO 1 WATER DELIVERY PROJECTS

Water delivery projects needed to maintain the level of service to the current water users in the water service area.

1.1 Goldfield to Fountain Mesa Road Transmission Main:

Part 1 is to replace or construct a new 16" transmission main paralleling the existing 12" Main from the Goldfield Tanks site along Fortman Avenue to Fountain Mesa Road. This improves the system flows and pressures supplying the Fountain High Zone existing demand and the existing main is approaching the end of useful life.

Part 2 is to replace or construct a new 16" transmission main paralleling the existing 12" Main along Fountain Mesa Road Southerly to the Fountain Fire Station 2. This improves the system flows and pressures supplying the Fountain High Zone existing demand and the existing main is approaching the end of useful life. There is a trenchless design (designed by Drexel Barell) for the Fountain-Mesa Road intersection with Mesa Ridge Parkway.

1.2 Fire Station #2 Fire Hydrant:
This hydrant is currently on a 4" dead-end line from the West. To improve the fire flow to this hydrant, the Western connection should be abandoned and the hydrant should be connected to the 12" main in Fountain Mesa Road (to the East).

1.3 South Santa Fe Avenue Project 3:
Replace the existing 4" main in South Santa Fe Avenue southerly of Illinois Avenue with an 8" main to increase fire flow to meet commercial flow standards. Work with the City to incorporate this into the Indiana Avenue intersection project.

1.4 West Iowa Avenue Water Main Loop:
Extend the 8" main on Iowa West of Santa Fe Avenue Easterly to connect to the 8" main in Santa Fe Avenue. This requires a trenchless connection to the Santa Fe Avenue main, resulting in increased fire flow on the West Iowa Avenue hydrants.

1.5 Alabama Avenue Water Main Project:
Extend an 8" main from the dead end east of the railroad, boring under Santa Fe Avenue, connecting to existing dead end 6" main in West Alabama Avenue. This improves fire flow to meet commercial standards at the Junior High School and commercial properties.

1.6 Metering:
One capital element of the general operations of the water system is the metering/billing network. This includes a plan to replace all water meters every ten years and plan that each replacement will include new collection technology. Meter replacement depends on battery life and is part of an integrated system to read and recover all metered usage precisely and remotely.

1.7 Downtown Fountain Cast Iron Main Replacement:
Many of the water mains (with associated valves, hydrants and services) in downtown Fountain were replaced about 20 years ago using CDBG funding. Not all of the small mains were replaced with larger, modern material mains. Currently, multiple relatively small (4" to 6" diameter) cast iron mains remain. These mains often have few services and some fire hydrants. These mains have only recently been failing, but when they fail, the water main in an entire block may require replacement. There are also multiple short dead end mains in downtown. These main replacements will result in increased flow, pressure and decreased stagnant water. These relatively small projects could be constructed using self-performed efforts

1.8 Aging Main and Associated Services Replacement:
In operation, aging piping is not hazardous or toxic to customers. There is no current requirement or mandate for water providers to mitigate or replace aging pipe with modern piping materials. Replacement will help minimize distribution losses.
The highest concentration of aging pipe in Fountain's water distribution system is in the Country Club Heights/Sunrise Ridge area of the City. Almost all the mains in the Country Club Heights/Sunrise Ridge area of the City this area are nearing the end of service life. This is a multi-year project.

1.9 Ridge Drive Connectivity:
Phase 1 is to install an 8" main connecting the mains in Ridge Drive between Crest Drive and Shield Road. Phase 2 is to install an 8" main in Ridge Drive between Arms Lane and Windsor Lane. These connections will improve redundancy, fire flow and pressure in the Crest neighborhood. These are opportunities for the Utility to self-perform these Projects.

1.10 Distribution System Loss Reduction Program:
Build on the current leak prevention program. Prioritize Projects that reduce non-revenue water loss. Make a goal of moving from approximately 17% non-revenue water loss to 11-12%.

1.11 Develop Little Ranches Pressure Zone:
Currently, the Little Ranches Zone is supplied through PRVs from the High Pressure Zone. Further elements to insulate the Little Ranches Pressure Zone include a pumping station from the Low-Pressure Zone and treated water storage in the Little Ranches Zone.

1.12 Transmission Main Replacement under the Interstate Highway:
The Colorado Department of Transportation (CDOT) has identified the replacement of the Little Fountain Creek Interstate Highway Bridge as an imminent Project. CDOT's initial alignment for the replacement bridge identified structural elements to be in conflict with an existing main. Although CDOT is working to design the structural elements of the Little Fountain Creek Bridge to avoid this main, any construction activity close to a main this old could break the main. Fountain is working with CDOT to replace this aging main in the area of the highway construction.

1.13 Ohio Avenue Pressure Reducing Vault (PRV):
This existing PRV is on the Northwest corner of Hamlin Street and Ohio Avenue. It reduces the High Zone Pressure (East) to the Low Zone Pressure (West) using a 6" cast iron main connected to the 12" PVC water main on the East side of Fountain Mesa Road, East of the Railroad. The PRV is seldom used in current operations. The vault that contains the PRV is old and does not meet current confined space entry geometry. In addition to replacing the PRV (possibly relocating it), the existing 6" cast iron pipe under the railroad would be abandoned and replaced by a 12" PVC carrier pipe inside a steel casing pipe. This upgrade will allow a redundant supply (from the High Zone East of the railroad) to flow into the Low Zone in Downtown Fountain.

1.14 Dr. Roger's Ditch Diversion & Augmentation Station:
The Dr. Rogers Ditch water right was decreed in 2019. This is planned to assign the design contract to a design firm in late 2022 and then build the combination diversion/augmentation in 2023. This will allow the full use of the decreed amount of water this water right yields.

1.15 Missouri Avenue/South Santa Fe Avenue Project:
This Project proposes to bore an 8" main from the dead end main on West Missouri Avenue to connect to the existing 8" main in Santa Fe Avenue. This improves pressure and flow on the West side of Santa Fe Avenue. Plans & Specifications have been developed by Forsgren, easements have been granted and recorded.

1.17 Finished Water Storage Tanks Refitting:
The refitting, sand-blasting, refinishing for the steel storage tanks is extensive and is a Capital Item. This is a regularly-occurring capital expense.

1.18 Venetucci Wellfield Capital Projects:
Replacement of Capital Items, such as well casings, pumps, motors and electrical equipment, require major refitting and replacement as this water source ages. Fountain is a 10% partner in the Capital improvements to all the jointly-owned elements of the Venetucci Wells and bears 10% of the Capital Expenses for these regularly-occurring projects.

1.19 Well Capital Costs and Treatment Plant Capital Costs:
The wells have all been extensively upgraded and the plant is new, but periodic capital investment is required.

1.20 ROY Reservoir Capital Expenses:
Develop planning, permitting & design for the Haynes Reservoir Project with ROY partners.

1.21 Develop Simmons Well as an additional Source for Groundwater Supply:
Redrill Simmons Well, install 3 blocks of non-potable main too Well #4 for additional raw water supply to I-X Plant.

1.22 Charter Oak Ranch Road CDOT Project:
Replace certain sections of the 8" and the 12" transmission mains as part of this roadway project in 2022.

1.23 Southwest Tank Transmission Main from Tank to SW Link Road Number 1:
Design and construct a 36" main Easterly from the SW Tank to connect to SW Link Road 1, including the I-25 and the railroad crossings.

1.24 Develop a Comprehensive Supervisory Control and Data Acquisition (SCADA) System:
Include Treatment Plant, Wells, Water Delivery, Pumping and Pressure Reducing Stations as connected SCADA components.

SCENARIO 2 WATER DELIVERY PROJECTS

Water delivery projects identified in Scenario 2 includes the water delivery infrastructure needed to serve the vacant property located within the existing water service area, excluding the Kane Ranch. These Projects are defined by development demand and the location of that development.

2.1 Charter Oak Ranch Road Connection to Bandley Drive Main:
Connect the existing 8” water main on Charter Oak Ranch Road Easterly to connect to the existing Bandley Road 12” water main. This requires a bore under I-25. This is to provide redundancy and fire flow for industrial demand growth along Charter Oak Ranch Road.

2.2 Powers Blvd. Transmission Main 1:
Design and construction of a 30" main from Goldfield Tank to Powers Boulevard, then South on Powers to Mesa Ridge Parkway to serve the demand growth in the High Pressure Zone and the Little Ranches Pressure Zone.

2.3 Powers Blvd. Transmission Main 2:
Design and construction of a 24" main along future Powers Boulevard alignment from to C&S Road. This is to serve the demand growth in the High Pressure Zone.

2.4 C&S Road Transmission Main:
Design and construct a 24" main along Marksheffel Road and C&S Road from Mesa Ridge Parkway East Transmission Main 1 (Project 2.6) to Link Road. This is to serve demand growth in both the High Pressure Zone and in the Little Ranches Pressure Zone.

2.5 Link Road Transmission Main:
Design and construct a 16" main & PRV in Link from C&S Road south to Squirrel Creek Road paralleling existing 12" main. This is to serve demand growth in the Little Ranches Pressure Zone.

2.6 Mesa Ridge Parkway East Transmission Main 1:
Design and construct a 24" main along Mesa Ridge Parkway from Powers Boulevard Easterly to Marksheffel Road. This serves demand growth in the High Pressure Zone.

2.7 Mesa Ridge Parkway East Transmission Main 2:
Design and construct a 24" main along Mesa Ridge Parkway from Powers Boulevard Westerly to Sneffels Street, then South to Cross Creek. This serves demand growth in the High-Pressure Zone.

2.8 Appletree and Almagre Development Transmission Loop:
Design and construct a 16" main loop internal to Appletree & Almagre. This serves the demand growth due to these two developments.

2.9 West Side Water Mains – Highway 85-87 Development:
Design and construct a 12" main in Hwy 85/87 South to Comanche Village Drive, a 12" main from Mesa West to Syracuse, a 12" main from Rustique Dirve to 85/87 and one PRV. These improvements serve the demand growth in the Mesa Crossing, Crescent Canyon and Independence Place developments.

2.10 Wilson Road Transmission Main 1:
Design and construct a 24" main Easterly along Wilson Road from SW Link 2 (Link Road West of the railroad) to Progress Drive. This includes boring under the railroad. These improvements serve the demand growth in the Low-Pressure Zone and as a supply to the Little Ranches Pressure Zone demand growth.

2.11 Wilson Road Transmission Main 2:
Design and construct a 16" main Easterly along Wilson Road from the Wilson Road Transmission Main 1 (Project 2.10) terminus Easterly 1 mile to the Little Ranches Zone Pump Station (Project 2.12). These improvements serve the demand growth in the Little Ranches Pressure Zone.

2.12 Little Ranches Zone Pump Station:
Design and construct a Pump Station at the East terminus of Wilson Road (Project 2.11) to raise the H.G.L from Low Zone to Little Ranches Zone pressure. This would be one of the two supply points for the demand growth in the Little Ranches Pressure Zone. The other is Project 2.5, supplying the Little Ranches Pressure Zone from the High Pressure Zone.

2.13 Little Ranches Treated Water Storage Tank:
Design and construct a 2.5 MG Tank in Little Ranches Zone. This could be at grade or elevated or a combination of at grade storage and elevated storage. This serves as the pressure regulation and fire flow/peaking supply for the demand growth in the Little Ranches Pressure Zone.

2.14 Orleans Road Main 1:
Design and construct a 16" main Southerly 1/2 mile from Wilson Road (Project 2.11) to Orleans Road East. This is transmission to the Countryside South and Johnson Ranch developments.

2.15 Orleans Road Main 2:
Design and construct a 16" main Easterly 1 mile from Orleans Road 1 (Project 2.15). This is transmission to the Countryside South and Johnson Ranch developments.

2.16 Womack Main Pumping & Supply Main:
Design and construct a Pumping Station at the easement on Fort Carson to pump the Womack Right (Keeton Reservoir) water to the Fountain Reservoir for treatment.

2.17 Construct the Fountain Reservoir:
Design, permit and construct the Fountain Reservoir, including diversion from Fountain Creek and pumping from the Fountain Creek diversion to the reservoir. Initially, the Fountain Reservoir will be for exchange management, then as a reservoir for Project 2.18.

2.18 Fountain Surface Water Treatment Works at the Fountain Reservoir Site:
The Fountain Reservoir site was purchased by the City in 2008 for future water storage and a source of water supply. The gravel mining that occurred at the site is completed and it is anticipated that the Colorado Division of Mining Reclamation and Safety will complete and release Martin-Marietta's reclamation permit. Upon release of the permit, Fountain assumes full ownership of and access to the entire site. Fountain has multiple water rights decrees that will allow delivery of these water rights to the Fountain Reservoir. In an average year, up to 1,200 acre-feet could be delivered to the reservoir from Fountain Creek. Construction and operation of a water treatment plant and the reservoir could be staged to increase production of treated water as the demand increases. Additional water rights could be assigned to be diverted to this plant as necessary. The reservoir could also be used as a return flow structure. The reservoir is included in the Arkansas Basin Improvement Plan and the Treatment Plant is included in Fountain's Intended Use Plan approved by the State of Colorado. The demand created by all anticipated development projects drives this treatment option.

2.19 Widefield Aquifer Recharge Association (WARA) Project with Widefield and Security Districts:
WARA has been planning for design and permitting of water storage and treatment facilities for over a decade. WARA's plans include a diversion of Fountain Creek water to a treatment plant and injection of treated water into the Widefield Aquifer for storage without evaporation. The water stored in the aquifer would be withdrawn and finished treated to potable standards and the WARA partners would deliver the treated water to their customers. The peer water utilities (Fountain, Widefield and Security) have successfully joint-ventured on several projects in the past including the Venetucci wellfield and the Joint Storage Tank Operations at Goldfield. The WARA project is listed in the Arkansas Basin Improvements Plan. The demand created by all anticipated development projects drives this treatment option.

2.20 Implement the Redundant Connection to Colorado Springs Utilities (CSU):
A direct connection to the CSU water system either via their distribution system near the Airport or via a treated water transmission main to Fountain directly from the Bailey Water Treatment Plant, would provide Fountain direct access to City's allocation in the Southern Delivery System without the Fountain Valley Authority exchange. The direct connection to CSU would provide needed redundancy for treated water to be delivered to an area in Fountain that has constraints in the internal distribution network. A direct connection to CSU would also enable the City to seek an agreement to purchase additional treated water from CSU when capacity is available. The demand created by all anticipated development projects drives this treatment option.

2.21 Implement the "Loop" Project with Woodmoor and Cherokee Districts:
The Loop is a plan to divert water from Fountain Creek through the Chilcott Ditch to an upgraded Calhan Reservoir, perform the initial stages of water treatment near the reservoir and then pump the partially treated water north for additional treatment and distribution by participating utilities. The Loop is currently in the conceptual planning stage. It is not included in the Arkansas Basin Improvement Plan. Fountain is a Shareholder in the Chilcott Ditch Company. The demand created by all anticipated development projects drives this treatment option.

2.22 Develop the Permanent Marshall #2 Fill Station as a Non-Potable Well Source:
The Marshall Well #2 is currently supplying construction water to contractors. To expand the use of the Marshall #2, developing a permanent non-potable pumping station, designed as a supply for non-potable irrigation in the proposed Countryside South and Johnson Ranch developments, is a project. The pump station has been designed by JDS Hydo (RESPEC), an easement for the site has been defined and the Marshall #2 is in the Augmentation Plan #3.

2.23 Develop Well #4 as a Non-Potable Construction Water Source:
Plumb the Well #4 to serve as a construction water fill station. This could be a self-performed project, benefitting proposed developments North of Well #4, near Highway 85/87.

2.24 Convert District 8 School sites from Potable to Non-Potable Irrigation:
Wherever practical, work with District 8 to assist in well augmentation for conversion of potable irrigation systems to groundwater non-potable irrigation.

2.25 Convert Fountain Park sites from Potable to Non-Potable Irrigation:
Wherever practical, work with Fountain Parks to assist in well augmentation for conversion of potable irrigation systems to groundwater non-potable irrigation for parks and cemetery.

2.26 Upgrade Legacy Private Systems to Current Distribution Standards:
Work with Legacy systems ownership to upgrade the water distribution systems to current standards. Potentially form Special Districts, potentially convert the systems from private to public and work with the owners to fund these upgrades. This could reduce water waste.

2.27 Convert Commercial, Industrial and Institutional customers from Potable to Non-Potable Irrigation:
Wherever practical, work with commercial, industrial and institutional customers to assist in well augmentation for conversion of potable irrigation systems to groundwater non-potable irrigation for these properties.

2.28 Convert District 3 School sites from Potable to Non-Potable Irrigation:
Wherever practical, work with District 3 to assist in well augmentation for conversion of potable irrigation systems to groundwater non-potable irrigation.

2.29 Additional Ground Water Wells and Associated Treatment:
This plan would investigate the potential for additional ground water supply from new wells including treatment for removal of perfluorinated compounds and potential advance treatment for hardness reduction. Well locations range from along Highway 85/87 to the north, near the former Appletree Golf Course to the east, and to the south. Water rights and permitting will be required for any new wells along with modification of augmentation plans.

SCENARIO 3 WATER DEVELOPMENT PROJECTS

Scenario 3 includes all the delivery projects defined in Scenario 2 and is expanded to include all of the infrastructure necessary to service Kane Ranch. This includes increased offsite and onsite

infrastructure necessary to supply the additional demands that the Kane Ranch development will require.

The additional infrastructure elements include an expansion of the area to be assigned to the Little Ranches pressure zone, including additional pumping facilities and treated water storage.

3.1 Wilson Road Transmission Main:
Design and construct a 36" main Easterly along Wilson Road from SW Link Road 2 (Link Road West of the railroad) to Kane Ranch Pump Station (Project 3.6). This includes boring under the railroad. This improvement supplies the Low Zone demand growth and the Little Ranches Pressure Zone demand growth in Kane Ranch.

3.2 Kane Ranch High Pressure Supply Main:
Design and construct a 24" main along Powers Blvd from Marksheffel Boulevard to Squirrel Creek Road to be the primary service for demand growth in the High Pressure Zone in Kane Ranch.

3.3 Kane Ranch Treated Water Storage Tank:
Design and construct a total of 2.5 million gallon treated water storage elevated and at-grade structures) in Kane Ranch to serve the Little Ranches Pressure Zone in Kane Ranch. This serves pressure maintenance, peak flow and fire flow reserve in Kane Ranch.

3.4 Kane Ranch Transmission Main 1:
Design and construct a 16” transmission main from the existing Little Ranches pressure zone to the Kane Ranch Treated Water Storage Tank (Project 3.3). This supplies the Kane Ranch projected demand from the Link Road Transmission Main (Project 2.5).

3.5 Kane Ranch Transmission Main 2:
Design and construct a 16” transmission main from the Kane Ranch Treated Water Storage Tank (Project 3.3) Easterly to supply the demand growth in the Little Ranches Zone of Kane Ranch.

3.6 Kane Ranch Pump Station:

Design and construct a 6.8 million gallon per day Pump Station to move water from the Low Pressure Zone to the Little Ranches Zone. This project would be a primary water supply to the proposed Kane Ranch development.

3.7 Kane Ranch Pump Station Discharge Main:
Design and construct a 24" transmission main from the Wilson Road Transmission Main (Project 3.1) to the Kane Ranch Treated Water Storage Tank (Project 3.3) to supply the Little Ranches pressure zone in the proposed Kane Ranch development.

3.8 Kane Ranch Fire Flow Pump Station:
Design and construct a 2,000 GPM Pump Station near the Kane Ranch Treated Water Storage site (Project 3.3) to maintain pressure in the Kane Ranch High Pressure Zone.

NON-CITY OWNED WATER DELIVERY SYSTEMS

Private Systems: There are two existing Mobile Home Communities (MHC) that have private water distribution systems, served by the City's water system through a single master meter; Chancellors MHC and Crest MHC. There are approximately 100 mobile home units in each of the MHC, all of which have independent water meters installed by the MHC management and served by the private water distribution system. The private water distribution systems are not compliant with City of Fountain standards and there are no onsite fire hydrants.

Potential policy considerations: Prohibit future "master metering" and private water systems or require all private water systems to be designed, constructed and maintained to City standards. Provide assistance and possibly incentives to encourage existing private water system owners to upgrade their systems to City standards and either dedicate the systems to the City or agree to maintain the system to City standards.

Pikes Peak International Raceway PPIR):

General: PPIR owns and operates a public water system (PWSID CO0221715) that is separate from the City's water system. The PPIR water system is served by two wells owned by the City in accordance with a 1996 contract between the City and PPIR. PPIR is responsible for the water quality and the distribution system. The maximum allowable annual water use from the two City wells is limited to 250 acre-feet and the use of the water from these two wells is also limited to specific areas in and around the PPIR property

FINAL

WATER MASTER PLAN – WATER DISTRIBUTION SYSTEM EVALUATION

B&V PROJECT NO. 409523

PREPARED FOR

City of Fountain

7 FEBRUARY 2022

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1.0 INTRODUCTION

Following calibration of the hydraulic model for July 13th, 2020, hydraulic model runs were conducted for the existing system and future systems. The hydraulic model runs were evaluated based on their ability to meet demand while meeting performance criteria shown in Table 1-1. Recommendations were developed to address existing areas of concern and provide adequate capacity for future conditions.

Table 1-1 Performance Criteria

DESCRIPTION	SERVICE GOAL
Pressure	
Minimum Pressure; normal conditions	> 50 psi (Existing) > 60 psi (Future)
Minimum Pressure; fire flow conditions	> 20 psi
Maximum Pressure; normal conditions	< 120 psi
Fire Flow	
Minimum Fire Flow Required	1,000 gpm for 2 hours (Residential) 2,000 gpm for 3 hours (Commercial, Industrial, & Institutional)
Pipe Capacity	
Maximum head loss (ft of head loss per 1000 ft of water main)	< 3 ft per 1,000 ft (≤ 16 inches) < 2 ft per 1,000 ft (> 16 inches)
Maximum Velocity	< 5 ft/sec for new pipes < 7.5 ft/sec for existing

The system evaluation consists of the pipe capacity, distribution system storage, and pump stations for three following scenarios:

- Scenario 1: includes the existing system evaluation with previously established demands
- Scenario 2: includes all planned developments except for Kane Ranch as well as identified infill and urban renewal areas (URAs)
- Scenario 3: includes all planned developments including Kane Ranch as well as identified infill and URAs

2.0 SCENARIO 1 RESULTS

The existing system model was run with the projected 2020 Maximum Day (MD) demand of 5.4 MGD. Model results are shown in Figure 2-1. Low pressures identified in several areas of the system:

- Southeastern Low Zone. Flow to this part of the system must travel from the SW Tank northward to the single Fountain Creek crossing, then back south through the downtown area to reach this portion of the system. Pressures are further reduced by operating the High Gate

Pump Station (PS), which pumps from the eastern part of the Low Zone to the southern end of the High Zone.

- Northern most end of the High Zone. Low pressures occur in the area around the intersection of Mesa Ridge Pkwy and Fountain Mesa Rd. This area has the highest ground elevations within the High Zone. Significant headloss occurs in the two 12-inch transmission mains from the Goldfield Tank Farm to the High Zone.
- Eastern Little Ranches Zone. This area is at the highest ground elevation within the Little Ranches Zone. Increasing the setting of the pressure reducing valves (PRVs) that supply the Little Ranches Zone would provide adequate pressure in this area. However, this would put customers at the lowest ground elevations within the Little Ranches Zone at the maximum desired pressure of 120 psi in an area where there is concern about the ability of the pipe to handle high pressures.

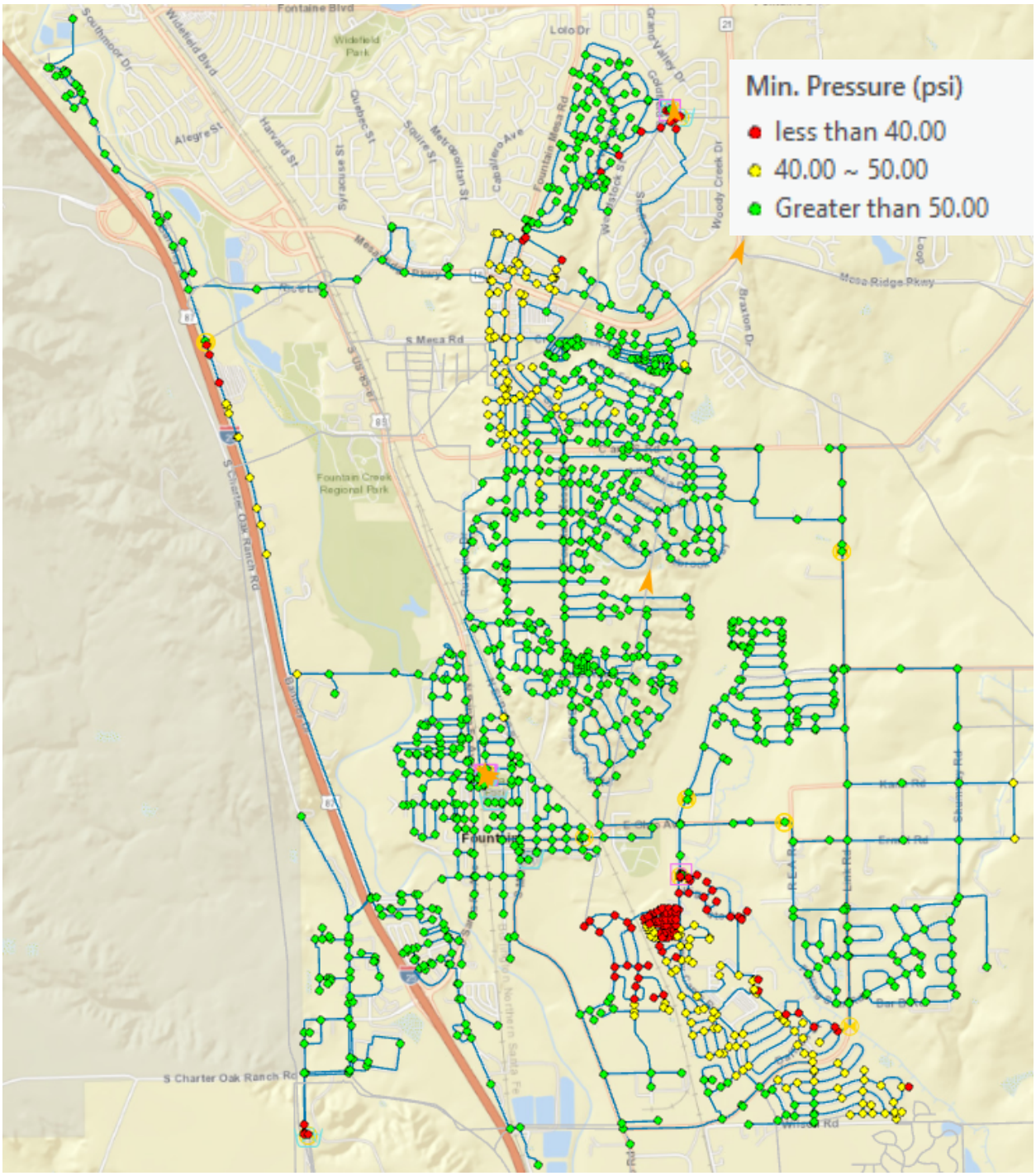


Figure 2-1 Scenario 1 Model Results

2.1 SCENARIO 1 CAPACITY IMPROVEMENTS

Improvements were evaluated to address the low MD pressures identified in the model.

The City is currently constructing a new 36-inch transmission main from S. Charter Oak Rd across Interstate 25 and Fountain Creek to the railroad crossing near Link Rd and Wilson Rd. This transmission main will significantly improve the movement of water to the southeast corner of the Low Zone while minimizing headloss. Model results indicate that the transmission main will raise MD pressures in the Low Zone to the desired threshold when it is put into service.

The pressure issues at the north end of the High Zone are primarily caused by headloss through the existing 12-inch transmission main along Fortman Ave. This line is older asbestos-cement (AC) pipe and City staff have indicated a desire to replace it for reliability. Replacement of this line with a new 16-inch PVC transmission main in approximately the same alignment will reduce headloss and alleviate the pressure issues at the north end of the High Zone.

To address pressure problems in the Little Ranches Zone, the City could install PRVs south of Ermel Road to create a Little Ranches Reduced Zone. This would allow the main Little Ranches PRVs to be set at a higher pressure and still protect the pipelines in the southern part of Little Ranches.

2.2 SCENARIO 1 FIRE FLOW ANALYSIS

A model scenario was run to determine the available fire flow at junctions near hydrant locations within the existing water system. The modeled results show that with the improvements identified above, Fountain's water system will be generally well equipped to handle fire flows for pipe velocities and flows at the demand nodes. However, there are several nodes in both residential and commercial areas where the performance criteria are not met. These results can be seen in Figure 2-2.

2.2.1 Residential Fire flow:

While most of the junctions in residential areas are able to provide the required 1,000 gpm fire flow, there is one area where the required fire flow is not met. There is a 2-inch water line along Shumway Way that appears to serve approximately 3 homes at the end of the line. The hydrants along this line cannot provide the required fire flow, but the hydrant at the intersection of Shumway Way and Shumway Rd can provide the required fire flow. Due to the small number of customers served on this line, and the proximity of a hydrant with adequate fire flow, no improvements are recommended. Any future development in this area would likely require new water main that could be sized to provide fire flow.

2.2.2 Commercial Fire Flow:

There were several locations that could not provide the required 2,000 gpm commercial fire flow, mostly due to dead-end mains and small diameter piping.

- **Hydrant Behind Fire Station No. 2:** This hydrant is currently on a 4-inch dead end line from the west. Adequate fire flow could be provided by connecting the dead end to the existing 12-inch line on Fountain Mesa Rd with an 8-inch line. The existing hydrant in front of the fire station is connected to the 12-inch line and has significantly higher flow available.

- **South end of Santa Fe Ave, North of Fountain Creek:** The hydrants in this area are on a 4-inch dead end line. Replacing the 4-inch line with an 8-inch line will provide adequate fire flow.
- **West Iowa Ave West of Santa Fe Ave:** The hydrant on Iowa Ave between Fountain St and Santa Fe Ave is on a dead-end 6-inch main from Fountain St. Extending an 8-inch line along Iowa Ave to tie in to the 8-inch along N Santa Fe Ave and loop in this area will provide adequate fire flow.
- **Alabama Ave West of Santa Fe Ave:** The hydrant on Alabama Ave between Fountain St and Santa Fe Ave is on a 6-inch and 2-inch loop. Extending an 8-inch line along Alabama Ave to tie in to the 8-inch along N Santa Fe Ave and loop in this area will provide adequate fire flow.
- **S Santa Fe Ave and Crest Dr/Santa Fe Interchange:** The hydrant on S Santa Fe Ave near the intersection with Crest Dr is on the end of an 8-inch dead-end main. Extending an 8-inch main to connect to the existing 8-inch main further south on S Santa Fe Ave will provide adequate fire flow.
- **Camping World Area:** Hydrants in this area have approximately 1,500 gpm in available fire flow. There are limited options for increasing fire flow as this area is on a long dead-end 12-inch line that extends into a remote part of the system, making looped connections difficult. Building construction in this area will likely need to be adapted to available fire flow.
- **Charter Oak Ranch Rd:** The hydrant in this area is on a long 8-inch dead-end line. Extending an 8-inch line across Interstate 25 to connect to the existing 12-inch line will provide adequate fire flow.

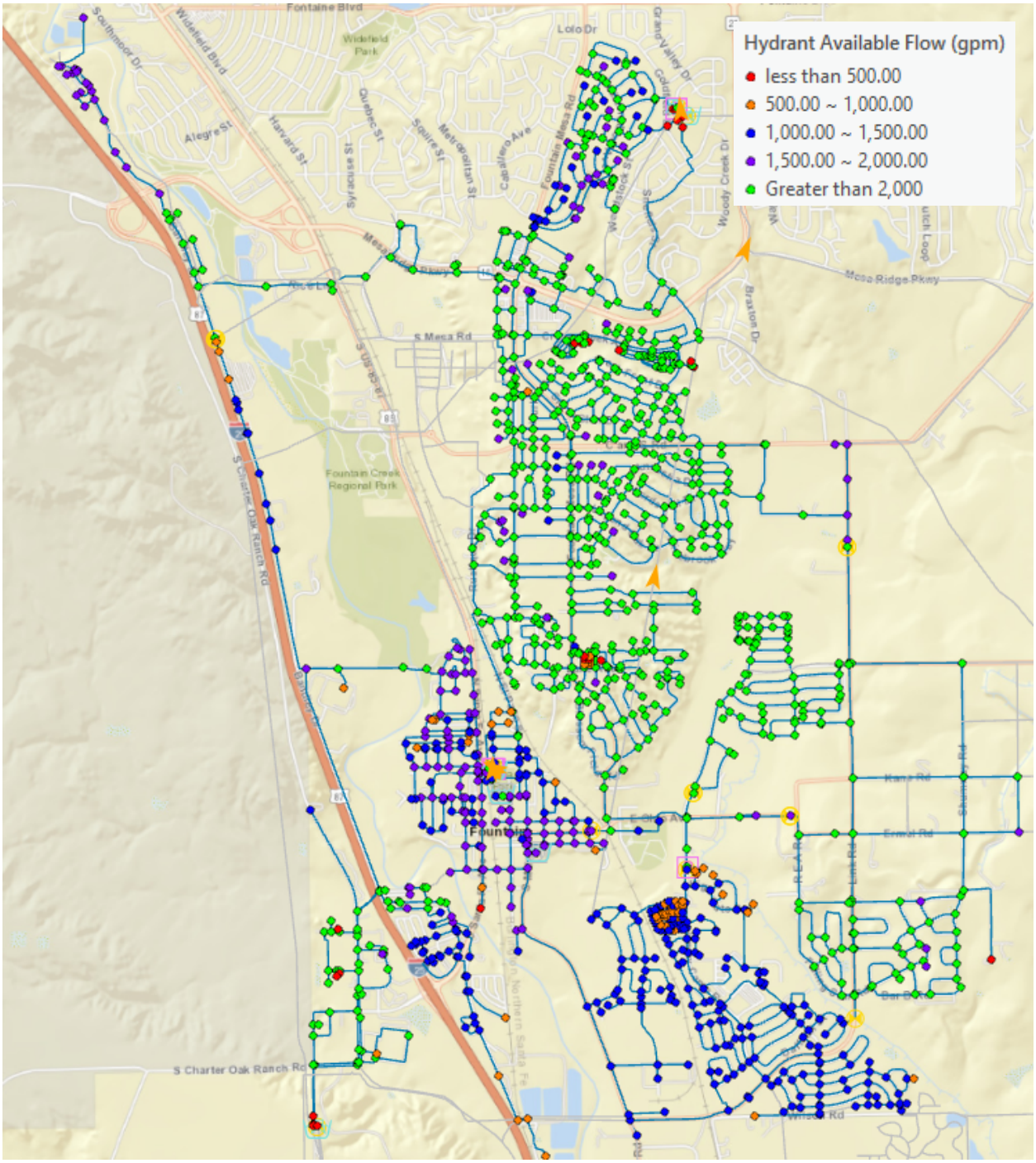


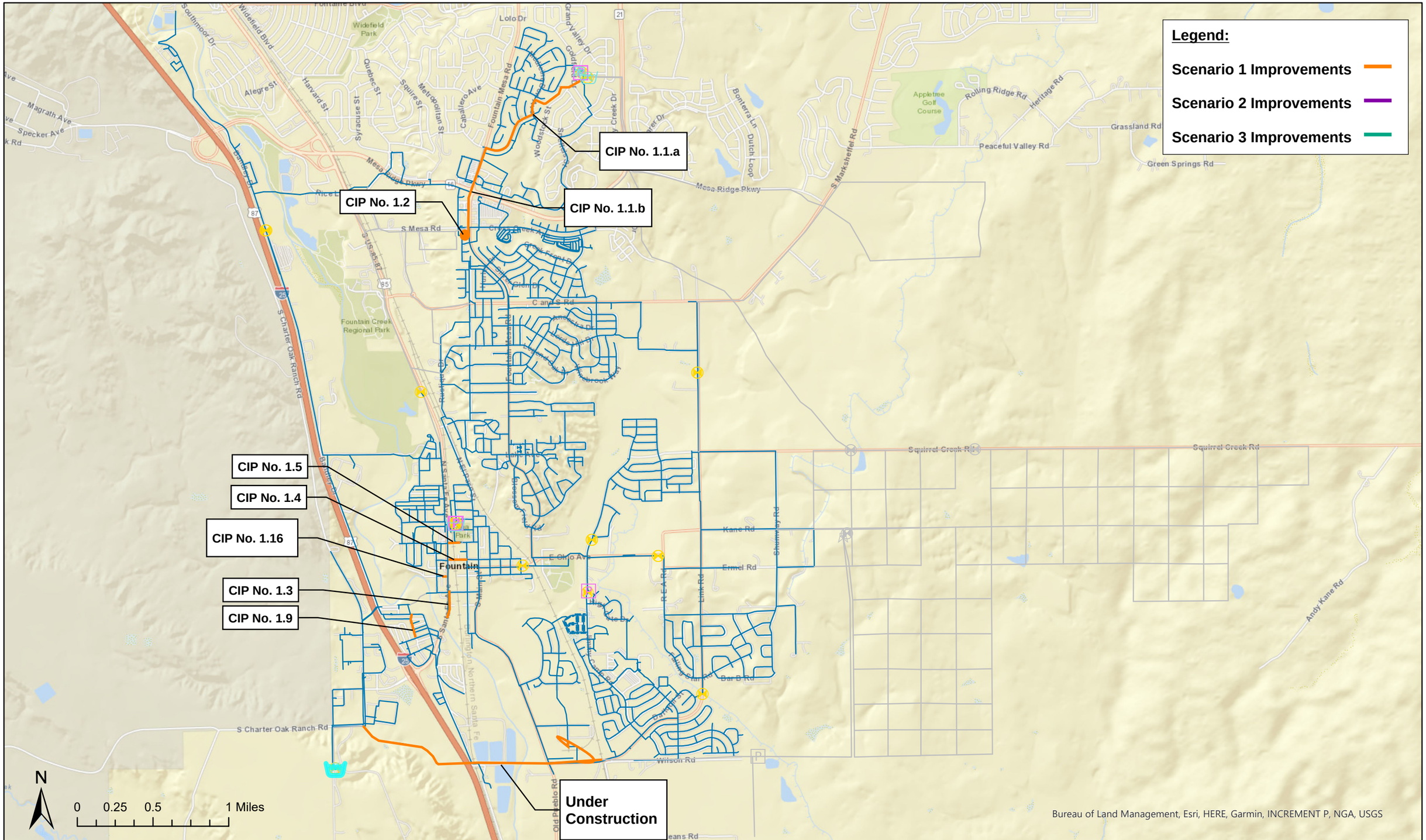
Figure 2-2 Scenario 1 Fire Flow Analysis

2.3 SCENARIO 1 RECOMMENDED IMPROVEMENTS

The recommended improvements to provide adequate system pressures during MD demands as well as fire flow are summarized in Table 2-1 and shown on Figure 2-3. Projects numbered to match City numbering. Does not include City projects unrelated to the capacity or fire flow.

Table 2-1 Scenario 1 Capital Improvements

PROJECT NO.	PROJECT NAME	DESCRIPTION	DRIVER	DIAMETER (INCHES)	LENGTH (FEET)
1.1a	Goldfield to Fountain Mesa Rd Transmission Main Project Part 1	Replace/Parallel the 12-inch main from Goldfield Tank to Fountain Mesa Rd and Fortman Ave with 16-inch main	Existing System Demands and Pressure	16	4,700
1.1b	Goldfield to Fountain Mesa Rd Transmission Main Project Part 2	Replace/Parallel the 12-inch main in Fountain Mesa Rd from Fortman Ave to south of Mesa Rd with 16-inch main to Fire Station No. 2 (Trenchless design for Mesa Ridge Pkwy crossing)	Existing System Demands and Pressure	16	4,100
1.2	Fire Station No. 2	Move hydrant from 4-inch dead end line and connect to the 12-in line in Fountain Mesa Rd	Fire Flow	8	170
1.3	S Santa Fe Ave Water Main Replacements	Replace the 4-inch dead-end leg going south in Santa Fe Ave from Illinois with 8-inch pipe	Fire Flow	8	1,050
1.4	W Iowa Ave Water Main Loop	Extend the existing 6-inch dead end line in W Iowa to connect to the 8-inch main along Santa Fe Ave	Fire Flow	8	210
1.5	W Alabama Ave Water Main Loop	Extend an 8-inch main from the dead end on E Alabama Ave, under the railroad and Santa Fe Ave to connect to the dead end in W Alabama Ave. Tie into the 8-inch main in Santa Fe Ave	Fire Flow	8	230
1.9	Ridge St Connectivity	Provide an 8-inch main from Crest Dr to Windsor Ln along Ridge Dr	Fire Flow	8	800
1.16	Missouri Ave and Santa Fe Ave Project	Connect the dead end main on W Missouri Ave to the 8-inch main in Santa Fe Ave	Improve pressure and flow	8	100



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CITY OF FOUNTAIN, COLORADO - SCENARIO 1 IMPROVEMENTS

FIGURE 2-3

3.0 SCENARIO 2 RESULTS

The water system model was run with the increased demand for Scenario 2 to evaluate the performance of the system and identify improvements necessary to maintain the identified performance criteria. The total system demand for Scenario 2 is greater than the City's current water delivery capabilities. For modeling purposes, the water delivery to the City through the SW Tank and Goldfield Tanks was increased as necessary to meet the future demands. Treated water supply to both tank sites is reaching its physical limit and the evaluation did not identify in what order developments would occur. However, recent development has been focused in the Low Zone (in the southeast part of the City). Assuming this development continues, additional water supplies should be developed to serve the SW Tank and Low Zone first. However, additional supply will also be needed in High Zone (northeast part of the City) to serve any of the large, planned developments.

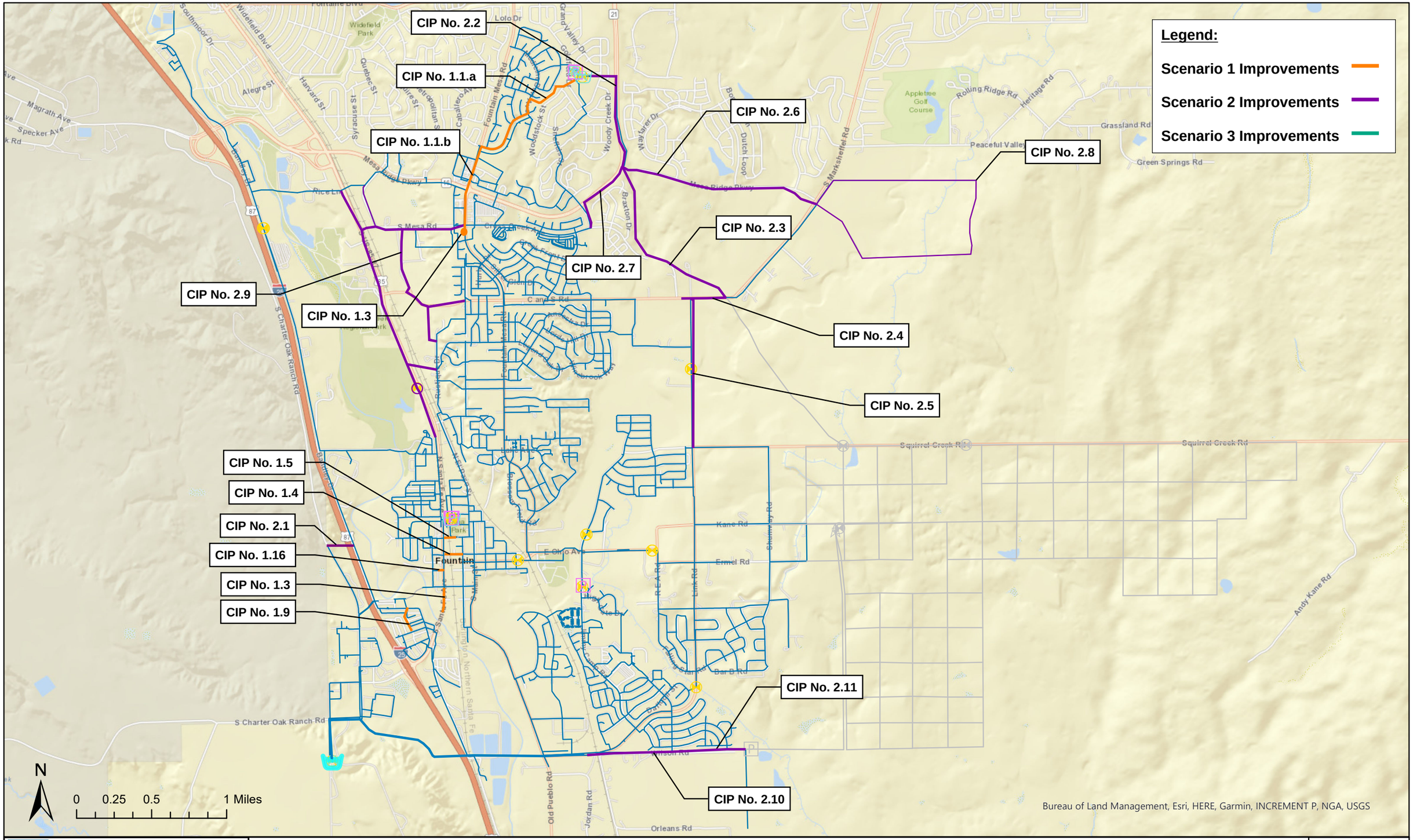
For Scenario 2, it was assumed that the Little Ranches Zone would continue to be supplied through PRVs from the High Zone supplemented by the existing High Gate PS.

Significant improvements are required to convey the increased flow to the development areas within the distribution system. Scenario 2 Improvements are summarized in Table 3-1 and shown in Figure 3-1.

Table 3-1 Scenario 2 Capital Improvements

PROJECT NO.	PROJECT NAME	DESCRIPTION	DRIVER	DIAMETER (INCHES)	LENGTH (FEET)
2.1	Charter Oak Ranch Rd Water Main Loop	Connect the existing 8-inch dead-end line on Charter Oak Ranch Rd across I-25 to the 12-inch main along Bandley Drive	Fire Flow and Redundancy	8	900
2.2	Powers Blvd Transmission Main 1	30-inch main from Goldfield Tank east to Powers Blvd, then south on Powers to Mesa Ridge Parkway	Northeast Developments or development in High Zone and Little Ranches Zone	30	4,420
2.3	Powers Blvd Transmission Main 2	24-inch main along future Powers Blvd alignment from Mesa Ridge Pkwy to C&S Rd	Development in the High Zone and Little Ranches Zone	24	6,540
2.4	C&S Rd Transmission Main	24-inch main along C&S Rd and Marksheffel Rd from Mesa Ridge to Link Rd	Development in the High Zone and Little Ranches Zone	24	5,900

2.5	Link Rd Transmission Main	Parallel 16-inch main along Link Rd from C&S Rd to Squirrel Creek Rd, Including new PRV station	Development in the Little Ranches	16	5,370
2.6	Mesa Ridge Pkwy East Transmission Main 1	24-inch main along Mesa Ridge Pkwy from Powers Blvd east to Marksheffel Rd	Northeast Developments	24	7,120
2.7	Mesa Ridge Pkwy East Transmission Main 2	24-inch main along Mesa Ridge Pkwy from Powers Blvd west to Sneffels St, then south on Sneffles St to Cross Creek	Development in the High Zone and Little Ranches Zone	24	2,810
2.8	Northeast Transmission Loop	16-inch loop through the Northeast developments	Northeast Developments	16	16,200
2.9	West Side Water Main Extensions	12-inch mains in Hwy 85/87 from Rice Ln south to Commanche Village Dr, from 85/87 west to Fountain Mesa Rd on Mesa Rd, and Commanche Village Dr from 85/87 east to Rustique Dr. Also provide 1 PRV	Santa Fe Corridor Developments	12	13,000
2.10	Wilson Rd Transmission Main 1	Extend a 24-inch main along Wilson from SW Link terminus (Link Rd west of railroad) east to Progress Dr	Southeast Development	24	2,700
2.11	Wilson Rd Transmission Main 2	16-inch main from the end of the Wilson Rd Transmission Main 1 east to Chilcott Ditch	Southeast Development	16	2000



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CITY OF FOUNTAIN, COLORADO - SCENARIO 2 IMPROVEMENTS

FIGURE
3-1

4.0 SCENARIO 3 RESULTS

Finally, the water system model was run with the increased demand for Scenario 3 to evaluate the performance of the system and identify improvements necessary to maintain the identified performance criteria. The total system demand for Scenario 3 is greater than the City's current water delivery capabilities. For modeling purposes, the water delivery to the City through the SW Tank and Goldfield Tanks was increased as necessary to meet the future demands. Treated water supply to both tank sites is reaching its physical limit and the evaluation did not identify in what order developments would occur. However, recent development has been focused in the Low Zone (in the southeast part of the City). Assuming this development continues, additional water supplies should be developed to serve the SW Tank and Low Zone first. However, additional supply will also be needed in High Zone (northeast part of the City) to serve any of the large, planned developments.

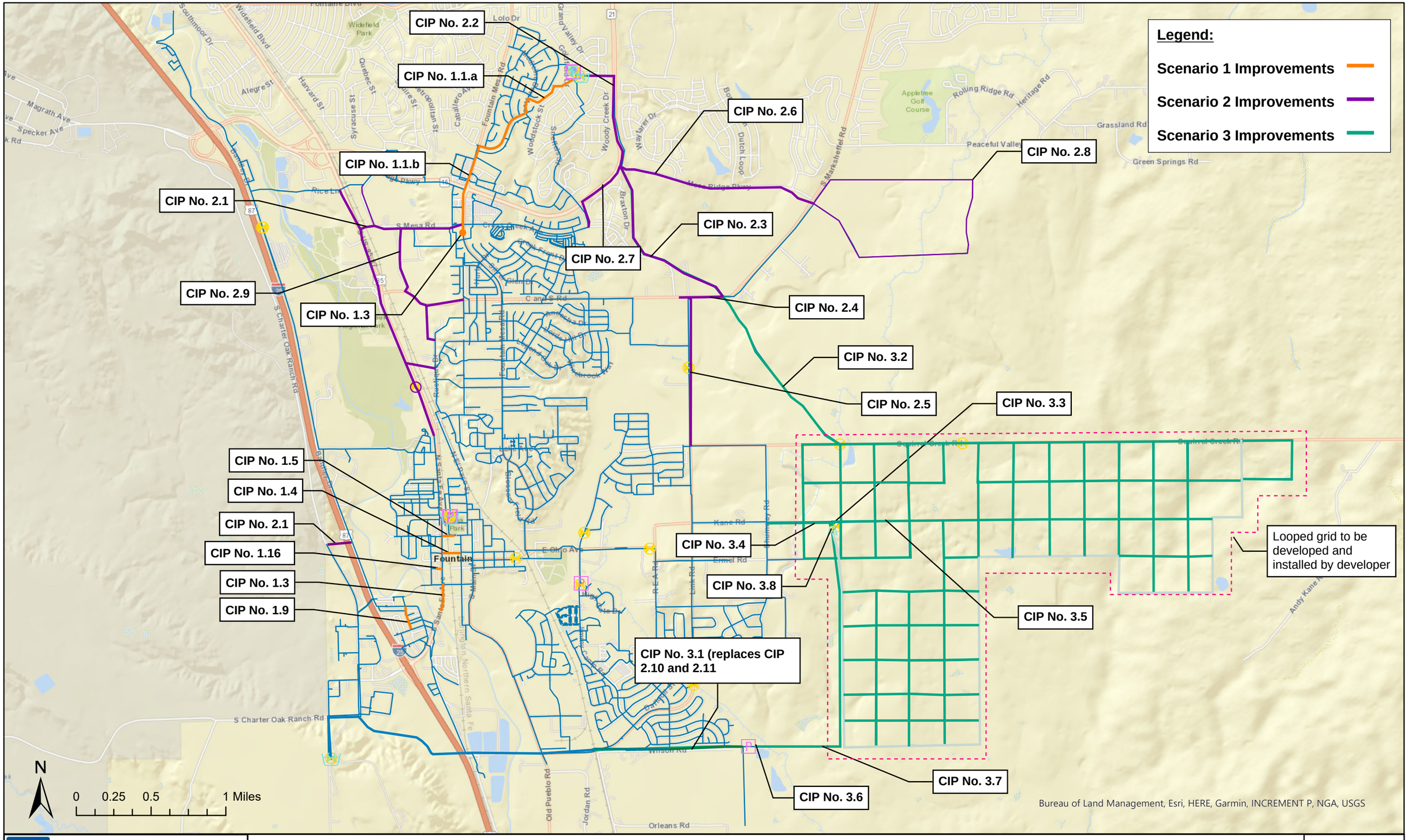
For Scenario 3, it was assumed that the High Zone in Kane Ranch would be supplied from the High Zone and the Little Ranches and Low Zone areas would be supplied through a new Kane Ranch PS and transmission main from the SW Tank Transmission main to a new Kane Ranch Tank.

Significant improvements are required to convey the increased flow to the development areas within the distribution system. Scenario 3 Improvements are summarized in Table 4-1 and shown in Figure 4-1.

Table 4-1 Scenario 3 Capital Improvements

PROJECT NO.	PROJECT NAME	DESCRIPTION	DRIVER	DIAMETER (INCHES)	LENGTH (FEET)
3.1	Wilson Rd Transmission Main – Kane Ranch	Extend 36-inch main from current terminus (Link Rd west of the railroad) east along Wilson Rd to the new Kane Ranch PS. (Replaces projects 2.10 and 2.11 in Scenario 2)	Kane Ranch and Southeast Developments	36	5,300
3.2	Kane Ranch High Pressure Supply Line	Extend 24-inch main along Power Blvd alignment south from Marksheffel Rd to Squirrel Creek Rd to serve the portion of Kane Ranch that would be in the High Zone. Also serves as a backup supply to the Kane Ranch Elevated Storage Tank (EST)	Kane Ranch Development	24	8,900
3.3	Kane Ranch EST	2.5 MG Kane Ranch EST at the Little Ranches Zone HGL located in the Kane Ranch development	Kane Ranch Development	NA	NA

3.4	Kane Ranch EST Transmission Main 1	16-inch transmission main from the Kane Ranch EST west along Kane Rd to the existing Little Ranches Zone	Development in Little Ranches Pressure Zone	16	2,650
3.5	Kane Ranch EST Transmission Main 2	16-inch transmission main from the Kane Ranch EST to the Kane Ranch area east of the tank	Kane Ranch Development	16	4,150
3.6	Kane Ranch PS	6.8 MGD Kane Ranch PS to pump from the Low Zone to Kane Ranch EST.	Kane Ranch Development	NA	NA
3.7	Kane Ranch PS Discharge Main	24-inch main from Kane Ranch PS to the Kane Ranch EST	Kane Ranch Development	24	8,140
3.8	Kane Ranch Fire Flow Pump Station	2,000 GPM PS near the base on the Kane Ranch EST to pump up to High Zone pressures for fire flow redundancy	Kane Ranch Development	NA	NA



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CITY OF FOUNTAIN, COLORADO - SCENARIO 3 IMPROVEMENTS

FIGURE 4-1

5.0 STORAGE CALCULATIONS

Storage in the distribution system is needed to provide equalization during the day and storage to meet emergency needs such as an outage or fire. Required storage calculations look at a variety of possible system storage needs and their likely duration to determine a reasonable storage volume. Storage, or equivalent pumping with backup power, needs to be provided for each pressure zone, unless a pressure zone is served by a PRV. More storage is not always helpful, excessive storage can result in water quality problems during normal operations.

Assumptions and terminology used in these calculations:

1. **Equalization:** Volume required to deliver the difference between peak hour (PH) and maximum day (MD) demand for a pressure zone. Assumed 4-hour duration for this evaluation.

2. **Fire:** Fire flow x fire duration. Using a commercial fire and a 3-hour duration from Table 1-1 (2,000 gpm x 3 hours = 360,000 gallons)

3. **Emergency:** 12 hours supply at ADD.

The ADD and MDD shown in Table 3-7 in the Water Demand TM.

For the City, storage is currently available the Low, High, and Booster zones. The Little Ranches Zone is dependent on storage from the High Zone.

- Scenario 1
    - FVA Fountain Terminal Reservoir (FVA Tank) and half of the Join Ground Storage Reservoir (Joint GST) provide storage to the High and Little Ranches zones
    - Joint Elevated Tank (Joint EST) provides storage for the Booster Zone
    - Southwest Tank provides storage for the Low Zone
- Scenario 2
    - FVA Fountain Terminal Reservoir (FVA Tank) and half of the Join Ground Storage Reservoir (Joint GST) provide storage to the High and Little Ranches zones
    - Joint Elevated Tank (Joint EST) provides storage for the Booster Zone
    - Southwest Tank provides storage for the Low Zone
- Scenario 3
    - FVA Fountain Terminal Reservoir (FVA Tank) and half of the Join Ground Storage Reservoir (Joint GST) provide storage to the High Zone
    - Joint Elevated Tank (Joint EST) provides storage for the Booster Zone
    - Southwest Tank provides storage for the Low Zone
    - Proposed Little Ranches Tank provides storage for the Little Ranches Zone

Required storage was then calculated for each facility and scenario using the following storage options:

- Storage Needs #1: Equalization + Emergency)
- Storage Needs #2: Fire + Emergency

Table 5-1 summarizes the storage evaluation for the different scenarios.

Table 5-1 Storage Evaluation Summary

SCENARIO/ STORAGE NEED	FVA TANK AND JOINT GST (MG)	SOUTHWEST TANK (MG)	BOOSTER TANK (MG)	PROPOSED LITTLE RANCHES TANK (MG)
Existing Storage	2.5 – FVA Tank 4.0 – Joint GST (Half for City) 4.5 - Total	3.0	0.75	Not Applicable
Scenario 1				
Equalization Fire Emergency	0.32 0.36 0.45	0.16 0.36 0.45	0.03 0.36 0.07	Not Applicable
Storage Needs #1 Storage Need #2	1.22 **1.26**	0.61 **0.81**	0.09 **0.43**	Not Applicable
Scenario 2				
Equalization Fire Emergency	1.01 0.36 2.79	0.38 0.36 1.06	0.03 0.36 0.07	Not Applicable
Storage Needs #1 Storage Need #2	**3.80** 3.15	**1.44** 1.42	0.09 **0.43**	Not Applicable
Scenario 3				
Equalization Fire Emergency	0.81 0.36 2.24	0.38 0.36 1.06	0.03 0.36 0.07	0.7 0.4 1.8
Storage Needs #1 Storage Need #2	**3.05** 2.60	**1.44** 1.42	0.09 **0.43**	**2.5** 2.2

Note: Bold indicates controlling volume and red indicates need for additional storage.

Based on a 12-hour emergency storage, the existing tanks will provide adequate storage through all scenarios as long as an additional 2.5 MG of storage in the Little Ranches Zone is added in conjunction with development of Kane Ranch as part of Scenario 3.

CAPITAL IMPROVEMENTS - FOUNTAIN WATER
SCENARIO 1 - WATER PROJECTS FOR EXISTING CUSTOMERS

PROJECT #	SHORT PROJECT NAME	SHORT PROJECT DESCRIPTION & LOCATION	SHORT PROJECT REASON	PRESSURE ZONE	SELF-PERFORM	PROJECT DEVELOPMENT
1.1.1	Goldfield to Fountain Mesa Road Transmission Main Project Part 1	Replace/Parallel the existing 12" main from Goldfield to Fountain Mesa Road with a 16" main	This improves existing system flows and pressures. The existing main is approaching end of life	High Zone	No	No planning or design has been started on this project.
1.1.2	Goldfield to Fountain Mesa Road Transmission Main Project Part 2	Replace/Parallel the existing 12" main from Fountain Mesa Road South to South of Mesa Road with a 16" main	This improves existing system flows and pressures. The existing main is approaching end of life	High Zone	No	Trenchless Design for Mesa Ridge Parkway intersection with Fountain Mesa Road is designed
1.2	Fire Station #2 Fire Hydrant	Replace the main feeding the hydrant on the West side of Fire Station #2 with an 8" main.	Fire flow will meet commercial standard flow and pressure.	High Zone	Yes	No planning or design has been started on this project.
1.3	South Santa Fe Avenue Project 3	Replace the existing 4" main from Illinois Avenue South to terminus with 8" main	This increases fire flow to meet commercial standards.	Low Zone	Yes/No	Consider installing the upsize at the Indiana instersection Possible the main South of Indiana is self-performed.
1.4	West Iowa Avenue Water Main Loop	Design the extension of the 8" main on Iowa West of South Santa Fe to connect to 8" main in Santa Fe Avenue.	This increases fire flow in commercial areas and Jr. High School	Low Zone	No	No planning or design has been started on this project.
1.5	Alabama Avenue Water Main Project	Extending an 8" main from the dead end East of RR, boring under Santa Fe, connecting to existing dead end 6" main	This improves Fire Flow to meet commercial standards at Junior High School and commercial properties	Low Zone	No	No planning or design has been started on this project.
1.6	Metering Program	Plan to replace all water meters every ten years. Plan that each replacement will include new collection technology.	Meter replacement depends on battery life. Meter technology changes often; old tech not supported	N/A	Yes/No	Possibly perform the meter replacements in-house. Data collection system by vendor
1.7	Downtown Fountain Cast Iron Pipe Replacement	Not all Downtown mains were replaced in the '80's & '90's. Identify end-of-life mains & prioritize replacement	These are often short blocks, with few water services. Open cut construction & replacment doesn't affect traffic.	Low Zone	Yes/No	No planning or design has been started on this project.
1.8	Aging Main & Service Replacement in Country Club Heights and Sunrise Ridge	This is a multi-year project. Identify end-of-life mains and services and proiritize replacement.	These mains and services are outdated & aging materials. This will help minimize distribution losses.	High Zone	Yes/No	No planning or design has been started on this project.
1.9	Ridge Street Connectivity. Phase 1 is Ridge and Shield. Phase 2 is Ridge from Arms to Windsor.	This will improve flow and pressure in this are of small mains. It will also improve redundancy.	This area has a single point of failure from Crest to South Santa Fe Avenue and a network of small constrictive mains.	Low Zone	Yes	No planning or design has been started on this project.
1.10	Distribution System Loss Reduction	Continue the leak prevention program. Look to projects that reduce non-revenue water loss	Fountain's distribution loss is about 17%. Prioritize projects that reduces losses.	All Zones	Yes/No	Build on the current Leak Detection Program. Prioritize Projects that reduce line and fitting losses.
1.11	Develop Little Ranches Pressure Zone	This isolates the Little Ranches Zone from the Low Zone and insulates existing customers from Low Zone demand.	Currently, the Little Ranches Zone is supplied from PRVs on the High Zone.	Little Ranches	Yes/No	Work to move primary supply from High Zone to Low Zone. See Item 2.X in Scenario 2.
1.12	Replacement Transmission Main under I-25	This is associated with the Little Fountain Creek I-25 Bridge Replacement Project in proximity to the 8" main under I-25	Although the existing main is not directly in the alignment with the proposed bridge structure, it could be damaged	Low Zone	No	Work with CDOT for Replacement of the existing main. Work to increase the size from an 8" to a 12"
1.13	Ohio Avenue Railroad Crossing & PRV	Replacement of the Ohio Avenue RR Crossing at Ftn Mesa Road; relocation of PRV	This PRV is inoperable and could be better located East of the RR; the RR crossing could provide redundancy.	High to Low Zone	No	No planning or design has been started on this project.
1.14	Dr. Roger's Ditch Diversion & Augmentation Station	This will allow the Water Rights decreed in 16CW3056 to be used	The City's Water Rights in this case were decreed in 2019. Design to be awarded in 2021; Construction in 2022	N/A	No	Design to be awarded in 2021, Construction in 2022
1.16	Missouri Avenue/Santa Fe Avenue Project	Bore an 8" main from the dead end main on Missouri to the 8" main in Santa Fe Avenue	This improves pressure and flow on the West side of Santa Fe Avenue	Low Zone	No	Plans & Specifications developed by Forsgren, easements granted.
1.17	Finished Water Tanks Refitting	Fountain's steel fiunished water tanks require periodic inspections and major refitting to remain in compliance	While this seems like an O & M task, the refitting, sand-blasting, refinishing is extensive and is a Capital Item.	High Zone Low Zone	No	No planning or design has been started on this project.
1.18	Venetucci Wellfield Capital Projects	The well casings, pumps, motors and electrical equipment is a Capital Expense that requires inclusion in the C.I.P.	Fountain is a 10% partner in the Capital improvements to all the jointly-owned elements of the V-Wells	N/A	No	Planning for the next two years is ongoing.
1.19	Well capital costs and I-X plant capital expenses	These basic elements of the groudwater source and treatment systems require periodic capital investment.	The wells have all been extensively upgraded and the plant is new, but periodic capital investment is required.	N/A	No	No planning or design has been started on this project.
1.20	ROY Reservoir Capital Expenses	Develop planning, permitting & design for the Haynes Project with ROY partners.	Move this Project from Flow Management to a 59310 Project. Development Expenses to be budgeted.	N/A	No	Planning will continue.
1.21	Develop Simmons Well as a supply to Well #4 for additional Ion-Exchange Treatment & construction water	Redrill Simmons Well, install 3 blocks of non-potable main to Well #4 for additional raw water supply to I-X Plant	The I-X Plant may be able to process more water than we can supply with just 4 wells.	Low Zone	Yes/No	Simmons Well requires Aug Plan; This could be constructed with a fill line at Well #4 to fill construction water trucks.

CAPITAL IMPROVEMENTS - FOUNTAIN WATER
SCENARIO 2 - WATER PROJECTS FOR DEVELOPMENT - NOT INCLUDING KANE RANCH

PROJECT #	SHORT PROJECT NAME	SHORT PROJECT DESCRIPTION & LOCATION	SHORT PROJECT REASON	PRESSURE ZONE	SELF-PERFORM	DEVELOPMENT PROJECT DRIVER
2.1	Charter Oak Ranch Road Connection to Bandley Drive Main	Connect the Northerly Terminus of CORR to Bandley Dr. Requires bore under I-25	This provides needed Fire Flow to the proposed industrial development on North CORR and for redundancy	Low Zone	No	To be required for the developer of Northern CORR industrial development
2.2	Powers Blvd. Transmission Main 1	30" Main from Goldfield Tank to Powers Boulevard, then South on Powers to Mesa Ridge Parkway	Volumetric Demand increasing in the High Zone & Little Ranches Zone due to development	High Zone Little Ranches Zone	No	Appletree, Almagre, other developments in High Zone & Little Ranches Zone
2.3	Powers Blvd. Transmission Main 2	24" main on future Powers Blvd. past Mesa Ridge Pkwy. to C&S Road	Volumetric Demand increasing in the High Zone & Little Ranches Zone due to development	High Zone	No	Development in Little Ranches Zone Development in High Zone
2.4	C&S Transmission Main	24" main along C&S Road from Mesa Ridge Pkwy to Link Road	Volumetric Demand increasing in the Little Ranches Zone	High Zone	No	Development in Little Ranches Zone Development in High Zone
2.5	Link Road Transmission Main	Install 16" main & PRV in Link from C&S South to Squirrel Creek paralleling existing 12" main	Volumetric Demand increasing in Little Ranches Zone	High Zone Little Ranches Zone	No	This is supply for the Little Ranches Zone
2.6	Mesa Ridge Pkwy East Transmission Main 1	Install 24"main along Mesa Ridge Parkway from Powers Easterly to Mark Sheffel	Volumetric Demand to supply Almagre & Appletree	High Zone	No	Development in Appletree & Almagre
2.7	Mesa Ridge Pkwy East Transmission Main 2	Install a 24" main along Mesa Ridge Pkwy from Powers Westerly to Sneffels, then South to Cross Creek	Volumetric Demand in High Zone and Little Ranches Zone	High Zone	No	Development in High Zone & Little Ranches Zone
2.8	AppleTree and Almagre Development Transmission Loop	16" main loop internal to Appletree & Almagre	Volumetric Demand in Appletree & Almagre	High Zone	No	Appletree & Almagre developments in High Zone
2.9	West Side Watermains - Highway 85-87 Development	12" main Hwy 85/87 South to Commanche, 12" main Mesa West to Syracuse, 12"main Rustique to 85/87, 1 PRV	Volumetric Demand in Lusardi, Crescent Canyon, 85/87 commercial area & Independence Place	High Zone	No	Lusardi, Crescent Canyon, Independence Place developments
2.10	Wilson Road Transmission Main 1 NOTE: This is also Project 3.1 in Scenario 3 with larger pipes	Extend 24" main Easterly along Wilson from SW Link 2 to Progress	Volumetric Demand in Low Zone & Little Ranches Zone	Low Zone Little Ranches Zone	No	Countryside South & Johnson Ranch developments & supply for Little Ranches Zone
2.11	Wilson Road Transmission Main 2 NOTE: This is also Project 3.1 in Scenario 3 with larger pipes	Extend 16" main Easterly along Wilson from SW Link 2 to Progress	Volumetric Demand in Low Zone & Little Ranches Zone	Low Zone Little ranches Zone	No	Countryside South & Johnson Ranch developments & supply for Little Ranches Zone
2.12	Little Ranches Zone Pump Station NOTE: This is also Project 3.6 in Scenario 3	Install a Pump Station at the East terminus of Wilson Road to lift the H.G.L from Low Zone to Little Ranches Zone pressure	Volumetric Demand in Little Ranches Zone	Low Zone Little Ranches Zone	No	Little Ranches Zone developments
2.13	Little Ranches Treated Water Storage Tank NOTE: This is a relocated Tank from Scenario 3, Project 3.3	2.5 MG Tank in Little Ranches Zone - could be at-grade or elevated or both	Volumetric Demand in Little Ranches Zone	Little Ranches Zone	No	This is the primary pressure control and treated water storage for Little Ranches pressure zone
2.14	Orleans Road Main 1	Extend 16" main Southerly 1/2 mile from Wilson Road to Orleans Road East	Volumetric Demand in Low Zone	Low Zone	No	Countryside South & Johnson Ranch
2.15	Orleans Road Main 2	Extend 16" main Easterly 1 mile from Orleans Road South along Orleans Rd East	Volumetric Demand in Low Zone	Low Zone	No	Countryside South & Johnson Ranch
2.16	Womack Main Pumping Station & Supply Line	Construct a pumping station on Fort Carson to deliver the Womack Water Right to the Fountain Reservoir	Volumetric Demand growth in the Low & Little Ranches Zone	N/A	No	Demand growth in the Low Zone
2.17	Construct the Fountain Reservoir	Design, Permit and construct the Fountain Reservoir	Initially, the Fountain Reservoir will be for exchange management, then as a reservoir for Project 2.18.	N/A	No	The Fountain Reservoir will eventually be for the Fountain Surface Water Plant - Project 2.18
2.18	Fountain Surface Water Treatment Works at Fountain Reservoir Site	Permit, Design and Construct Fountain Surface Water Treatment Works at Fountain Reservoir Site	This treatment facility is necessary to address development demand throught the service area	N/A	No	The demand created by all anticipated development projects drives this treatment option.
2.19	Implement WARA with Widefield and Security Districts	Permit, Design and Construct WARA Water Treatment Works	This treatment facility is necessary to address development demand throught the service area	N/A	No	The demand created by all anticipated development projects drives this treatment option.
2.20	Implement the Redundant Connection to Colorado Springs Utilities	Permit, Design and Construct a redundant connection to the Colorado Springs Utilities finished water system.	This treatment facility is necessary to address development demand throught the service area	N/A	No	The demand created by all anticipated development projects drives this treatment option.
2.21	Implement the "Loop" Water System with Woodmoor & Cherokee Districts	Permit, Design and Construct a treatment facility sourced from the Chilcott Ditch diversion.	This treatment facility is necessary to address development demand throught the service area	N/A	No	The demand created by all anticipated development projects drives this treatment option.
2.22	Fully Develop the Permanent Marshall #2 Fill Station & Non-Potable Well Source	Build Marshall Well non-potable Pump Station for Countryside S & Johnson Ranch as well as construction H2O	This project builds out the Marshall Well for non-potable water distribution to C-Side South & Johnson Ranch	Low Zone	No	Benefits Countryside South and Johnson Ranch developments
2.23	Develop the Well #4 as a construction water fill station NOTE: This can work with 1.21 in Scenario #1	Repipe the Well #4 to deliver raw water for construction water	Repipe & revalve the Well #4, install a swing-out arm and metering system for non-pot use.	Low Zone	Yes/No	Benefits N Santa Fe, Crescent Canyon, Lusardi & Independence Place developments for construction water
2.24	Convert as many District 8 school sites from potable irrigation to non-potable groundwater	Wherever practical, work with Dist 8 to assist in well augmentation for conversion from potable to non-pot	Include wells in or near school sites in City Augmentation Plan filing(s); conserves treated water supply.	Low Zone/High Zone Little Ranches Zone	No	Benefits the District 8 expenses, moves water demand from treated water to non-treated water
2.25	Convert as many Fountain park sites, streetscapes & cemetaries irrigation to non-potable groundwater	Wherever practical, work with Parks to assist in moving treated water irrigation to non-pot.	Include wells near parks & cemetary in City Augmentation Plan filing(s); replace treated water with raw water	Low Zone/High Zone Little Ranches Zone	Yes/No	Benefits the City expenses, moves water demand from treated water to non-treated water
2.26	Upgrade distribution water systems at Legacy Projects to current standards	Work with MHC and other legacy developments to upgrade leaking & inefficient private systems to current standards	This reduces water waste & addresses fire flow deficiencies	Low Zone	Yes/No	Reduces water waste, possibly increases the number of customers
2.27	Convert as many commericial, industrial & institutional customers to non-potable groundwater	Wherever practical, work with owners to assist in moving treated water irrigation to non-potable sources	This initiative reduces water demand in the peak seasons and reduces customers water bills.	Low Zone/High Zone Little Ranches Zone	No	This initiative moves water demand from treated water to non-potable water in the highest demand times and days
2.28	Convert as many District 3 school sites from potable irrigation to non-potable groundwater	Wherever practical, work with Dist 8 to assist in well augmentation for conversion from potable to non-pot	Include wells in or near school sites in City Augmentation Plan filing(s); conserves treated water supply.	High Zone	No	Benefits the District 3 expenses, moves water demand from treated water to non-treated water
2.29	Additional ground water wells and associated treatment.	Permit, Design and Construct Groundwater Treatment using existing wells and existing GAC units.	These treatment facilities are necessary to address development demand throught the service area	N/A	No	The demand created by all anticipated development projects drives this treatment option.
2.30	Design & construct a surface water treatment plant in East Fountain supplied from SDS raw water trasmission	Permit, Design and Construct a treatment facility sourced from the SDS Raw Water Main.	This treatment facility is necessary to address development demand throught the service area	N/A	No	The demand created by all anticipated development projects drives this treatment option.

CAPITAL IMPROVEMENTS - FOUNTAIN WATER
SCENARIO 3 - WATER PROJECTS FOR KANE RANCH DEVELOPMENT

PROJECT #	SHORT PROJECT NAME	SHORT PROJECT DESCRIPTION & LOCATION	SHORT PROJECT REASON	PRESSURE ZONE	SELF-PERFORM	PROJECT DEVELOPMENT
3.1	Wilson Road Transmission Main NOTE: This is also Projects 2.10 & 2.11 in Scenario 2	Extend 36" main Easterly along Wilson from SW Link 2 to Kane Ranch Pump Station	Volumetric Demand in Low Zone & Little Ranches Zone	Low Zone Little Ranches Zone	No	Countryside South & Johnson Ranch Low Zone developments & supplies Little Ranches Zone in Kane Ranch
3.2	Kane Ranch High Pressure Supply Main	Extend 24" main along Powers Blvd from Marksheffel to Squirrel Creek Rd to serve High Zone in Kane Ranch	Volumetric Demand in High Zone area of Kane Ranch	High Zone	No	This is the primary supply main for the High Pressure areas of Kane Ranch & back-up for L Ranches in Kane Ranch
3.3	Kane Ranch Treated Water Storage Tank NOTE: This is a relocated Tank from Scenario 2, Project 2.13	2.5 MG Kane Ranch Tank in Little Ranches Zone in Kane Ranch - could be at-grade or elevated or both	Volumetric Demand in Little Ranches Zone area of Kane Ranch	Little Ranches	No	This is the primary pressure control and treated water storage for Little Ranches pressure zone
3.4	Kane Ranch Transmission Main 1	16" transmission main from the existing Little Ranches area to the Kane Ranch Water Storage Tank	Redundant supply for Kane Ranch Little Ranches pressure zone area	Little Ranches	No	This is the element that ties the existing Little Ranches Zone area to the Kane Ranch Little Ranches Zone area
3.5	Kane Ranch Transmission Main 2	16" transmission main from the Kane Ranch Storage Tank to the Little Ranches Zone in Kane Ranch to the East	Supply for the Kane ranch Development in the Little Ranches pressure zone	Little Ranches	No	This is exclusively to supply water to the East part of Kane Ranch.
3.6	Kane Ranch Pump Station NOTE: Larger capacity PS than Project 2.12 in Scenario 2	6.8 MGD pumping water from the Low Zone to the Little Zone to Project 3.3	Supply and redundancy for the Little Ranches pressure zone in Kane Ranch	Little Ranches	No	This is exclusively to supply water to Kane Ranch
3.7	Kane Ranch Pump Station Discharge Main	This transmission main connects Project 3.6 to Project 3.3	Supply and redundancy for the Little Ranches pressure zone in Kane Ranch	Little Ranches	No	This is exclusively to supply water to Kane Ranch
3.8	Kane Ranch Fire Flow Pump Station	Located near the Tank (Project 3.3), this 2,000 GPM pump increases pressure from Little Ranches to High Zone	This is for Fire Flow and for redunancy to the High Zone areas of Kane Ranch	High Zone	No	This is exclusively to supply water to Kane Ranch
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CITY OF FOUNTAIN WATER MASTER PLAN 2021
WATER RESOURCE PLANNING AND LAND USE PLANNING

INTRODUCTION

The City of Fountain Utilities Department regularly coordinates with the City's Planning Division for review of new development applications and other land use matters. The preparation of this Water Master Plan included a considerable amount of input from the Planning Division, coordination with the City's Land Use Master Plan, and review of the City's land development policies and regulations.

LAND USE PLANNING DRIVES WATER DEMAND PLANNING

For the Water Demand section of the Master Plan, future water use was calculated using the current land use applications and the remainder of undeveloped properties within the water service area were assigned an estimated water demand per acre according to the current zoning. Water demand for properties that are likely to redevelop were calculated based on the anticipated new use of the property.

BASIC WATER ASSUMPTIONS FOUNDED ON LAND PLANNING DATA

Infill Areas: Within the City of Fountain's Water Service area, there are multiple properties that are currently either vacant or used for agriculture. The future water demand is based on the zoning classifications as noted in Table 3-2. It is assumed that the infill areas, as well as the planned developments, will be built out to the defined densities over the term of the Water Master Plan.

Urban Renewal Areas: Only a portion of two of the City's four Urban Renewal Authority (URA) areas are located within the water service area. Parts of two of these URAs are within the Water Service Area. The projected future demand for the two URAs is captured with the infill areas.

Unbuildable Areas: There are multiple properties within the water service area that have geographic or legal constraints that limit or prohibit development or development densities that would affect water demand. Against development or development intensities that would affect

Water Demand. The constrained properties are reasonably unbuildable. These constraints include:

Special Flood Hazard Areas: Fountain Creek, Jimmy Camp Creek and Williams Creek all have Special Flood Hazard Areas defined by the Federal Emergency Management Agency (FEMA). These designations severely restrict the construction of most land uses that impose additional water demands on Fountain water system.

Conservation Easements: Conservation Easements are real property constraints against developing identified properties. The ownership of these properties voluntarily accepts these constraints by recording an encumbrance on the property that prohibits all but the specified uses. Conservation Easements are authorized by Colorado Revised Statute 38 CRS 30.5.

Irrigation Canal Routes: Several irrigation canals traverse the Fountain water service area. These irrigation canal routes are often irregularly shaped and are assumed to have no contribution to future Water Demand requirements.

Railroad Rights-of-Way: Two active rail rights-of-way traverse the Fountain water service area. Generally, these rail uses have no water demand, but, as some railroad rights-of-way are determined to be excess property by the rail operators, these properties may be transferred from railroad ownership. One such property was transferred to City ownership and is planned to become a City Park (the "Blast Park"). While this specific reuse of rail rights-of-way can contribute to some additional Water Demand, the amount will probably not be significant.
Upon transition of surplus rail rights-of-way to uses that have a water demand, the changed use be reviewed for the impact on the overall water demand for the City prior to granting approval to the proposed reuse. All current water conservation codes and standards should be applied to whatever reuse is proposed for rail rights-of-way proposed to be changed in use.

WATER CONSERVATION ASPECTS OF LAND USE PLANNING

The City of Fountain has developed a robust Water Conservation Planning function, reflecting the direction of the 2007 Water Master Plan. Professional staff trained in water conservation and sustainability, classes in landscaping, directions on efficient outside irrigation, showerhead replacements and bill credit for installing water saving toilets are all efforts that have all worked to steadily decrease the per person water demand over the past 15 years.

Part of the reason that Water Conservation was identified as essential in the 2007 Water Master Plan was that Fountain projected up to five years of double-digit increases in Water Rates to fund the investment in the Southern Delivery System (SDS).

For new developments, these efforts begin at the land planning point of contact. Applicants for new developments are informed at the beginning of planning that the subdivision or planned development will be expected to incorporate structural water conservation as part of the design and construction.

For several years, new residential developments were incentivized by subsidies for Water Tap Fees that encouraged installation of water conserving landscape design.

The Water Conservation efforts largely succeeded for new developments; the modern water saving fixtures and the xeriscape (low water use landscaping) installation at the point of purchase for new homes resulted in new homes consistently using less water than the existing housing stock in Fountain.

However, the water conservation efforts have not been as widely embraced by existing neighborhoods. In some areas, rather than adapt to lower exterior water demand landscaping, the results have been abandoned landscaping due to financial constraint. Addressing healthy landscaping in mature neighborhoods is a goal of the Water Master Plan.

LANDSCAPE REQUIREMENTS

Fountain currently has minimal landscaping requirements embedded in codes and regulations for all categories of land use. To encourage sustainable, attractive and functional landscapes that not only support the water needs of new developments, but are affordable and implementable, revisions to the City's landscape requirements should be considered.

Existing Residential Neighborhoods: The challenge to maintain the livability of all properties in Fountain is the maintenance continuity for the existing residential neighborhoods. The water rate increases that were adopted over the past fifteen years have sometimes had adverse effects on existing properties, leading to abandonment of landscape care and irrigation for some properties. While this lowers water demand and reduces peak load, it has a deleterious effect on the neighborhood appearance. Potential outreach initiatives, such as the Grass-to-Garden initiative, may be implemented or enhanced to address these existing neighborhoods.

New Multi-Family/Commercial/Industrial/Institutional Multiple Building (Campus or Office Park) Developments: Proposals for commercial development of office parks, condominium, apartment communities, or other multiple building developments that are developed under single or condominium ownership are all potential candidates for implementing specific water conservation and landscaping plans that reduce overall water use while maintaining sustainable and attractive landscapes. As these developments are planned, investigation into the potential for non-potable water use for exterior irrigation should be encouraged. If the geology is possible for well(s) to be drilled and raw groundwater used for exterior irrigation, the City may offer a contract for augmentation of well depletions for the development. If the groundwater and soil is incompatible with development of raw water irrigation for the proposed development, an irrigation-only connection fee and water rates could be established for exterior potable water landscape irrigation.

Redevelopment of Commercial, Industrial and Institutional Properties: As commercial, industrial and institutional properties change use and water demand, the change in use may trigger a redesign of the exterior landscaping.

> Potential policy considerations: Consider offering an incentive program to existing commercial, industrial and institutional properties that encourages upgrading the interior water use facilities to meet current code compliance and that exterior landscaping also be incentivized to upgrade to current standards.

Other landscape initiatives that could be reduce the overall system demand could include outdoor watering restrictions and/or a water waste ordinance.

Outdoor Watering Restrictions: The City Council passes a Resolution annually to encourage observation of voluntary outdoor irrigation standards. Recent national studies have indicated that voluntary outdoor irrigation standards have little or no effect on limiting water demand or diurnal peaking. In 2019, the City of Colorado Springs adopted a mandatory Water Restrictions

Ordinance that included enforcement provisions that limited outdoor water use to three days per week. Consideration of adoption of mandatory and continuing Water Restrictions is one tool that may be effective in limiting demand in high use periods (hot days in the summer) and lowering the diurnal water demand peaking. This is a direction that should be adopted only after careful study and reviewing other case studies. Mandatory irrigation limitation may only be appropriate for inclusion in the Water Scarcity Response Plan, rather than as a regular matter of doing business.

Water Waste Ordinance: Water waste is defined as excessive irrigation or domestic water runoff, pooling water or stagnant potable water that presents a health or safety concern. Water waste also occurs as a result of a broken irrigation system or water service line or valve. In general, water waste is characterized by disuse or unattended running water, either indoors or outdoors.

Many of these water wasting practices may be identified much earlier with the implementation of a fully automated metering system. Water use by each customer is compiled daily (rather than monthly) and increases in use can be flagged for Customer Service to reach out to these customers to address plumbing or irrigation excesses can be communicated within days, rather than waiting for a monthly meter read and seeing an excessive water bill.

Potential policy considerations: A water waste ordinance and outdoor watering restrictions may result in a reduction of peak water demands. A full automated metering system would provide additional tools and data for the effective management of the distribution system and enable staff to advise customers of potential problems be for they become an excessive water bill.

REGIONAL CONGRUENCE FOR LAND USE PLANNING AND WATER RESOURCES PLANNING

Water management in El Paso County is almost always a multi-agency effort. Whether it's the Fountain Valley Authority, the Pikes Peak Regional Water Authority or the Southern Delivery System, the water utilities work together regularly. The point that the cooperation requires further effort is tying the Water Resources Planning with the Land Use Planning.

Much of this progress in this area has been possible in Fountain because the organization is a Home Rule City. Many other water utilities in El Paso County are organized as some form of Special District. Special Districts do not have land use responsibilities and depend on El Paso County, the City of Colorado Springs, Fountain or other governmental units with Land Use responsibilities. Fountain is taking a leadership role in the Southern El Paso County area,

working with other water providers to develop best practices all of the water providers may adopt to manage their water resources.

Utilities staff have been working with El Paso County Planning and Community Development, Colorado Springs Utilities and the City of Colorado Springs to define areas of shared interests in sustainability and conservation. Teaming with these other units of government may enhance the Land Use Planning and the Water Resource Planning Congruence efforts beyond just the City of Fountain. Some joint efforts identified are:

Messaging: The coordination of messaging about all water conservation efforts between these entities will keep all customers current on the conservation efforts.

Adoption of Consistent Landscaping Codes: Potentially aligning codes and standards for exterior landscaping will benefit the development community in simplifying procurement and compliance.

Coordination of Supply and Demand Definitions: Sharing the basic foundational supply and demand standards as each utility plans out its own Water Master Plan will allow El Paso County to present a single unified message to the Arkansas Basin Roundtable, to the Colorado Water Conservation Board and to the Division of Water Resources.

CITY OF FOUNTAIN WATER MASTER PLAN 2021
OPERATIONS

PURPOSE

The Water Operations and Maintenance Section addresses the routine tasks and duties, programs and personnel necessary efficiently operate and maintain the City's water system, in compliance with all drinking water regulations.

GENERAL OPERATIONS

Routine Tasks and Duties: Water Operations Staff perform the following tasks and activities in the course of operating and maintaining the water system:

Facilitating deliveries from treated source water;
Managing storage of raw water;
Conducting treatment of raw source water (wells);
Distributing potable water to customers;
Sampling for and ensuring compliance with regulatory testing requirements;
Planning, reviewing and inspecting construction of new water infrastructure;
Planning and executing major repairs of water infrastructure;
Responding to and resolving customer concerns and complaints;
Responding to water system leaks, malfunctions or other emergency occurrences; and
Assisting with utility locating and monitoring active construction for the protection of water infrastructure.

Operation and Maintenance Programs: Water operations staff implements and conducts the following programs on a structured timetable for proactive maintenance and system protection:

1. Hydrant flushing, maintenance and repair – Recurring visual inspections and conducting of flow and pressure tests on every system hydrant. This information is used to identify and correct mechanical deficiencies, schedule maintenance or replacement of hydrants, and determine available fire flows and pressures for coordination and support of firefighting operations.
2. Valve exercising, maintenance and repair – Systematic opening and closing of all system valves to ensure proper operation, identifying stuck or leaking valves and confirming full connectivity of the system. This work helps identify valves that are inaccessible or set to

improper grade, ensures all water mains are open and flowing, targets valves needing replacement, and helps prevent valves from seizing up and long periods of non-use.

3. Backflow prevention and cross-connection control administration – State mandated annual program requiring testing and reporting of all commercial backflow devices to ensure proper operation of all devices connected to the water system. Backflow prevention devices are required on all commercial users connected to the water system stop the entry of harmful contaminants back into distribution system.
4. Leak detection and repair – Cycling deployment of specialized acoustic devices to 'listen' for and identify locations of potential leaks.
5. Pressure monitoring – Deployment of pressure monitoring and recording equipment in known sensitive areas. This data helps to monitor system stability, verifies the proper operation of pressure reducing vaults, and troubleshoots the timing and source of potential system-harming events or actions.
6. Construction water administration – Consistent oversight, tracking and accounting of water taken from hydrants and wells for use on construction sites and other temporary applications.
7. Tank inspections – State mandated inspections performed to check condition and safety of treated water storage Tanks. This involves quarterly visual inspections of all tank appurtenances for proper protection and operation, as well as internal inspections performed by draining the tank or employing divers to inspect tank linings and structural integrity.
8. Maintaining the Asset Management System for all water infrastructure.

Water Losses in Operations: Water losses in the transmission and distribution systems and developing a comprehensive and continuing leak detection program is an important elements of system operations. These losses are known as "non-revenue water." According to AWWA, "utilities incur real losses from pipeline leakage and apparent losses when customer water consumption is not properly measured or billed."

Recommendation: Provide AWWA's M 36 training for operations and engineering staff.

Recommendation: Institute a system-wide "non-revenue water" detection initiative and use the developed data to prioritize investment in water mains, valves and service replacements.

PERSONNEL

Existing Personnel:

1. Water Operations is authorized by budget to employ 13 full-time persons in the following Positions:
   a. Water Resources Manager (1)
   b. Water Engineer 1 (1)
   c. Utilities Management Assistant (1)
   d. Water/Sewer Inspector (1)
   e. Water Foreman (1)
   f. Water Compliance Technician (1)
   g. Water Operators (Various Designations) (6)
2. In addition to the full-time employees, water operations has, in the past, employed seasonal labor and contracted for specialized discipline-trained personnel as needed.
3. As an owner of a water facility, the City is required by the Code of Colorado Regulations to designate an Operator(s) in Responsible Charge (5CCR 1003-2-100.10). The Water Foreman is designated as the City's Operator in Responsible Charge (ORC). ORC(s) have specific responsibilities and duties as defined in the Code of Colorado Regulations (5CCR 1003-2-100.12).
4. Operations personnel are not exclusively assigned to only treatment or only distribution duties. The operations personnel are cross-trained in both disciplines. As the City expands its water treatment facilities, consideration will be given to dividing the operations personnel into two working groups of plant operators and system operators.
5. Operation personnel pay is based on the individual's accomplishments of attaining Operator Certifications. Pay is increased to the individual as the Operator attains progressively higher levels of certifications

Licensure and Certification:

1. Engineering positions require registration as a professional engineer by the State of Colorado.
2. Water Operator positions require certification as Colorado Certified Water Professionals (CCWP), a program administered by the Colorado Department of Public Health and Environment.
3. Water Operators may be certified for Water Treatment or Water Distribution, and may hold both at the same time.
4. The City of Fountain, based on population served and complexity of the water system, requires a "Level C" Treatment Certification and a "Level 3" Distribution Certification for the Operator in Responsible Charge (ORC) in order to be legally compliant with State Health

Regulations. As the water system grows in complexity through expansion of piping and the addition of new treatment elements these operational certification requirements will increase.

SYSTEM

Existing System: Fountain has operated a municipal water system since 1911. Most of the infrastructure in the Water System is less than 30 years old. The Water Operations Personnel are charged with operating, repairing, maintaining and monitoring all these elements of the municipal water system.

1. The City operates a distribution system serving approximately 8,800 service connections. These Service Connections may serve single-family residential, commercial, institutional or industrial customers.
2. The Distribution system currently has 141 lineal miles of water distribution/transmission pipelines, two pumping stations, 7 pressure regulating stations, 3,900 valves and 1,136 fire hydrants.
3. The Distribution system has a finished water storage capacity of 8 million gallons, in five different water storage tanks (reference the Water Delivery Section).
4. The City has multiple sources of water, both surface water and groundwater (reference to Water Supply Section).
5. The City has two Granular Activated Carbon (GAC) Plants for per fluorinated compound (PFAS) removal from groundwater supplies. These two plants are owned and operated by the City and are the only treatment systems that the City currently operates.
6. The City will be assuming the responsibility of operating an Ion-Exchange Water Treatment Plant that is more complex than the two GAC Plants and will require a higher level of personnel interaction and expertise for operations.
7. The City operates the Keeton Reservoir, a small surface water reservoir west of the City, with an outlet pipe that crosses Fort Carson.

Existing Pressure Zones: In order to accommodate varying ground elevations within the service area without producing excessively low or high system pressures, the City's water distribution system is divided into two major pressure zones (referred to as the Low Zone and the High Zone) as well as one isolated Booster zone and the Little Ranches zone supplied through pressure reducing valves. Table 4-3 provides a summary of the ground elevations and operating gradients within the various pressure zones that makeup the Fountain water system, and the subsequent paragraphs discuss the individual pressure zones in more detail.

Water System Pressure Zone Attributes			
Pressure Zone	Current Operating Gradient (feet)	Approximate Range of Ground Elevations (feet)	Approximate range of Static Pressures (psi)
Low	5,740	5,490 to 5,620	51 to 107
Little Ranches[(1)]	5,810	5,560 to 5,720	38 to 108
High	5,920	5,540 to 5,770	64 to 163
Booster	6,023	5,770 to 5,880	61 to 109

[(1)] Little Ranches Pressures vary based on settings of the PRV's as set by Utility Operations Staff; those setting generally adhere to the values provided above.

Low Zone

The Low Zone serves the low-lying ground in the southwest part of the City, generally southwest of the Union Pacific Railroad tracks. Ground elevations within the Low Zone range from about 5,490 feet along Fountain Creek to 5,620 feet at the north extent on Bandley Drive. The Low Zone operates on a static hydraulic gradient of 5,740 feet as determined by the overflow elevation of the City's 3.0-million-gallon Southwest Tank.

FVA and SDS water is supplied to the City's Low Zone from the Fountain Valley Conduit via a 10" turnout located about 3 miles upstream of Forebay Tank No. 4 into Fountain's Southwest Tank and then flows by gravity into the distribution system. Additional water for the Low Zone is obtained from City's Ion-Exchange Groundwater Treatment Facility located at Aga Park, which can be directed to distribute to either the Low Zone, High Zone, or both simultaneously. Under unusual demand conditions or emergencies, water can also be supplied to the Low Zone through pressure reducing valves located along the boundary between the Low and High zones.

High Zone

The High Zone serves most of the higher-lying ground in the northeast part of the City, generally northeast of the Union Pacific Railroad tracks. Ground elevations within the High Zone range from about 5,540 feet along Jimmy Camp Creek to 5,770 feet in the vicinity of Janitell Junior High School. The High Zone operates on a static hydraulic gradient of 5,920 feet as determined by the overflow elevations of the Fountain Terminal Tank and the Joint Storage Tank.

FVA and SDS water is supplied to the High Zone through the 24" Fountain Valley Lateral, which conveys water from the Fountain Valley Conduit to the Widefield Regulating Tank. Water flows by gravity from the regulating tank to the Fountain Terminal Tank and the Joint Storage Tank. From these tanks, water can flow by gravity into the High Zone distribution system or be pumped into the Booster Tank. Additional water for the High Zone is obtained from City's Ion-Exchange Groundwater Treatment Facility located at Aga Park, which can be directed to distribute to either the Low Zone, High Zone, or both simultaneously.

Little Ranches Zone

The Little Ranches Zone serves an area in the southeast part of the City where the ground elevations are too high to be served effectively from the Low Zone but lower than the ground being served from the High Zone. Ground elevations in the Little Ranches Zone range from about 5,560 feet by the Chilcott Canal to 5,720 feet at the eastern extent of Ermel Road. Water is supplied through pressure reducing valves (PRV's) that bleed water from the High Zone into the regulated zone. Because there are no storage facilities within the Little Ranches Zone, the static hydraulic gradient within the zone is determined by the downstream pressure setting on the pressure reducing valve.

Booster Zone

The Booster Zone serves the high-lying ground in the north part of the City, generally north of Janitell Junior High in the Country Club Heights/Sunrise Ridge subdivisions. Ground elevations in this zone range from about 5,770 feet to 5,880 feet. The Booster Zone operates on a static hydraulic gradient of 6,023 feet as determined by the overflow elevation of the Joint Elevated Tank.

Water is pumped from the Joint Storage Tank into the Joint Elevated Tank using two pumps located in the base of the Joint Elevated Tank. Each of the pumps has a rated capacity of 1,300 gallons per minute (gpm) at a head of 100 feet, and each is equipped with a 50 horsepower (hp) motor that operates at a speed of 1,750 revolutions per minute (rpm).

Existing Pressure Reducing Valve (PRV) Stations: The Fountain Water System currently has seven pressure reducing valve stations, of which only five are active and operating at the time of Master Plan implementation. The majority of these stations operate with a pressure sustaining valve on the upstream end, a large diameter mainline pipe with a PRV, and a small diameter bypass pipe with a PRV. The pressure sustaining valve ensures that a minimum pressure is kept upstream of the station by throttling or stopping flows through the vault when those pressures fall below a set point. The small diameter bypass pipe and PRV are the primary means of transferring water through the station, with the valve generally being set approximately 10 PSI higher than the larger PRV. Under normal operations, water slowly flows through the bypass pipe and PRV to sustain the set pressure in the downstream pressure zone. The large diameter pipe and PRVs are set to a lower pressure than the bypass, and are designed to only open when a high water demand significantly drops the pressure downstream. Outside of significant demand events, such as a fire, the larger PRV remains closed and all pressure zone transfers occur through the smaller PRV inside of each vault. These vaults are generally located at the locations and with the characteristics noted below:

Water System Pressure Reducing Valve Stations				
Station Name	Vault Location	Mainline Size (inch)	Bypass Size (inch)	Status
REA Vault	Ohio Ave at REA Rd	8	3	Operational
N Link Vault	Link Rd at Jimmy Camp Creek	8	3	Operational
Jimmy Camp Vault	Jimmy Camp Rd north of Ohio Ave	8	3	Operational
Highgate Vault	Jimmy Camp Rd at High Gate Dr	8	3	Operational
Fortman Vault	Ohio Avenue at Hamlin St	6	No bypass	Inactive
Bandley Vault	Bandley Dr north of KOA Campground	8	4	Operational
Circle C Vault	Circle C Rd at Link Rd	6	2	Decommissioned

(1) Tanks are jointly utilized by the City of Fountain and the Widefield Water & Sanitation District.

Existing Water Mains

The City of Fountain's Water system currently contains over 141 miles of Distribution and Transmission Mains with a wide range of service ages and varying materials. These mains range from 4" diameter distribution pipes, primarily located in older areas and situated within minor side roads and back alleys, up to 36" transmission piping located along the southern extent of the City's limits. The vast majority of the System's distribution mains, which are directly tapped to provide service to individual customers, are 6" and 8" diameter pipes. The Majority of the System's Transmission mains, which convey water from storage to the localized distribution mains, are 12" diameter pipes; however, there are a few isolated stretches of 16" and 36" transmission mains within the system.

Fountain's Water Mains are comprised of ductile iron, cast iron, asbestos-cement (AC), high density polyethylene (HDPE) and polyvinyl chloride (PVC) piping. Most pipes installed after the early 1990's are PVC pipe, whereas areas predating that period are most commonly ductile or cast iron. The pipes within the area served by Booster Zone, built in the 1970's, are almost exclusively AC pipe.

CITY OF FOUNTAIN WATER MASTER PLAN 2021
FINANCIAL TOPICS

INTRODUCTION

In managing the financial aspects of the water utility, the City of Fountain has traditionally subscribed to the following guidance statements:

- Water system should be financially self-supporting;
- Water rates, tap fees and miscellaneous charges for service should be equitable and based on actual cost of service;
- Water rates should promote conservation;
- Water rates should be adequate to ensure that the City's water quality meets and/or exceeds all health standards;
- Water rates should be adequate to ensure that funds are available for proper operation and maintenance of the system; and
- Existing customers should not be burdened with the costs of system expansion, growth should pay its own way.

SOURCES OF REVENUE

The Water Utility in Fountain has multiple sources of revenue, all of which are addressed in every Annual Budget adopted by the City Council.

Metered Sales: The City of Fountain has adopted an inclining block (tiered) water rate structure based on the size of the tap and the amount of water used (gallons) during each billing cycle. The principle of water rate structure is that a customer pays a higher price per unit (1,000 gallons) as their use or consumption increases. This method of rate design is intended to encourage customers to better manage their water use and to conserve, The City's water rates are set by ordinance (adopted by City Council).

Connection Fees: The City of Fountain charges a one-time water tap fee to all who desire to connect to and receive service from the City's water system. This connection fee charge is based on the size of the meter to be used. The connection fee is comprised of two components:

Infrastructure Fee: This part of the connection fee is designed and intended to fund the capital improvements required for storing, treating, and delivering this additional water to satisfy new water system connection demands.
Water Acquisition Fee: This part of the connection fee is designed and intended to fund the costs associated with the acquisition of water rights needed to serve new water system connection demands.

Miscellaneous Fees: In administering the billing and collection function, the City charges service-related fees. The following fees are established by resolution of the City Council:

After Hours Services: This is a per-visit fee for non-emergency service calls not during regular business hours.
Water Meter Tests: Upon customer request, the City will perform a meter test for water meter accuracy.
Water Meter Removal and Replacement: This fee applies to a customer request for water meter removal and a separate request for water meter installation. Often this fee is applied to remodel or demolition projects.
Reconnection to Water Services: If a water meter is disconnected for repairs to the customer's plumbing, there is a reconnection fee.
Water Inactive Account Fee: If the customer has requested that a water service be turned off, but the water service is to remain active, there is a monthly fee that is billed during the inactivity.
Collection Fees: If a customer's account is delinquent and subject to collection, the Collection Fee (in addition to the customer paying the billing amount due) is 20% of the outstanding bill. There are also late payment, stop payment and dishonored payment fees.
Damage Repair Fees: If a component of the water system is damaged, such as a hydrant being impacted by a traffic accident, the City Council bills the responsible party for the actual cost to repair the damage.
Diversion Fees: If a customer damages, bypasses or otherwise tampers with a water meter, the customer is charged a diversion fee, plus the cost of repair, administrative and investigative expenses and repayment of unbilled consumption.
Inspection Fees: There is no charge for water system inspections during normal working hours. After-hours inspections are subject to an hourly fee, with a two-hour minimum.

Augmentation Contracts: The City of Fountain provides water to augment groundwater depletions for well owners under contracts approved by the City Council. This is primarily to incentivize the use of groundwater for large irrigation water users. By using well water to

irrigate parks and open spaces rather than treated water, the well user saves money and the water used for irrigating grass does not need to be highly treated potable water. There are currently three Augmentation Contracts administered by the City.

Bulk Sales:

Farmer's Hydrant: The City maintains a bulk fill facility (known as the Farmer's Hydrant) which is restricted to City residents who do not have a water main in proximity to their property. This facility is not available to water customers who have a connection to the water infrastructure or to anyone for use outside the City.

Construction Metered Sales: The City makes construction water available for use within the City limits at an adopted rate for potable water and at a reduced rate for untreated water.

Other Bulk Sales: The sale of untreated groundwater as a replacement to either exterior landscape irrigation is currently addressed on a contract basis between the City and the water user.

G.I.D. #2: In 2012, the City Council created, by ordinance, General Improvement District #2 (GID 2). The GID provides a reduction in City fees including a 20% reduction in the infrastructure fee component of the water connection fee. As a condition of inclusion in the GID 2 area, the property tax levied on all eligible properties within the GID area has an increased *ad valorem* tax rate. A portion of the revenues generated by the increased tax rate are designated for water infrastructure.

Grants: The City has obtained grants and funding from governmental sources (FEMA and the Air Force as examples) and from other sources for specific projects and programs.

Revenue from Sale of Excess Equipment or Real Property: The City of Fountain Financial Policies and Procedures Manual, adopted by the City Council, prescribes a rigorous Surplus Property Disposal Process.

Loans: The City has taken loans for water infrastructure construction in the past. There are no current outstanding water loans.

Bonds: The City Utilities Enterprise has issued bonds to generate revenue for capital projects and purchase including water rights, water infrastructure and buildings.

Potential Additional Income Sources: Several additional income sources are discussed in this section. Adoption of additional sources of income requires City Council action.

EXPENSES

The water utility in Fountain expenses fall within the following general categories:

Source of Supply: Source of supply expenditures are expenditures associated with the purchase or lease of raw water, raw water extraction (City owned wells), storage and conveyance and the purchase of treated water. The City's sources of supply include:

Fountain Valley Authority (FVA): The Fryingpan-Arkansas Water System is a United States Bureau of Reclamation (USBR) project that diverts western slope water to the Arkansas River watershed. The Southeastern Colorado Water Conservancy District has a contract with the USBR for the conveyance of project water to the FVA. Fountain is a partner in the FVA, which owns the water treatment facility and the treated water conveyance system. FVA contracts with Colorado Springs Utilities to operate the FVA system.

The Southern Delivery System (SDS): The SDS is a Colorado Springs project to transport and treat raw water from the Pueblo Reservoir. The City receives SDS water allocation through the FVA system in accordance with an exchange agreement with Colorado Springs. The City currently has no physical connection to SDS.

Venetucci Wells: This project was jointly constructed and funded by Fountain, Security and Widefield. The City pays a proportional share of the annual lease (payable to the Pikes Peak Community Foundation, the water rights owner) and operating costs.

Groundwater: The City owns four wells that produce raw water that is treated for potable water.

Leases: Through an agreement with the Super Ditch Company, a group of water rights owners along the Caitlin Canal in the Lower Arkansas Valley, the City leases raw water based on a 40-year Lease Contract approved by Council in October 2018. The City also leases raw water storage space in the Holbrook Reservoir in the Lower Arkansas Basin.

Surface Water: The City has expenses associated with the following surface water rights:

The Fountain Mutual Irrigation Company (FMIC): Fountain owns 640 shares in FMIC. Currently Fountain has an elected Member of the Board of Directors of FMIC.

The Chilcott Ditch Company (CDC): Fountain owns 23.25 Shares in the CDC, leases 2.5 shares from Fountain-Fort Carson District 8 and has two Carriage Agreements with the CDC for the company to carry water rights that are owned by the City through the ditch.

The Colorado Canal Company and Lake Meredith Reservoir Company (CCC): The City owns 512.5 Shares in the CCC Company, which is in the Lower Arkansas Valley

and 512.5 Shares in the Lake Meredith Reservoir Company. Both of these mutual companies are managed by the same management group.

The Doctor Rogers Ditch: The City owns the entire water rights of the Doctor Rogers Ditch. This water right is in El Paso County, just south of the City of Fountain.

H2O Ranch/Bell Ditch: The City owns parts of the Bell Ditch #1, #2 and #3 and the Lee Adams Well on the H2O Ranch in Westcliffe, Colorado. These water rights are conveyed to the Pueblo Reservoir via the Arkansas River.

The Little Fountain Pipeline: The City shares the water rights (known as the Womack Water Rights) with the Department of Defense and several landowners West of Fort Carson. These water rights are delivered through the Keeton Reservoir, which is owned by the City and across Fort Carson to Fountain Creek.

Operations & Maintenance: Operations and maintenance expenses are the regular and normal expenses the City incurs to continue the operations of the water system, starting from the source of supply to the tap including personnel, materials, services, and equipment. The cost includes water treatment (ground water) and treated water storage, transmission and distribution.

Capital: Capital expenditures are the expenses incurred to purchase, construct, acquire, replace, or expand the durable elements of the water system. Land, buildings, treatment systems and water delivery components such as storage tanks, mains, pumps, hydrants, valves, meters and metering equipment are all capital expenses.

Administration: Administration expenses include labor, materials and services required to manage and support the operational functions of the utility. Administration and support functions include the City Manager's office, the Utility Director's office, legal services, finance/accounting, human resources and tech services.

Customer Service: The Customer service expenses include labor, materials, services, and equipment required to perform the billing and collection functions of the water utility.

Debt: The Utilities Enterprise has six bond issues that have water components with a current balance of just under $50 million. Bonds have been issued to generate revenue for the City's portion of the Southern Delivery System and to pay for a portion of the customer service building and utilities operations center. The outstanding bonds, purpose and payoff dates are:

Series 2021 (refunding 2013): (2041)
Series 2020 (refunding 2011): SDS (2041)
Series 2019: utilities operations center & miscellaneous water improvements (2039)

Series 2016 (refunding 2009): water storage and customer service (2038)
Series 2015: SDS (2045)
Series 2014: SDS (2044)

Debt payments, including Principal and interest, cost $3,521,050 annually.

Potential policy consideration: Where appropriate, certain revenues may be restricted or designated for specific expenditures.