



Washington City

**CULINARY WATER MASTER PLAN &
IMPACT FEE FACILITIES PLAN**

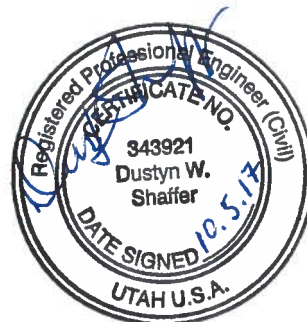
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1 EXECUTIVE SUMMARY

1.1 Introduction

Washington City commissioned Sunrise Engineering to update the Culinary Water Master Plan, Impact Fee Facilities Plan and Impact Fee Analysis. This plan evaluates the existing system and recommends improvements for a 10-year development horizon and a 20-year planning period. The City continues to experience growth in many areas throughout its boundaries. This plan should act as a guide to plan for and implement culinary water improvements to meet the needs of the residents and businesses.

1.2 System User Analysis

For this study we assume that Washington City's growth rate will remain steady over the next several years.

- Population Growth Rate of 3%
 - 2015 Census estimated population was 24,299
 - 2017 estimated population is 26,566
 - 10-year development horizon estimated population is 35,703
 - 20-year planning period estimated population is 47,982
- Commercial Connections were calculated to be 5.1 Equivalent Residential Units
 - 2017 estimated total Commercial ERUs is 2,886
 - 10-year development horizon estimated total Commercial ERUs is 3,879
 - 20-year planning period estimated total Commercial ERUs is 5,213
- Historic annual average water consumption is 427.3 gpd/ERU
 - Approximate annual average indoor consumption is 221.6 gpd/ERU
 - Estimated annual average outdoor consumption is 205.7 gpd/ERU

1.3 System Capacities & Facilities

The City's culinary water system was divided into four sub-systems that are analyzed separately to measure the sustainability of each sub-system and the overall system.

- Existing Source Capacity is 14,926 gpm
 - Calculated existing State required water source capacity is 7,003
 - Recommended to increase source capacity by 5,060 gpm by 2027
- Existing Storage Capacity is 7,800,000 gallons
 - Calculated existing State required water storage capacity is 5,222,500 gallons
 - Recommended to increase storage capacity by 8,300,000 gallons by 2027
- Existing Treatment Capacity is 4,726 gpm
- Existing Distribution System demands
 - Peak day demand is 7,003 gpm
 - Peak day demand plus fire flow is 8,503 gpm
 - Peak instantaneous demand is 21,708 gpm

The existing H2ONet® (by Innovyze) model of the culinary system was updated and evaluated under existing and 20-year planning period demands. The results of the model shaped the recommended improvements for the distribution system.

1.4 Recommended Improvements

A summary of recommended improvements and opinions of costs for projects in the 10-year development horizon are available in Table 8-1, and is shown below.

| Source Improvements | Cost |
|---|----------------------|
| South Washington Fields WCWCD Connection (2020) | \$ 231,500 |
| Grapevine Pass Wash Well Field (2027) | \$ 2,666,000 |
| Total + Incidentals | \$ 3,948,300 |
| Storage Improvements | Cost |
| 2,000,000 Gallon Tank Red Cliffs (2018) | \$ 1,226,400 |
| 1,000,000 Gallon Tank Long Valley (2020) | \$ 1,493,100 |
| 500,000 Gallon Tank Grapevine Pass Wash (2022) | \$ 648,150 |
| 2,800,000 Gallon Tank Warner Valley for Fields (2024) | \$ 1,293,100 |
| 2,000,000 Gallon Tank Sunrise Valley (2027) | \$ 1,498,100 |
| Total + Incidentals | \$ 6,599,550 |
| Treatment Improvements | Cost |
| 560 GPM Increase to Microfiltration Plant (2019) | \$ 765,800 |
| Total + Incidentals | \$ 935,100 |
| Distribution Improvements | Cost |
| Red Cliffs Transmission Pipeline (2018) | \$ 566,500 |
| Total + Incidentals | \$ 848,700 |
| Grand Total of All Projects | \$ 12,331,650 |

A full summary of recommended improvements is provided in Section 8 and shown in the Recommendations Map in Appendix A (Map 6).

1.5 System Financials

An Engineer's Opinion of Probable Cost shows that construction related costs total to \$12,332,000 in 2017 dollars as shown in the above table, plus \$50,000 for Impact Fee Facilities Plan updates.

A city utility must be able to sustain itself financially through user rates and impact fees. User rates cover operations and maintenance and includes existing debt not covered by impact fees. Impact fees pay for improvements that are required to support growth.

An average user rate was calculated based on the projected fiscal year 2018 expenses and revenues. Base and overage rate tables are provided in Appendix D. WCWCD intends to increase

the cost per 1,000 gallons of wholesale water by \$0.10 per year for 10 years. This is reflected in the Cash Flow.

A new impact fee was calculated by adding together all impact fee eligible costs and dividing them by the number of new ERUs projected to be added to the system in 10 years. This analysis is shown in Appendix D.

- Total EOPC construction costs - **\$12,331,650**
- Existing Average User rate - \$33.95
- Calculated Average User Rate - **\$35.99**
- Existing Impact Fee per ERU - \$2,121.00
- Maximum Allowable Impact Fee per ERU - **\$1,981.05**
- Calculated Water Acquisition Impact Fee Credit - **\$1.66 per gpd**

2 INTRODUCTION

2.1 Purpose and Scope

Washington City commissioned Sunrise Engineering, Inc. to conduct an update to the Water Master Plan. The plan update also acts as an Impact Fee Facilities Plan, provides an Impact Fee Analysis, updates the water model, and gives a review of the City's water user rates. The purpose of the study is to provide a master plan that can be used as a tool by the City for the following:

1. Understanding the key elements of the system including existing sources, storage facilities, pipe networks, pressure zones, and demand areas.
2. Show the water needs of Washington City, focusing on existing and 20-year planning period demand needs.
3. Evaluation of the existing water sources; discuss their existing capacity and their ability to meet the future demands of the water system. This includes existing wells and water available from Washington County Water Conservancy District (WCWCD).
4. Summarize existing water storage facilities and their capacities, and evaluate existing and future storage needs for fire suppression.
5. Understanding of the water treatment facilities, evaluate capacities, and evaluate existing and future treatment needs along with possible expansion.
6. Model and evaluate the distribution system and its ability to convey water in average day, peak day, and fire flow scenarios.
7. Recommend improvements to meet the identified deficiencies for all elements of the water system to meet existing and future water needs. Provide an Engineer's Opinion of Probable Cost for recommended improvements in the 10-year development horizon.
8. Review and provide recommendations for the water rate structure to comply with a proposed financing plan.
9. Prepare Impact Fee Analysis and recommend an impact fee for new improvements that are needed to accommodate growth within the water system.

The items to be discussed in this master plan will focus on the existing system in 2017 followed by a 20-year (2037) planning period. Project costs and impact fee calculations were based on a 10-year development horizon.



Figure 2-1: Washington City

2.2 Background Information

Washington City is a growing urban community in southern Washington County, just east of St. George City. Its current and future economic status benefits from I-15. The City is geographically split into three sections north-to-south by both I-15 and the Virgin River. Washington City has a long agricultural heritage that is still active in the Washington Fields area of the City. However, with rapid residential growth, much of the Washington Fields area is changing from a rural community to a suburban community. Residential and commercial growth are impacting nearly every area of the City.



The study area for this plan is all areas within the existing city limits and inside the annexation area for Washington City that will conceivably be serviced by the city water utility within the planning period. This includes growth in Green Springs, Sienna Hills, Washington Fields, Long Valley, Sunrise Valley, and Warner Valley.

This Master Plan Update 2017, has a foundation based on the 2010 Water Master Plan Update and will rely on certain information developed for that report. Sunrise Engineering also completed the 1993 and 1999 versions of the Washington City Water Master Plan. Since the last Master Plan, several large utility projects have been completed, the latest being the East Regional Connection and Booster Pump Station. This project made a large connection to the WCWCD pipeline near the County Landfill that pumps source water to the Grapevine and Red Cliffs tanks and secures future source water for Washington City.

3 SYSTEM USER ANALYSIS

3.1 Projected Growth Rate & Planning Period

An essential element in the development of a Culinary Water Master Plan is the projection of the City's population growth rate. The population growth rate gives the planner a glimpse of the future demands that may need to be accommodated by the City's culinary water system. Projecting the number of future culinary water connections with any degree of accuracy can be a very subjective process, especially with the fluctuating growth trends that Washington City has seen in recent years. With this in mind this plan uses several resources including Census figures, and water connection data from the City's Billing Summaries to evaluate the growth trends and to provide a projection of how growth will occur in the future. **Error! Not a valid bookmark self-reference.**

shows historic growth rates based on census counts from 1980 through 2010 and census estimates from 2011 through 2015.

It is expected that the number of new connections per year will increase at a moderate growth rate for the duration of the planning period. Table 3-2 shows the projected ERU, connections, and population growth. Significant growth is expected to be in the Washington Fields, South Fields, Sunrise Valley, Long Valley, Sienna Hills, and the area adjacent to the Washington Parkway exit on I-15. Growth in Warner Valley is expected to occur later than those areas previously mentioned. For the purpose of

Table 3-1: Washington City Historic Growth

| Time Frame | Population | % Growth |
|---|------------|-------------|
| 1980 Census Population | 3,092 | |
| 1990 Census Population | 4,198 | 3.1% |
| 2000 Census Population | 8,186 | 6.9% |
| 2010 Census Population | 18,761 | 8.6% |
| U.S. Bureau of the Census Subcounty Population Estimates 2011-2015 | | |
| 2011 Estimated Population | 19,974 | 6.5% |
| 2012 Estimated Population | 20,848 | 4.4% |
| 2013 Estimated Population | 21,908 | 5.1% |
| 2014 Estimated Population | 23,360 | 6.6% |
| 2015 Estimated Population | 24,299 | 4.0% |
| Growth rate experienced between 1980 & 1990 | | 3.1% |
| Growth rate experienced between 1990 & 2000 | | 6.9% |
| Growth rate experienced between 1980 & 2000 | | 5.0% |
| Growth rate experienced between 2000 & 2010 | | 8.6% |
| 30-Year Historic Growth Rate (1980-2010) | | 6.2% |

Table 3-2: Population and ERU Growth Projections

| Year | Est. Growth Rate | *Estimated Residential ERU's | *Estimated Commercial ERU's | *Estimated Total ERU's | *Estimated Total Conn. | **Estimated Population | New Conn. (i.e. Building Permits) |
|------|------------------|------------------------------|-----------------------------|------------------------|------------------------|------------------------|-----------------------------------|
| 2010 | - | 7,020 | 2,215 | 9,235 | 7,359 | 18,761 | - |
| 2011 | - | 7,231 | 2,282 | 9,512 | 7,580 | 19,974 | 221 |
| 2012 | - | 7,447 | 2,350 | 9,798 | 7,808 | 20,848 | 227 |
| 2013 | - | 7,671 | 2,421 | 10,091 | 8,042 | 21,908 | 234 |
| 2014 | - | 7,901 | 2,493 | 10,394 | 8,283 | 23,360 | 241 |
| 2015 | - | 8,138 | 2,568 | 10,706 | 8,654 | 24,299 | 371 |
| 2016 | - | 8,475 | 2,744 | 11,219 | 9,016 | 25,256 | 362 |
| 2017 | 5.2% | 8,915 | 2,886 | 11,801 | 9,484 | 26,566 | 468 |
| 2018 | 3.0% | 9,182 | 2,973 | 12,155 | 9,768 | 27,363 | 285 |
| 2019 | 3.0% | 9,458 | 3,062 | 12,520 | 10,062 | 28,184 | 293 |
| 2020 | 3.0% | 9,742 | 3,154 | 12,896 | 10,363 | 29,030 | 302 |
| 2021 | 3.0% | 10,034 | 3,249 | 13,282 | 10,674 | 29,901 | 311 |
| 2022 | 3.0% | 10,335 | 3,346 | 13,681 | 10,994 | 30,798 | 320 |
| 2023 | 3.0% | 10,645 | 3,447 | 14,091 | 11,324 | 31,722 | 330 |
| 2024 | 3.0% | 10,964 | 3,550 | 14,514 | 11,664 | 32,673 | 340 |
| 2025 | 3.0% | 11,293 | 3,656 | 14,949 | 12,014 | 33,653 | 350 |
| 2026 | 3.0% | 11,632 | 3,766 | 15,398 | 12,374 | 34,663 | 360 |
| 2027 | 3.0% | 11,981 | 3,879 | 15,860 | 12,746 | 35,703 | 371 |
| 2028 | 3.0% | 12,340 | 3,995 | 16,336 | 13,128 | 36,774 | 382 |
| 2029 | 3.0% | 12,710 | 4,115 | 16,826 | 13,522 | 37,877 | 394 |
| 2030 | 3.0% | 13,092 | 4,239 | 17,331 | 13,927 | 39,013 | 406 |
| 2031 | 3.0% | 13,485 | 4,366 | 17,850 | 14,345 | 40,184 | 418 |
| 2032 | 3.0% | 13,889 | 4,497 | 18,386 | 14,776 | 41,389 | 430 |
| 2033 | 3.0% | 14,306 | 4,632 | 18,938 | 15,219 | 42,631 | 443 |
| 2034 | 3.0% | 14,735 | 4,771 | 19,506 | 15,675 | 43,910 | 457 |
| 2035 | 3.0% | 15,177 | 4,914 | 20,091 | 16,146 | 45,227 | 470 |
| 2036 | 3.0% | 15,632 | 5,061 | 20,694 | 16,630 | 46,584 | 484 |
| 2037 | 3.0% | 16,101 | 5,213 | 21,314 | 17,129 | 47,982 | 499 |

* Estimated ERU's and Connections are based on the data from the City's Annual Rate Table Summary for July 2015 through July 2016. (Census Population data is based on estimates taken in July)

** Estimated Population is determined by multiplying the estimated residential ERU's by 2.98. 2.98 is the number of people per residential ERU in past years.

this Master Plan and to prepare for the future culinary water requirements it is assumed that 3.0% growth will occur for the 20-year planning period. Although historic growth for the City has generally been in the 5-8% range, the City now has a greater population base and it is expected that the growth rate will slow. It is important to understand that projected population figures are not the corner stone of this master plan. If the maximum number of system connections projected is reached earlier or later than projected, then future improvements to support growth may either come earlier or later. Impact Fees should not be significantly affected if the actual rate of growth varies from the rate used in the plan.

3.2 Culinary Water Connections

According to Washington City user summary data presented in Appendix B, the number of culinary connections for July 2016 was 9,016. This value includes 8,475 residential connections and 541 commercial connections (see Table 3-2). The 541 identified commercial connections are actually made up of agricultural, commercial, government, institutional, and landscape connections. For the purposes of this report these non-residential connections will be identified as commercial connections.

Population projections and number of future culinary connections is calculated using the compound interest formula and inserting the projected growth rate, number of culinary water ERUs, and the 20-year planning period.

$$F = P(1 + i)^n$$

F = Future Value
P = Present Value
i = Growth Rate
n = Years

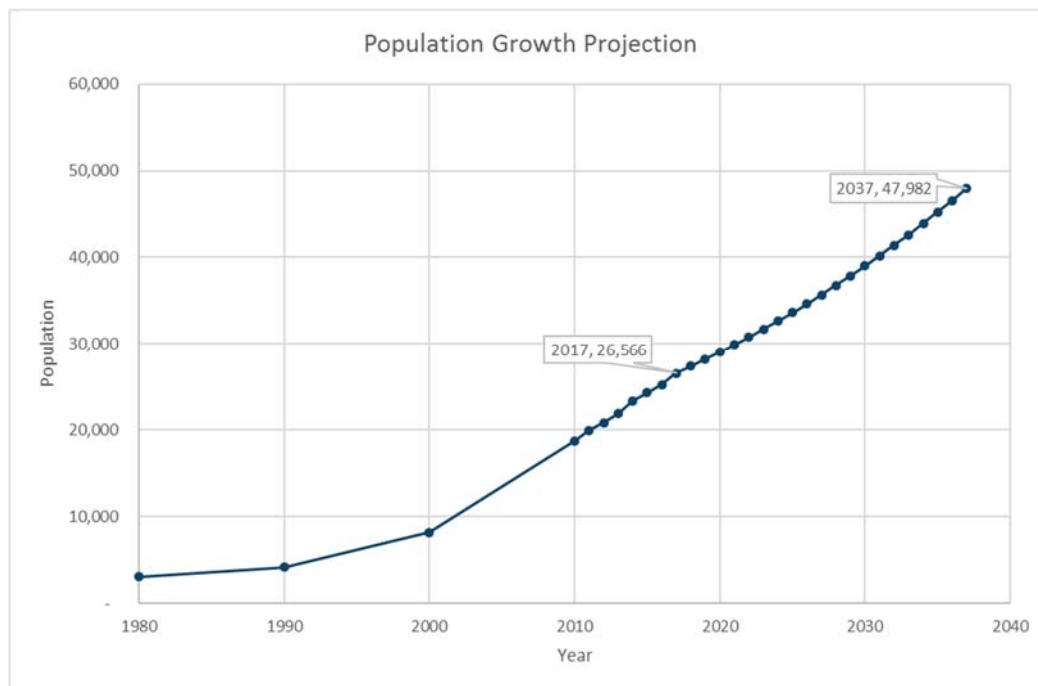


Figure 3-1: Historic Population and Population Projections

City wide water use has increased over the last few years mostly because of population growth. Figure 3-2 shows system wide water use by month from July 2008 to December 2016. Figure 3-3 shows the same data but organized by total system annual water use for Washington City from 2009 to 2016.

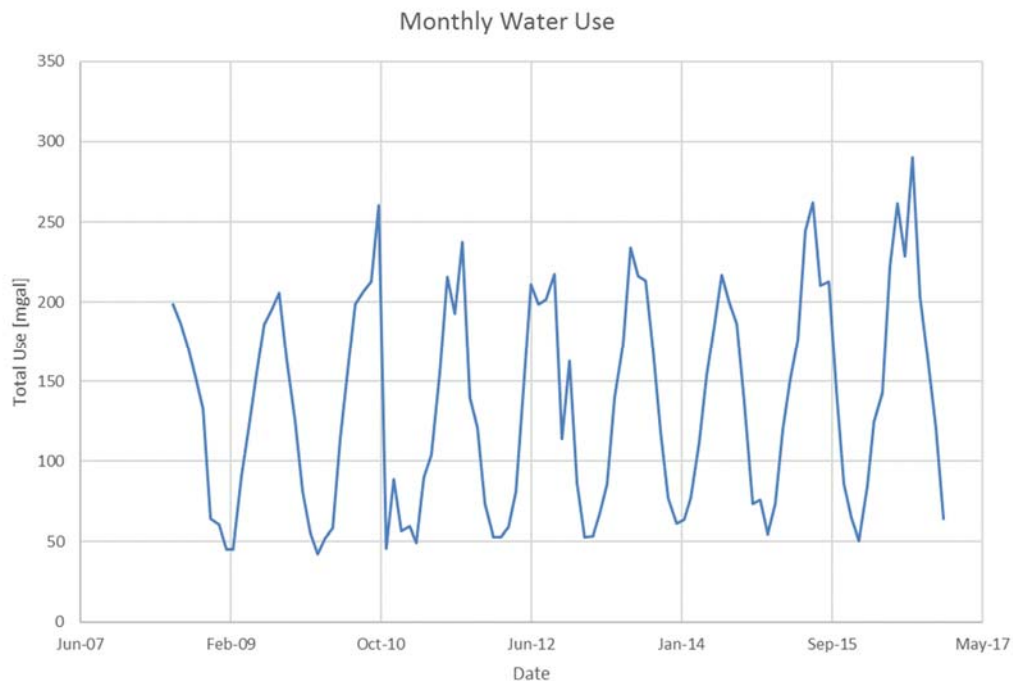


Figure 3-2: Monthly Water Use Summary

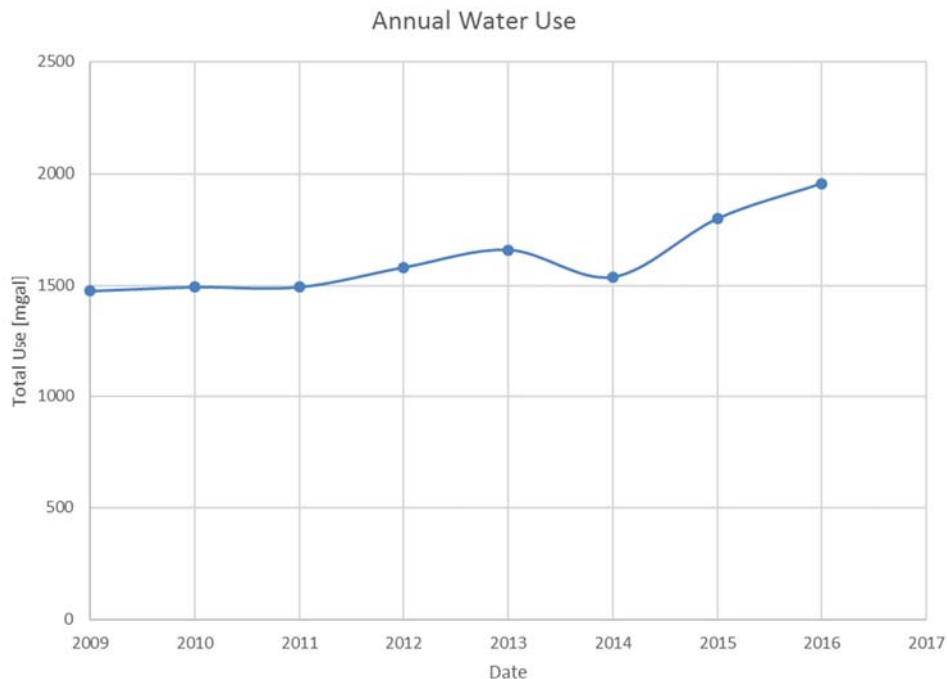


Figure 3-3: Annual Water Use Summary

3.3 Equivalent Residential Units

Commercial connections generally require more water than that required by a residential customer. An Equivalent Residential Unit (ERU) represents the additional volume of water required for commercial users above and beyond the amount used by an average residential connection.



Figure 3-4: Treatment Plant Booster Pumps

The ERU value is determined by comparing the average daily use per commercial connection to the average daily use per residential connection. The City presently performs this analysis with individual commercial connections for billing purposes. To calculate the average daily use for commercial connections, the total amount of water used by all commercial users was determined for the same one-year period. In the year 2015, the total commercial water usage of approximately 393,350,000 gallons was distributed to an average of 515 commercial users.

The average commercial connection in 2015 used approximately 5.0 times the amount used by the average residential connections in the same year (420 gal/day). Likewise, the average commercial connection in 2016 used approximately 5.1 times the amount used by the average residential connections in the same year (435 gal/day). Thus, for the purpose of this master plan we will use an ERU value for each commercial connection of 5.1. The total number of ERUs for 2016 is calculated below.

$$8,475 \text{ Residential ERUs} + 2,744 \text{ Commercial ERUs} = 11,219 \text{ ERUs}$$

3.4 Average Demands

Essential to calculating the ERU value of a commercial connection is calculating the average use per residential connection. Since the number of connections to the system changes throughout the year, the average number of connections for the year was used in calculating average annual demand per ERU. Table 3-3 shows a summary of the average annual use calculation for 2015 and 2016. This master plan will use the value of 427.3 gpd/ERU for average annual use. Indoor usage was calculated by averaging the monthly use in December, January, and February. The average annual indoor use was calculated to be 221.6 gpd/ERU.

Table 3-3: Average Use Per ERU Calculation

| Year | Total Annual Residential Use [gal] | Average Residential Connections | gpd/ERU |
|----------------|------------------------------------|---------------------------------|--------------|
| 2015 | 1,407,119,000 | 9186.2 | 419.7 |
| 2016 | 1,521,171,000 | 9556.7 | 434.9 |
| Average | | | 427.3 |

4 SOURCE CAPACITY ANALYSIS

4.1 Existing Water Source Capacity

To analyze source capacity, all available culinary water sources are first identified and listed in Table 4-1 below. The flow capacity numbers were acquired from the City and are based on maximum flow if all the wells are running at capacity. This means that a given well may be capable of flowing at a higher rate than shown, but with other wells also running at the same time the well will be limited to the given flow rate.

With the Regional Water Supply Agreement (RWSA), the WCWCD will account for much of the future source improvements for the City.

Table 4-1: Washington City Water Sources

| Wells | Total Flow | |
|--------------------------------|------------|---------------|
| | CFS | gpm |
| No. 2 | 1.045 | 469 |
| No. 3 | 0.290 | 130 |
| No. 4 | 1.731 | 777 |
| No. 5 | 2.103 | 944 |
| No. 6 | 1.693 | 760 |
| Grapevine Well No. 1 | 0.305 | 137 |
| Grapevine Well No. 2 | 0.267 | 120 |
| Sub-total Wells = | 7.435 | 3,337 |
| Microfiltration (Quail Lake) | 3.095 | 1,389 |
| Sand Hill Dr Booster Pump | 6.684 | 3,000 |
| Field Road WCWCD Connection | 8.913 | 4,000 |
| East Regional WCWCD Connection | 7.130 | 3,200 |
| Grand Total = | 33.257 | 14,926 |

4.2 Existing Required Water Source Capacity

The State of Utah Administrative Rules for Public Drinking Water Systems, Sections R309-510 states that a community should have an adequate water source capacity to supply a peak demand of 800 gallons per day per connection for indoor use. The regulations also require the source to be capable of meeting peak irrigation demands, where no secondary source of irrigation water is available.

In the State regulations, the peak day demand for source capacity requirement per connection is double the average amount of water required per connection per day. Similarly, this master plan assumes that the peak day demand in Washington City for source capacity is double their average requirement per ERU based on historic use figures. Therefore, the required source capacity per ERU in Washington City is assumed to be 855 gallons per day.

Table 4-2: Peak Day Demand Summary

| | | | |
|--|-------|---------|-------------------------|
| Historic Average Consumption | 427.3 | gpd/ERU | (Total Indoor/Outdoor) |
| Historic Average Indoor Consumption | 221.6 | gpd/ERU | (Approx. Indoor Use) |
| Historic Average Outdoor Consumption | 205.7 | gpd/ERU | (Estimated Outdoor Use) |
| Peak Day Demand (Historic times 2) | 854.6 | gpd/ERU | (Total Indoor/Outdoor) |
| Peak Day Indoor Demand Estimate (Historic times 1.1) | 244 | gpd/ERU | (Estimated Indoor Use) |
| Peak Day Outdoor Demand Estimate (Historic times 2.97) | 611 | gpd/ERU | (Estimated Outdoor Use) |

Using available data and engineering judgment, it was discussed that during peak day demand scenarios, indoor water usage would increase by a factor of 1.1 times 222 gpd/ERU to 244 gpd/ERU. This means that outdoor demand makes up the remaining peak day demand of 611 gpd/ERU, which is 2.97 times more than the annual average day outdoor demand.

The required existing source capacity is calculated below:

$$11,801 \text{ ERUs} \times \frac{854.6 \text{ gpd}}{\text{ERU}} \times \frac{1 \text{ day}}{1,440 \text{ min}} = 7,003 \text{ gpm}$$

The existing source capacity surplus or deficit is determined by subtracting the existing required source capacity of 7,003 gpm from the total available source capacity of 14,926 gpm, which yields a source surplus of 7,922 gpm. Reversing the source calculation above, one is able to find the number of ERUs that the source surplus should sustain. The number of ERUs that may be added to the system with the existing source surplus is 13,349 ERUs.

4.3 Projected Required Water Source Capacity

Projected required water source capacity at the end of the planning period is determined from the same information and calculations explained in Section 4.2, except the projected number of culinary water ERUs is substituted in the calculations for the number of ERUs. Table 4-3 shows the results from source capacity calculations.

Table 4-3: Existing and Projected Source Capacity

| Average Source Req. Based on INDOOR & OUTDOOR Water Use | Year 2017 | Year 2037 | Units |
|--|--------------|---------------|------------|
| ERUs | 11,801 | 21,314 | ERUs |
| Peak Water Use (Indoor + Outdoor) | 854.6 | 854.6 | gpd/ERU |
| Required Water Source (Indoor + Outdoor) | 7,003 | 12,649 | gpm |
| Existing Culinary System Water Source Surplus/(Deficit) | 7,922 | 2,277 | gpm |
| Number of ERU's that can be added | 13,349 | 3,836 | ERUs |

It was projected that at the end of the 20-year planning period there will be a surplus of 2,277 gpm compared to the existing source capacity.

4.4 Recommended Water Source Improvements

The existing source capacity surplus of 7,922 gpm is projected to not be exceeded by the end of the 20-year planning period. Because of the agreement with WCWCD, the City is not required to increase source capacity through future improvements. However, the current level of service for source capacity to Washington City is double then the State required source capacity. The reason for this level of service is to meet peaking requirements. If this level of service is to be maintained several improvements are recommended.

While the Conservancy District will be responsible to provide new sources, Washington City should plan on getting water from the District's pipelines to the various points of use in the City and adding City owned sources.

- Increase Microfiltration Plant capacity by 0.8 MGD (560 gpm)
- Additional small production wells in Grapevine Pass Wash area
- WCWCD regional waterline connection at Washington Fields Road (4,000 gpm)
- WCWCD future Warner Valley regional line connection (6,000 gpm)

Figure 4-1 shows the potential source capacity with these recommendations and the projected required capacity. It was determined that a safety factor of 1.6 to account for peaking for source capacity would be used to calculate the timing and amount of recommended sources.

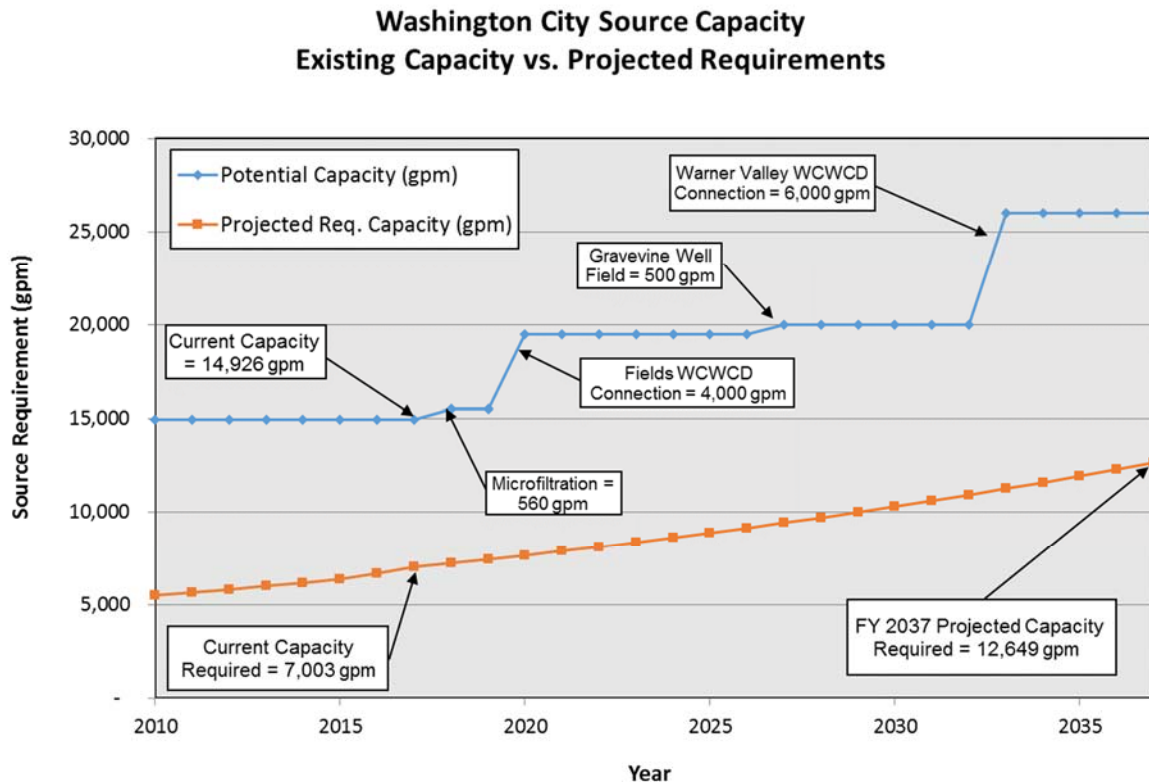


Figure 4-1: Source Capacity Projections and Requirements

Washington City has interest in expanding the capacity of the Microfiltration Plant by adding 560 gpm to its current capacity. The City and Pall Corporation did an evaluation of the existing filter racks and determined that additional filters could be added to the end of each rack to expand capacity. In addition to the expanded racks, Sunrise evaluated the capacity of the high service pumps and subsequent power facilities. It appears that only minor modifications to control are required. The Quail Lake Pump Station will need to be modified to deliver additional raw water from Quail Lake. Finally, an analysis is needed to address issues with delivering the added treated water to the areas of the City that need it the most.

Additional wells could also be drilled in the Grapevine Pass Wash area or even in the Mill Creek well field. Grapevine Wells 1 and 2 only produced between 100 gpm and 160 gpm. Despite the low production the wells are still economically feasible at a relatively low cost per 1,000 gallons produced. For this reason the City may choose to drill several wells (with the hope of drilling a good producer) at intervals along the existing access road near the existing Grapevine wells using existing pipelines to transport the water to the City. Even if the wells only produce 100 gpm to 200 gpm, the cost of water would be relatively low.

In conjunction with the 2006 Culinary Water Master Plan, Sunrise Engineering provided a Secondary Irrigation Master Plan that addresses ways to reduce the culinary water requirement by implementing a pressurized secondary irrigation system. Many new developments, especially those in Washington Fields have dry irrigation lines that could be connected to a City pressurized irrigation system. The implementation of a pressurized secondary irrigation system throughout the City should still be considered.



Figure 4-2: Air Release Lines

Sources in the Warm Springs area currently provide approximately 550 gpm of irrigation water to the City. The City has various options for additional sources of water for a secondary irrigation system. By replacing the current flood irrigation methods with a pressurized system, excess irrigation water that would otherwise drain into the Virgin River could be retained to supplement the culinary water system. The City also has additional capacity available from Well No. 1 that is currently providing irrigation water for the City's cemetery and ball fields. In addition, the City could utilize scalping plants in conjunction with their wastewater system improvements and reuse the filtered water for irrigation needs.

To a certain extent, conservation is a very reasonable way to reduce the overall required water source. The City has already implemented a water user rate structure with overage steps to encourage conservation (see Appendix D). The City should also adopt landscape requirements that will reduce irrigation demands and reduce the overall usage

5 STORAGE CAPACITY ANALYSIS

5.1 Existing Water Storage Capacity

The existing storage facilities in Washington City is shown in Table 5-1.

Table 5-1: Existing Storage Capacity

| | |
|------------------------------------|----------------------|
| Red Cliffs 2.3 Million Gallon Tank | 2,300,000 gal |
| Red Cliffs 1 Million Gallon Tank | 1,000,000 gal |
| Grapevine Tank | 1,000,000 gal |
| Warner Ridge Tank | 1,000,000 gal |
| Microfiltration Plant | 500,000 gal |
| Washington Dam Tank | 2,000,000 gal |
| Total Existing Capacity | 7,800,000 gal |

5.2 Existing Required Water Storage Capacity

Water storage capacity requirements are found in the State of Utah Administrative Rules for Public Drinking Water Systems, Section R309-510. These regulations require storage for a community's culinary water system to meet one full day's use requirement for all connections in the community plus the required fire flows for a minimum of one hour. The City has decided to maintain storage for two hours of fire flow.

As shown in previous sections, the historic average use per ERU in Washington City is assumed to be 427 gallons per day. Storage requirements for fire protection vary from community to community. In general, fire flow requirements are set by the local Fire Chief or are based on building size, and type of construction. The statewide minimum fire flow for one and two family dwellings under 3,600 square feet is 1,000 gpm; fire flows of 1,500 gpm or greater are required for all other buildings. The City has indicated that for planning purposes the required fire flow should be 1,500 gpm. Based on the above data Washington City storage capacity is calculated below.

$$11,801 \text{ ERUs} \times \frac{427.3 \text{ gpd}}{\text{ERU}} = 5,042,486 \text{ gal}$$

Storage for fire protection is calculated below.

$$1,500 \text{ gpm} \times \frac{60 \text{ min}}{\text{hr}} \times 2 \text{ hr} = 180,000 \text{ gal}$$

The total existing State required storage is 5,222,486 gal. This results in a surplus of 2,577,514 gal.

5.3 Projected Required Water Storage Capacity

Projected required culinary water storage capacity at the end of the 20-year planning period is determined from the same factors explained in Section 5.2 above, but the projected number of culinary water ERUs is inserted into the calculations. Table 5-2 shows a summary of water storage calculations for existing water use and projected water use at the end of the 20-year planning period. The same calculations are presented under the hypothetical situation that all outdoor water use is provided via a pressurized secondary irrigation system.

Table 5-2: Projected Total and Indoor Water Storage Summary

| Avg. Storage Req. Based on INDOOR & OUTDOOR Water Use | Year 2017 | Year 2037 | Units |
|--|------------------|------------------|--------------|
| Existing ERU's | 11,801 | 21,314 | ERUs |
| Average Water Use (Indoor + Outdoor) | 427 | 427 | gpd/ERU |
| Water Storage for Average Usage (Indoor + Outdoor) | 5,042,486 | 9,107,291 | gal |
| Required Storage for Fire Protection (1,500 gpm for 2 hours) | 180,000 | 180,000 | gal |
| Total Required Water Storage (Indoor + Outdoor) | 5,222,486 | 9,287,291 | gal |
| Existing Culinary System Water Storage Surplus/(Deficit) | 2,577,514 | (1,487,291) | gal |
| Average Storage Req. Based on INDOOR Water Use | | | |
| Existing ERU's | 11,801 | 21,314 | ERUs |
| Average Water Use (Indoor) | 222 | 222 | gpd/ERU |
| Water Storage for Average Usage (Indoor) | 2,615,048 | 4,723,067 | gal |
| Required Storage for Fire Protection (1,500 gpm for 2 hours) | 180,000 | 180,000 | gal |
| Total Required Water Storage (Indoor) | 2,795,048 | 4,903,067 | gal |
| Existing Culinary System Water Storage Surplus/(Deficit) | 5,004,952 | 2,896,933 | gal |

5.4 Recommended Water Storage Improvements

Based solely on the State requirement for quantity of storage capacity and at the projected growth rate this surplus capacity should last until approximately the year 2031. The projected required storage capacity calculations yield a storage capacity shortage of 1,487,000 gal at the end of the 20-year planning period if water usage continues at the same rate of consumption.

Figure 5-1 shows the potential storage capacity with these recommendations and the projected required capacity. It was determined that a safety factor of 1.3 for storage capacity would be used to calculate the timing and amount of recommended storage facilities. This means that when system demand gets within 40% of capacity, new storage will be added. Currently, the level of service of storage capacity is over 1.4, or over 40% more storage than State law requires.

A notable factor in the addition of new water storage facilities will be the location of new growth that is expected to occur. As can be seen by the 20-year projection for storage requirement and the recommendations discussed in this section, the design location of these tanks is based more on meeting peak instantaneous flows and fire flows for developing areas than on an immediate need to increase storage capacity in the City as a whole. Recommended storage above the State Requirement and above the existing level of service was deemed necessary to act as a buffer during abnormally high use days and provide water to specific areas to augment the distribution system. A minimum safety factor of 1.4 was used in determining the total amount of

recommended storage in Figure 5-1. No safety factor was used in determining required buildout storage capacities.

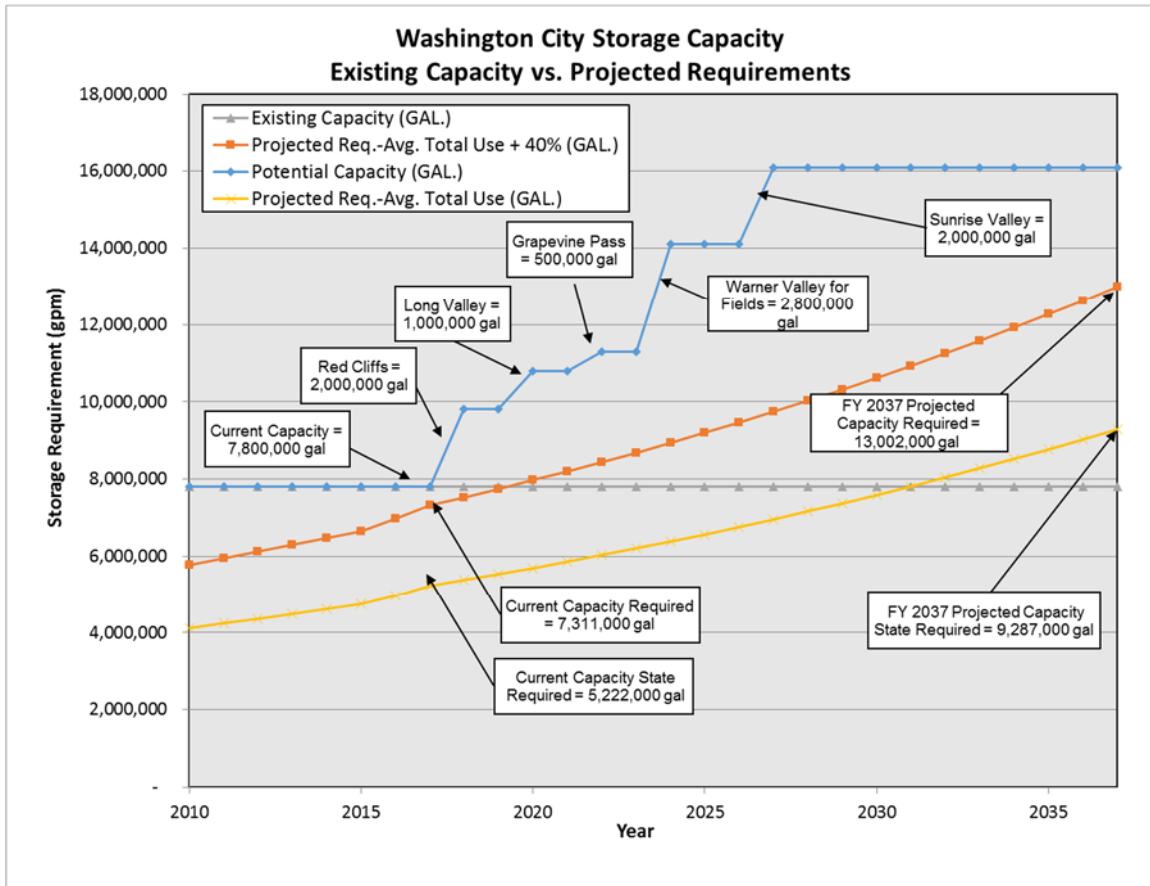


Figure 5-1: Storage Capacity Projections and Requirements

An analysis considering the buildout storage requirements for Washington City was done to evaluate the size and location of recommended storage. A table summarizing this buildout water storage analysis is in Appendix B. Table 5-3 presents a summary of the results of that analysis combined with immediate storage needs in the City.

For the most immediate needs, the City should consider a 2 Million Gallon Tank site located near the existing Red Cliffs 1 Million Gallon Tank. This tank should serve the Green Springs and downtown areas. A pad was constructed for the tank during a project in 2008. Also, in the next five years, the City should consider a 1 million gallon tank in Long Valley in conjunction with development of the Southern Corridor, and a new 500,000 gallon tank in the Grapevine Pass Wash north of I-15 to serve the area near the existing Grapevine Tank, at the top of Washington Black Ridge.

Table 5-3: Recommended Storage Tank Summary

| New Tanks Summary | | |
|--|--------------|------------|
| New Tank Description | Approx. Year | Size [gal] |
| New 2,000,000 Gallon Tank Red Cliffs | 2018 | 2,000,000 |
| New 1,000,000 Gallon Tank Long Valley | 2020 | 1,000,000 |
| New 500,000 Gallon Tank Grapevine Pass Wash | 2022 | 500,000 |
| New 2,800,000 Gallon Tank Warner Valley for Fields | 2024 | 2,800,000 |
| New 2,000,000 Gallon Tank Sunrise Valley | 2027 | 2,000,000 |
| Additional Capacity in Warner Valley | Buildout | 1,000,000 |
| Additional Capacity in Grapevine Pass Area | Buildout | 1,500,000 |
| Additional Capacity in South Warner Valley | Buildout | 4,100,000 |
| Additional Capacity in Washington Fields | Buildout | 2,500,000 |
| Additional Capacity in South Washington Fields | Buildout | 2,000,000 |
| Additional Capacity in Fort Pearce Wash | Buildout | 3,250,000 |

In addition to the tanks previously mentioned, during the next 20 years, the City should also plan on new tank sites in the South Washington Fields area and Warner Valley to service Washington Fields. Depending on growth, the City has made a decision to build storage tanks in phases instead of larger tanks at the beginning of development. WCWCD has plan to construct a tank in Warner Valley. Washington City should coordinate with the District for a shared tank to take advantage of lower construction cost per gallon of storage. In this case, Washington City should request **2.8 million gallons of storage in the regional tank**. This accounts for growth in the area for the next twenty years as caculated by the ERUs that will need to be served plus 40% to account for emergency storage and to match the current level of service in the City. At buildout for the same area, the City may plan on 4.5 million gallons of state required storage, plus 40% for emergency storage and currently level of service brings the **total storage at buildout to be 6.3 million gallons**.

6 TREATMENT REQUIREMENTS

6.1 General Requirements

The State of Utah Administrative Rules for Public Drinking Water Systems, in accordance with the National Safe Drinking Water Act, have adopted “primary” regulations for the protection of public health, and “secondary” regulations related to taste and aesthetics. The regulations recommend that all culinary water sources have provisions for continuous disinfection.

6.2 Existing Water Treatment Facilities

Washington City has chlorination facilities to be able to treat all of the City's existing wells to ensure that the culinary water meets minimum requirements. Water from the Mill Creek well field is pumped through the chlorination facilities at the Red Cliffs 1 million gallon and 2.3 million gallon tanks. Water from the Grapevine Wells is pumped into an existing chlorination facility at the Grapevine Tank. It is not mandatory to chlorinate underground water sources, but having the ability to do so is highly recommended.

Table 6-1: Existing Treatment Facilities and Capacity

The Microfiltration Water Treatment Plant is a surface water treatment facility that treats water from Quail Creek Reservoir. It has a current treatment capacity of approximately 1,400 gpm. The raw water is pre-strained, filtered, and then chlorinated before being pumped into the culinary water system. A summary of the existing treatment facilities is shown in Table 6-1. The remaining water source being used by the City is supplied and treated by Washington County Water Conservancy District.

| | | |
|--------------------------------------|--------------|------------|
| Red Cliffs Chlorination | 3,080 | gpm |
| Grapevine Chlorination | 257 | gpm |
| Microfiltration Water Treatment Plan | 1,389 | gpm |
| Total Existing Capacity | 4,726 | gpm |

6.3 Recommended Water Treatment Facility Improvements

As previously discussed in this plan, the City has an agreement in which, in conjunction with development of new sources, the Conservancy District will provide future chlorination facilities for the City. If the City were to drill new wells, the City would be required to provide the treatment facilities for the water being pumped. The City may seek new sources to offset peak water needs and future increases in WCWCD water costs.

Also with reference to increasing source capacity via the Microfiltration Plant, the treatment capacity of the plant will need to be expanded to treat the approximately 560 gpm of additional source water.



Figure 6-1: Membrane Filters

7 WATER DISTRIBUTION SYSTEM ANALYSIS

7.1 Existing Distribution System Analysis

The State of Utah Administrative Rules for Public Drinking Water Systems, Section R309-510, requires distribution systems to be sized to supply peak day flows with a fire flow, while maintaining a minimum system pressure of 20 psi. The State guidelines specify that a pressure of 30 psi be maintained under peak instantaneous demands. The system is also required to provide



Figure 7-1: Diversion Structure

40 psi under peak day demands. As a general guideline, it is recommended that pressures be maintained between 50 and 90 psi during normal system operations. The regulations require a minimum fire flow of 1,000 gpm for residential buildings less than 3,600 square feet and 1,500 gpm for all others, as discussed in Section 5. Washington City has identified 1,500 gpm as a goal for all hydrants throughout the city.

As stated in Section 3.4 the average day demand is 427.3 gpd/ERU. This equals 3,502 gpm demand on the system for 2017. The existing peak day demand is twice the average day demand, thus equaling 7,003 gpm. Peaking factors from the 2010 Master Plan were used. The peaking factor was determined by dividing the peak instantaneous demand by the average day demand and include indoor and outdoor use. The peaking factor for 2017 is recorded as 6.2 and decreases to 5.9 in 2030. Therefore, the peak instantaneous demand for 2017 is shown in Table 7-1. The average day demand of 3,502 gpm multiplied by the peaking factor of 6.2 equals a peak instantaneous flow of 21,708 gpm.

Table 7-1: Existing System Demand Scenarios

| | | | | |
|--|-----------------------------|--------------------|-----------|---------------------|
| Indoor Peak Instantaneous Demand: | | | | |
| Q= | 10.8 X N ^{.64} | N= Number of ERU's | | |
| Q= | 10.8 X 11801 ^{.64} | | | |
| Q= | | | | = 4,360 gpm |
| Outdoor Peak Instantaneous Demand: | | | | |
| | 11,801 ERU X | 0.1 acre X | 9.8 gpm | = |
| | | ERU | irr. acre | 17,348 gpm |
| Current Peak Instantaneous Demand | | | | = 21,708 gpm |
| Peak Day Demand & Fire Flow | | | | |
| | 11,801 ERUs X | 855 gpd X | 1 day X | = |
| | | ERU | 24 hr | 7,003 gpm |
| | | | 1 hr | |
| | | | 60 min. | |
| Fire Flow | | | | = 1,500 gpm |
| Current Peak Day Demand + Fire Flow | | | | = 8,503 gpm |

The existing Washington City culinary water distribution system has been modeled, using the computer program H2ONet® by MWHSoft. The main network of Washington City's distribution system generally appears to be providing good service to all of the connections. At the existing peak day demand, the model shows that nearly all of the junctions in the system are able to produce the required fire flows.

7.2 Projected Distribution System Analysis

The projected distribution system analysis is performed using the same assumptions as used in the existing system analysis, except that the projected number of ERUs for year 2037 is inserted into the calculations. This is summarized in Table 7-2. The peaking factor was report as 5.9 in the previous master plan and is used here to calculate the projected peak instantaneous demand. The peaking factor was determined by dividing the peak instantaneous demand by the average day demand, and include indoor and outdoor use. The peaking factor for 2017 is recorded as 6.2 and decreases to 5.9 in 2030.

Table 7-2: Projected System Demand Scenarios

| | | | | | |
|--|------------------------------|--------------------|-----------|---|-------------------|
| Indoor Peak Instantaneous Demand: | | | | | |
| Q= | 10.8 X N ^{.64} | N= Number of ERU's | | | |
| Q= | 10.8 X 21,314 ^{.64} | | | | |
| Q= | | | | = | 6,365 gpm |
| Outdoor Peak Instantaneous Demand: | | | | | |
| 21,314 ERUs X | 0.1 irr. acre | X | 9.8 gpm | = | 31,332 gpm |
| | ERU | | irr. acre | | |
| Projected Peak Instantaneous Demand | | | | = | 37,697 gpm |
| Peak Day Demand & Fire Flow | | | | | |
| 21,314 ERUs X | 855 gpd X | 1 day X | 1 hr | = | 12,649 gpm |
| | ERU | 24 hr | 60 min. | | |
| Fire Flow | | | | = | 1,500 gpm |
| Projected Peak Day Demand + Fire Flow | | | | = | 14,149 gpm |

7.3 Recommended Distribution System Improvements

The following policies for developers should be maintained as growth occurs:

- A policy requiring all new development to install 8" minimum line and to loop their developments back into the City's network, and a secondary irrigation system where potential exists.
- A policy requiring all new development to perform a fire flow analysis before approval will most likely be required by new state regulations. If the fire flow analysis shows a deficiency, the developer should be required to construct sufficient storage at an appropriate elevation to provide fire protection.

The following additional improvements are anticipated to be needed over the 10-year development horizon, but should be implemented when appropriate:

- Construct 16" transmission line from the proposed tank at Red Cliffs to the intersection of Fairway Drive and 1860 N. The developer is also installing a section of this line over the top of the new development in Green Springs.
- Construct 16" transmission line from the proposed Long Valley tank to future local distribution system.
- Construct 16" transmission line from the proposed Sunrise Valley tank to future local distribution system.

The following improvements are anticipated to be needed over the 20-year planning period, but should be implemented when appropriate:

- Construct 16" supply and transmission lines to and from the proposed tank site located in Sunrise Valley. The supply line will supply water to the proposed tank from the Sand Hollow Regional Pipeline.

When development occurs in the area between Red Cliffs Tank and Green Springs, the proposed water system should be modeled and evaluated to analyze if the proposed developer provided system will provide adequate capacity through buildout.

With the implementation of the recommended improvements, the majority of the coverage area of the culinary water system will meet the City goal of 1,500 gpm fire flow during peak day demands. However, a few neighborhoods at the highest elevations and at the end of long stretches of 6" lines would not be able to provide a 1,500 gpm fire flow without additional distribution improvements or strategically placed fire protection tanks. The City could look into constructing 8" pipelines to replace the existing 6" pipelines in areas where fire flows of 1,500 gpm cannot be achieved as a result of the smaller pipe.

8 SUMMARY OF RECOMMENDED IMPROVEMENTS

8.1 Recommended Improvements

Washingtons City's water utility will soon be in need of more warehouse space to store materials needed for maintenance. This additional space is to service the growth expected in the next 20 years. According to the City and based on previous warehouse projects, this new warehouse is expected to cost \$500,000. It is also expected to start construction in FY 2019. This cost is shown in the probable cost summary (Table 8-1) and the impact fee calculation (Table 10-2), but not in the EOPC.

Recommendations marked with an asterisk (*) are included in the 10-year Development Horizon and are also included in the Engineer's Opinion of Probable Cost in Section 8.2.

8.1.1 Source Capacity Improvements

- Additional small production wells in Grapevine Pass Wash area*
- WCWCD regional waterline connection at Washington Fields Road (4,000 gpm)*
- WCWCD future Warner Valley regional line connection (6,000 gpm)
- Consider implementing a City pressurized secondary irrigation system
- Encourage conservation

8.1.2 Storage Capacity Improvements

- 2,000,000 Gallon Tank Red Cliffs (2018)*
- 1,000,000 Gallon Tank Long Valley (2020)*
- 500,000 Gallon Tank Grapevine Pass Wash (2022)*
- 2,800,000 Gallon Tank Warner Valley for Fields (2024)*
- 2,000,000 Gallon Tank Sunrise Valley (2027)*

See Table 5-3 for a full list of storage recommendations through buildout. Appendix B has a summary of the buildout storage analysis by pressure zone.



Figure 8-1: Red Cliffs Tank Site

8.1.3 Treatment Improvements

- Increase pumping capacity from Quail Lake by 560 gpm*
- Increase Microfiltration Plant capacity by 0.8 MGD (560 gpm)*

8.1.4 Distribution System Improvements

- Construct 16" transmission line from the proposed tank at Red Cliffs to the intersection of Fairway Drive and 1860 N.*
- Construct 16" transmission line from the proposed Long Valley tank.* (Shown in the EOPC as part of the accompanying tank project)

Section 8 – Summary of Recommended Improvements

- Construct 16" transmission line from the proposed Sunrise Valley tank.* (Shown in the EOPC as part of the accompanying tank project)
- Construct 16" supply and transmission lines to and from the proposed tank site located in Sunrise Valley.

8.2 Engineer's Opinion of Probable Cost

Opinions of Probable Cost for the recommended improvements have been prepared and are included in Appendix D. Opinions of probable cost for each of the capital projects are based on experience with similar projects, bid tabulations from past projects, and from information provided by the City through prior experience.

Table 8-1: Summary of Opinions of Probable Costs

| Source Improvements | Cost |
|---|----------------------|
| South Washington Fields WCWCD Connection (2020) | \$ 231,500 |
| Grapevine Pass Wash Well Field (2027) | \$ 2,666,000 |
| Total + Incidentals | \$ 3,948,300 |
| Storage Improvements | Cost |
| 2,000,000 Gallon Tank Red Cliffs (2018) | \$ 1,226,400 |
| 1,000,000 Gallon Tank Long Valley (2020) | \$ 1,493,100 |
| 500,000 Gallon Tank Grapevine Pass Wash (2022) | \$ 648,150 |
| 2,800,000 Gallon Tank Warner Valley for Fields (2024) | \$ 1,293,100 |
| 2,000,000 Gallon Tank Sunrise Valley (2027) | \$ 1,498,100 |
| Total + Incidentals | \$ 6,599,550 |
| Treatment Improvements | Cost |
| 560 GPM Increase to Microfiltration Plant (2019) | \$ 765,800 |
| Total + Incidentals | \$ 935,100 |
| Distribution Improvements | Cost |
| Red Cliffs Transmission Pipeline (2018) | \$ 566,500 |
| Total + Incidentals | \$ 848,700 |
| Building Projects | Cost |
| Water Utility Warehouse (2019) | \$ 500,000 |
| Total | \$ 500,000 |
| Grand Total of All Projects | \$ 12,831,650 |

Estimated pipeline project costs normally include items such as mobilization, materials sampling and testing, valves, fittings, service connections, earth materials, vaults, asphalt replacement, surface restoration, etc. as well as professional and incidental costs such as environmental services, right-of-way acquisition, funding administration, survey, permitting, geotechnical reports, legal services, engineering services, etc.

Opinions of probable costs for non-pipeline improvements are intended to include the primary improvement listed, plus costs for appurtenances typical of a similar improvement, plus incidental and professional costs as described previously.

Opinions of probable project costs included in this report are planning-level costs only. As the City seeks to undertake specific projects, more detailed, project-specific opinions of cost should be prepared to guide project development through the preliminary engineering and funding acquisition phases.

9 FINANCIAL ANALYSIS

9.1 Existing User Rate

Water rates are a combination of base rates and overage (or variable) rates. The base rate is charged to all connections in the system whether or not water is used, and should cover all fixed costs of the system. Overage rates are normally set to encourage water conservation, but should always cover all variable costs of the system. Washington City currently has the following rate structure:

Table 9-1: Existing Base Rate Structure

| Meter Size | Base Rate |
|------------|------------|
| 5/8" | \$18.25 |
| 3/4" | \$18.25 |
| 1" | \$33.00 |
| 1 1/2" | \$73.00 |
| 2" | \$130.00 |
| 3" | \$292.00 |
| 4" | \$518.00 |
| 6" | \$1,168.00 |

Increases in the base rate are based on the connection size. The base rates are proportional to the meter size area compared to three-quarter inches ($\frac{3}{4}$ "). For example, a 1 1/2" water meter has four times the area of the $\frac{3}{4}$ " water meter. Thus the base rate is four times the standard base rate.

Table 9-2: Existing Overage Rate Structure

| Tier | Threshold Gallons | Washington City | WCWCD* | Rate/1000 gal |
|---|--------------------|-----------------|--------|----------------|
| 1 | 0 - 5,000 | \$0.64 | \$0.46 | \$1.10 |
| 2 | 5,001 - 10,000 | \$0.74 | \$0.46 | \$1.20 |
| 3 | 10,001 - 15,000 | \$0.84 | \$0.46 | \$1.30 |
| 4 | 15,001 - 20,000 | \$0.94 | \$0.46 | \$1.40 |
| 5 | 20,001 - 25,000 | \$1.04 | \$0.46 | \$1.50 |
| 6 | 25,001 - 30,000 | \$1.14 | \$0.46 | \$1.60 |
| 7 | 30,001 - 35,000 | \$1.29 | \$0.46 | \$1.75 |
| 8 | 35,001 - 40,000 | \$1.44 | \$0.46 | \$1.90 |
| 9 | 40,001 - Unlimited | \$1.59 | \$0.46 | \$2.05 |
| Average Water Use Cost (for 13,228 gal) | | | | \$15.70 |

*WCWCD has a planned \$0.10 increase per year for the next 10 years

9.2 Average Rate Determination

The Average Rate Analysis in Appendix D shows a method used to determine the average water rate per ERU. The analysis uses data for FY 2018, so any new debt service can be included in the analysis. The operation and maintenance expenses for FY 2018 are added to the existing debt service payments not covered by impact fees. Water fund income that are not metered water rates are subtracted from the expenses to achieve total fixed and variable costs to be covered by user rates. The total costs are divided by the estimated number of ERUs serviced by the system in FY 2018 and converted to an average monthly rate of **\$35.99**.

Table 9-3: Water Rate Analysis

| Average Water Rate Analysis Washington City | | | | | | |
|---|------|--------------|------|--------------|-------|------------------|
| FY 2018 | % | Fixed | % | Variable | Total | |
| Salaries & Wages | 50% | \$ 408,803 | 50% | \$ 408,803 | \$ | 817,607 |
| Employee Benefits | 50% | \$ 257,546 | 50% | \$ 257,546 | \$ | 515,092 |
| Overtime | 0% | \$ - | 100% | \$ 10,000 | \$ | 10,000 |
| Uniforms | 80% | \$ 3,784 | 20% | \$ 946 | \$ | 4,730 |
| Dues And Memberships | 0% | \$ - | 100% | \$ 2,613 | \$ | 2,613 |
| Conference & Travel | 0% | \$ - | 100% | \$ 14,212 | \$ | 14,212 |
| Office Expense & Supplies | 25% | \$ 575 | 75% | \$ 1,724 | \$ | 2,299 |
| Equipment- Supplies & Maint. | 25% | \$ 17,047 | 75% | \$ 51,140 | \$ | 68,186 |
| Fuel & Oil | 0% | \$ - | 100% | \$ 30,828 | \$ | 30,828 |
| Building & Grounds | 75% | \$ 18,876 | 25% | \$ 6,292 | \$ | 25,168 |
| Utilities | 25% | \$ 127,839 | 75% | \$ 383,518 | \$ | 511,357 |
| Telephone | 25% | \$ 2,365 | 75% | \$ 7,096 | \$ | 9,461 |
| Professional & Technical | 25% | \$ 10,000 | 75% | \$ 30,000 | \$ | 40,000 |
| Water Purchase Sandhollow | 50% | \$ 488,723 | 50% | \$ 488,723 | \$ | 977,445 |
| Water Purchase Quail Lake Raw | 50% | \$ 104,500 | 50% | \$ 104,500 | \$ | 209,000 |
| Administrative Costs | 50% | \$ 148,760 | 50% | \$ 148,760 | \$ | 297,520 |
| District Surcharge | 0% | \$ - | 100% | \$ 250,800 | \$ | 250,800 |
| Special Department Supplies | 25% | \$ 36,771 | 75% | \$ 110,313 | \$ | 147,084 |
| Bank Charges | 75% | \$ 22,102 | 25% | \$ 7,367 | \$ | 29,469 |
| Uncollectable Accts | 100% | \$ 7,062 | 0% | \$ - | \$ | 7,062 |
| Other Projects | 50% | \$ 350,000 | 50% | \$ 350,000 | \$ | 700,000 |
| Capital Projects or Equipment | 0% | \$ - | 100% | \$ 150,000 | \$ | 150,000 |
| Lease Purchase | 100% | \$ 2,979 | 0% | \$ - | \$ | 2,979 |
| Cost of Issuance | 0% | \$ - | 100% | \$ 10,000 | \$ | 10,000 |
| Funded Depreciation | 100% | \$ - | 0% | \$ - | \$ | - |
| EXISTING DEBT SERVICE NOT IMPACT FEE ELIGIBLE | | | | | | |
| Water Revenue Refunding Bonds 2016A | 100% | \$ 268,258 | 0% | \$ - | \$ | 268,258 |
| Water Revenue Refunding Bonds 2016B | 100% | \$ 196,874 | 0% | \$ - | \$ | 196,874 |
| NEW DEBT SERVICE | | | | | | |
| Bond | | | | | | |
| Total Expenses: | | \$ 2,472,863 | | \$ 2,825,180 | \$ | 5,298,043 |
| OTHER INCOME (BESIDES WATER SALES) | | | | | | |
| Connection Fees | 0% | \$ - | 100% | \$ 79,659 | \$ | 79,659 |
| Other Revenue (Hydrant Meters, etc.) | 0% | \$ - | 100% | \$ 282,689 | \$ | 282,689 |
| Interest | 30% | \$ 27,247 | 70% | \$ 63,577 | \$ | 90,824 |
| Total Other Income: | | \$ 27,247 | | \$ 425,924 | \$ | 453,171 |
| Total Expenses - Total Other Income: | | \$ 2,445,616 | | \$ 2,399,256 | \$ | 4,844,872 |
| Total Project System Billed ERU's in FY 2018 | | 11,219 | | 11,219 | | 11,219 |
| Monthly Cost Per Billed ERU in FY 2018 | | \$ 18.17 | | \$ 17.82 | \$ | 35.99 |
| BASE AND OVERAGE RATE DETERMINATION | | | | | | |
| Resident Base Cost (0 Gallons) | | \$ 18.17 | | | | |
| Non-Resident Base Cost (0 Gallons) | | \$ 36.33 | | | | |
| Resident Variable Cost (Avg Usage) | | | | \$ 17.82 | | |
| Non-Resident Variable Cost (Avg Usage) | | | | \$ 35.64 | | |
| Average Use/Billed ERU (Gal) | | | | 13,228 | | |
| Resident Cost/1000 Gallons | | | | \$ 1.35 | | |
| Total Average Monthly Resident Rate/Billed ERU | | | | | \$ | 35.99 |
| Total Average Monthly Non-Resident Rate/Billed ERU | | | | | \$ | 71.97 |
| WCWCD Surcharge | | | | | \$ | 1.75 |

9.3 Base and Overage Rate Determination

All expenses and other income is separated into fixed and variable costs to calculate the base and overage rates. This splits the average rate in an average base rate and an average overage rate. The average base rate was calculated as **\$18.17** and the average overage rate as **\$17.82**. These calculations are based on being residents of Washington City. Non-resident rates are double the resident rates at **\$36.33** and the average overage rate at **\$35.64**.

Table 9-5: Recommended Base Rate

| Option 1 Water Base Rate Structure | |
|------------------------------------|------------|
| Meter Size | Base Rate |
| 5/8" | \$18.17 |
| 3/4" | \$18.17 |
| 1" | \$33.00 |
| 1 1/2" | \$73.00 |
| 2" | \$130.00 |
| 3" | \$291.00 |
| 4" | \$517.00 |
| 6" | \$1,163.00 |

Table 9-4: Recommended Overage Rate

| Option 1 Water Tiered Rate Structure | | | | |
|---|--------------------|-----------------|--------|----------------|
| Tier | Threshold Gallons | Washington City | WCWCD* | Rate/1000 gal |
| 1 | 0 - 5,000 | \$0.74 | \$0.46 | \$1.20 |
| 2 | 5,001 - 10,000 | \$0.86 | \$0.46 | \$1.32 |
| 3 | 10,001 - 15,000 | \$0.98 | \$0.46 | \$1.44 |
| 4 | 15,001 - 20,000 | \$1.10 | \$0.46 | \$1.56 |
| 5 | 20,001 - 25,000 | \$1.22 | \$0.46 | \$1.68 |
| 6 | 25,001 - 30,000 | \$1.34 | \$0.46 | \$1.80 |
| 7 | 30,001 - 35,000 | \$1.51 | \$0.46 | \$1.97 |
| 8 | 35,001 - 40,000 | \$1.68 | \$0.46 | \$2.14 |
| 9 | 40,001 - Unlimited | \$1.85 | \$0.46 | \$2.31 |
| Average Water Use Cost (for 13,228 gal) | | | | \$17.25 |

*WCWCD has a planned \$0.10 increase per year for the next 10 years

It is recommended that base rate and overage rate structure remain the same for residents of Washington City. The calculated average rate is similar to the existing rate that any recommended changes would likely be unnecessary at the moment. The base rate should cover the fixed expenses of the water system. The overage rate should be structured to promote conservation and work hand-in-hand with drought management policies. Appendix D contain several optional rate scenarios that identified base and overage rates that should satisfy the revenue requirements based on estimated operation and maintenance expenses and on projected water usage. Washington City is able to set the rate structure to any amount it deems to be fair. However, the rates should be such that the system remains financially viable.

Table 9-7: Non-Resident Base Rate

| Option 1 Non-Resident Water Base Rate Structure | |
|---|------------|
| Meter Size | Base Rate |
| 5/8" | \$36.33 |
| 3/4" | \$36.33 |
| 1" | \$66.00 |
| 1 1/2" | \$146.00 |
| 2" | \$260.00 |
| 3" | \$582.00 |
| 4" | \$1,034.00 |
| 6" | \$2,326.00 |

Table 9-6: Non-Resident Tiered Rate

| Option 1 Non-Resident Water Tiered Rate Structure | | | | |
|---|--------------------|-----------------|--------|----------------|
| Tier | Threshold Gallons | Washington City | WCWCD* | Rate/1000 gal |
| 1 | 0 - 5,000 | \$1.94 | \$0.46 | \$2.40 |
| 2 | 5,001 - 10,000 | \$2.18 | \$0.46 | \$2.64 |
| 3 | 10,001 - 15,000 | \$2.42 | \$0.46 | \$2.88 |
| 4 | 15,001 - 20,000 | \$2.66 | \$0.46 | \$3.12 |
| 5 | 20,001 - 25,000 | \$2.90 | \$0.46 | \$3.36 |
| 6 | 25,001 - 30,000 | \$3.14 | \$0.46 | \$3.60 |
| 7 | 30,001 - 35,000 | \$3.48 | \$0.46 | \$3.94 |
| 8 | 35,001 - 40,000 | \$3.82 | \$0.46 | \$4.28 |
| 9 | 40,001 - Unlimited | \$4.16 | \$0.46 | \$4.62 |
| Average Water Use Cost (for 13,228 gal) | | | | \$34.50 |

*WCWCD has a planned \$0.10 increase per year for the next 10 years

Washington City may decide to lower the base rate and increase the overage rates in order to promote further conservation. The base and overage rates should be examined each year to ensure that enough revenue is being generated to cover the expenses.

9.4 Future Rates

WCWCD has planned to increase wholesale water rates \$0.10 per 1,000 gallons per year for ten years. This means that the monthly cost of the average usage of 13,228 gallons will increase \$1.32 each year and the monthly cost after ten years will be \$13.23 more than it is now. This annual increase is accounted for in the Cash Flow in Appendix D. No other future rate increases are accounted for. The cash flow revenue is based on the average rate per ERU of **\$35.99**. If a lower average rate is approved by Washington City, the level of financial viability displayed in the cash flow will not be maintained.

9.5 Cash Flow

The Cash Flow in Appendix D shows several years of past revenues and expenses, along with twenty years of projected revenues and expenses for the water system. These projections are based on assumptions of inflation, growth, average rates, proposed projects, etc. Calculations for average rates and impact fees have been carried over to the cash flow analysis.

Water rates and fees should be reviewed by Washington City periodically to ensure that they keep up with inflation rates and increase costs in system maintenance. Washington City does not have to adopt the amounts shown in the rate analysis. However, the rates suggested are calculated to be enough to ensure that the water fund remains viable.

10 IMPACT FEES

10.1 Existing Impact Fees

This report constitutes a capital facilities plan to determine the public facilities requirement to serve development resulting from new development activity. An impact fee that is charged by a community may be used to pay for capital costs and the debt service associated with surplus capacity built into the system provided actual costs can be documented. The surplus capacity in the water system can be assessed to growth, and for this reason, impact fees can pay for that portion of the debt service associated with the system surplus capacity. The impact fee should also be used to pay for the cost of improvements to the system that are required to support new growth as new connections are added to the system.

Table 10-1 shows that existing Impact Fees are based on meter size and ERUs per meter size. The existing base impact fee is \$2,121.00.

Table 10-1: Existing Impact Fees

| Meter Size | ERUs | Impact Fee |
|-------------------|-------------|-------------------|
| 5/8" & 3/4" | 1 | \$2,121.00 |
| 1" | 1.65 | \$3,499.65 |
| 1 1/2" | 3.73 | \$7,911.33 |
| 2" | 6.55 | \$13,892.55 |
| 3" | 14.73 | \$31,242.33 |
| 4" | 26.17 | \$55,506.57 |
| 6" | 58.88 | \$124,884.48 |

10.2 Proposed Impact Fees

The total cost that is eligible for the impact fee assessment is equal to the existing debt service from previous water improvements projects that can be attributed to new growth plus the portion of any planned water improvements project that will be constructed in the next 10 years to accommodate new growth. The combined total cost that is due to new growth is divided by the projected number of new ERUs that will be added to the system. Please note that this impact fee calculation assumes that Washington City is in agreement with WCWCD Regional Water Supply Agreement and thus will not need to purchase any additional water right. Should the City choose otherwise, the impact fee should be adjusted accordingly.

It is recommended that Washington City continue charging impact fees per ERU or meter size. The maximum allowable impact fee was calculated to be **\$2,412.23**. This is \$291.23 more than the existing impact fee.

Impact fees must be used within six years (6 yr) of their receipt according to Utah State Impact Fee law. This plan accounts for all incoming fees to be used for eligible projects and debts in the continuous six year window.

Table 10-2: Impact Fee Calculation

| Impact Fee Analysis Washington City | | | | |
|---|--------------------------------|----------------------------------|--------------------------|----------------|
| Existing Debt Service | Debt to be Paid FY2018-2028 | Inflation Adjusted Costs | Impact Fee % Eligible | Eligible Costs |
| Water Revenue Refunding Bonds 2016A | \$ 1,219,608 | N/A | 34% | \$ 414,667 |
| Water Revenue Refunding Bonds 2016B | \$ 4,573,338 | N/A | 34% | \$ 1,554,935 |
| Regional Pipeline Bond | \$ 1,500,000 | N/A | 100% | \$ 1,500,000 |
| Subtotal | | | | \$ 3,469,601 |
| Past Projects | Total Actual Project Costs | Inflation Adjusted Costs | Impact Fee % Eligible | Eligible Costs |
| East Regional Connection Project (2014) | \$ 4,198,478 | N/A | 100% | \$ 4,198,478 |
| Subtotal | | | | \$ 4,198,478 |
| Subtotal Multiplied by 10-yr ERU Factor | | | 32% | \$ 1,343,513 |
| Proposed Improvement Projects (FY2018-2028) | Total EOPC | Inflation Adjusted Costs (3%) | Impact Fee % Eligible | Eligible Costs |
| Culinary Water Master Plan | \$ 50,000 | \$ 57,964 | 100% | \$ 57,964 |
| Subtotal | | | | \$ 57,964 |
| South Washington Fields WCWCD Connection (2020) | \$ 315,455 | \$ 344,706 | 100% | \$ 344,706 |
| Grapevine Pass Wash Well Field (2027) | \$ 3,632,845 | \$ 4,882,240 | 100% | \$ 4,882,240 |
| 560 GPM Increase to Microfiltration Plant (2019) | \$ 935,100 | \$ 992,048 | 100% | \$ 992,048 |
| Subtotal | | | | \$ 6,218,994 |
| Subtotal Multiplied by Source 10-yr ERU Factor | | | 32% | \$ 1,990,078 |
| 2,000,000 Gallon Tank Red Cliffs (2018) | \$ 1,314,156 | \$ 1,353,580 | 100% | \$ 1,353,580 |
| 1,000,000 Gallon Tank Long Valley (2020) | \$ 1,599,940 | \$ 1,748,297 | 100% | \$ 1,748,297 |
| 500,000 Gallon Tank Grapevine Pass Wash (2022) | \$ 694,529 | \$ 805,149 | 100% | \$ 805,149 |
| 2,800,000 Gallon Tank Warner Valley for Fields (2024) | \$ 1,385,629 | \$ 1,704,148 | 100% | \$ 1,704,148 |
| 2,000,000 Gallon Tank Sunrise Valley (2027) | \$ 1,605,297 | \$ 2,157,385 | 100% | \$ 2,157,385 |
| Red Cliffs Transmission Pipeline (2018) | \$ 848,700 | \$ 874,161 | 100% | \$ 874,161 |
| Subtotal | | | | \$ 8,642,722 |
| Subtotal Multiplied by Storage 10-yr ERU Factor | | | 31% | \$ 2,679,244 |
| Water Utility Warehouse (2019) | \$ 500,000 | N/A | 50% | \$ 250,000 |
| Subtotal | | | | \$ 250,000 |
| Total Cost Eligible For Impact Fee | | | | \$ 9,790,400 |
| Projected No. of Existing Culinary ERUs (beginning FY 2018) | | | | 11,801 |
| Anticipated No. of Culinary ERUs (beginning FY 2028) | | | | 15,860 |
| No. of New ERUs Due to Growth | | | | 4,059 |
| Maximum Impact Fee = Total Eligible Cost / New ERU's | | | | \$ 2,412.23 |

The impact fee eligible percentage of the existing debt services were determined in a previous master plan and should be carried over for the life of the debts. Impact fee eligible percentages for past and proposed projects were determined on a system wide basis. Each storage and source project has a quantifiable number of ERUs that are to be served by that project. These calculations are shown in Table 10-3 and Table 10-4.

Table 10-3: Source Project Impact Fee Eligibility

| Source Projects Name | Flow [gpm] | ERUs Served |
|--|------------|-------------|
| East Regional Connection Project (2014) | 3,200 | 4,389 |
| South Washington Fields WCWCD Connection (2020) | 4,000 | 6,737 |
| Grapevine Pass Wash Well Field (2027) | 500 | 842 |
| 560 GPM Increase to Microfiltration Plant (2019) | 560 | 943 |
| Total ERUs Served | | 12,912 |
| No. of New ERUs Due to Growth | | 4,059 |
| Impact Fee Eligible | | 32% |

It is important to note that these impact fees are for the improvements summarized in Section 8 and do not provide for the City to design and build anything beyond the proposed projects. All new additions to the system will need to be considered in the impact fee calculations. Otherwise the developer should be required to make the improvements.

Table 10-4: Storage Project Impact Fee Eligibility

| Storage Projects Name | Storage [gal] | ERUs Served |
|---|---------------|-------------|
| Current Level of Service = 1.45 | | |
| 2,000,000 Gallon Tank Red Cliffs (2018) | 2,000,000 | 3,230 |
| 1,000,000 Gallon Tank Long Valley (2020) | 1,000,000 | 1,615 |
| 500,000 Gallon Tank Grapevine Pass Wash (2022) | 500,000 | 808 |
| 2,800,000 Gallon Tank Warner Valley for Fields (2024) | 2,800,000 | 4,522 |
| 2,000,000 Gallon Tank Sunrise Valley (2027) | 2,000,000 | 3,230 |
| Total ERUs Served | | 13,405 |
| No. of New ERUs Due to Growth | | 4,059 |
| Impact Fee Eligible | | 31% |

10.3 Water Acquisition Impact Fee Credit

In preparing for a secondary water system, the City may give a culinary water credit to new residents added to the system that provide the City with irrigation water. This would be called a Water Acquisition Impact Fee Credit. This secondary water would be most beneficial to the City in the summer and should be counted as source water. The credit was calculated under the peak day demand usage scenario of 855 gpd/ERU and 611 gpd/ERU outdoor usage. Table 10-5 shows the calculation of the credit based on the previously calculated impact fee of \$2,412.23.

Table 10-5: Water Acquisition Impact Fee Credit Calculation

| Water Acquisition Impact Fee Credit | | | |
|---|----------------|------------------|-------------------------|
| Historic Average Consumption | 427.3 | gpd/ERU | (Total Indoor/Outdoor) |
| Historic Average Indoor Consumption | 221.6 | gpd/ERU | (Approx. Indoor Use) |
| Historic Average Outdoor Consumption | 205.7 | gpd/ERU | (Estimated Outdoor Use) |
| Peak Day Demand (Historic times 2) | 855 | gpd/ERU | (Total Indoor/Outdoor) |
| Peak Day Indoor Demand Estimate (Historic times 1.1) | 244 | gpd/ERU | (Estimated Indoor Use) |
| Peak Day Outdoor Demand Estimate (Historic times 2.75) | 611 | gpd/ERU | (Estimated Outdoor Use) |
| <i>Indoor peaking factor of 1.1. Outdoor peaking factor of 2.76</i> | | | |
| Peak Day Outdoor Demand/Peak Day Demand | 71.4% | | |
| % of Full Impact Fee | \$ 1,723.48 | | |
| Water Acquisition Credit per gpd | \$ 2.02 | Credit per ac-ft | \$ 1,800.47 |

The results of the analysis show that a credit \$1,800.47 per ac-ft annually of available secondary water flow would be a fair impact fee credit. For example, if a new resident was added to the system and was able to provide 0.5 ac-ft of secondary water flow, then a credit of \$900.24 would be given.

All secondary water acquisition transfers shall have water right or water shares. The City may accept the water acquisition transfer at their discretion.

10.4 Connection Fees

According to Utah State law, connection fees are to not be more than the actual cost of establishing the connection including a water meter and labor to connect the meter to the water main line. Table 10-6 shows proposed connection fees based on meter size. This includes the cost of the meter and 1 hour of labor.

Table 10-6: Proposed Connection Fees

| Meter Size | Connection Fee |
|-------------------|-----------------------|
| 5/8" & 3/4" | \$266 |
| 1" | \$352 |
| 1 1/2" | \$590 |
| 2" | \$960 |
| 3" | \$1,262 |
| 4" | \$1,841 |
| 6" | \$4,202 |

10.5 Impact Fee Related Items

In general, it is beneficial to update this impact fee facilities plan and analysis at least every five years, or more frequently if drastic growth or changes affect the assumptions and data in this plan. It is assumed that this plan will be updated as recommended.

There are a few items relating to impact fees that Washington City must consider when planning for, collecting, and expending impact fees in accordance with Utah Code 11-36a-101.

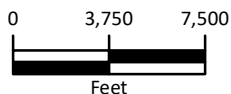
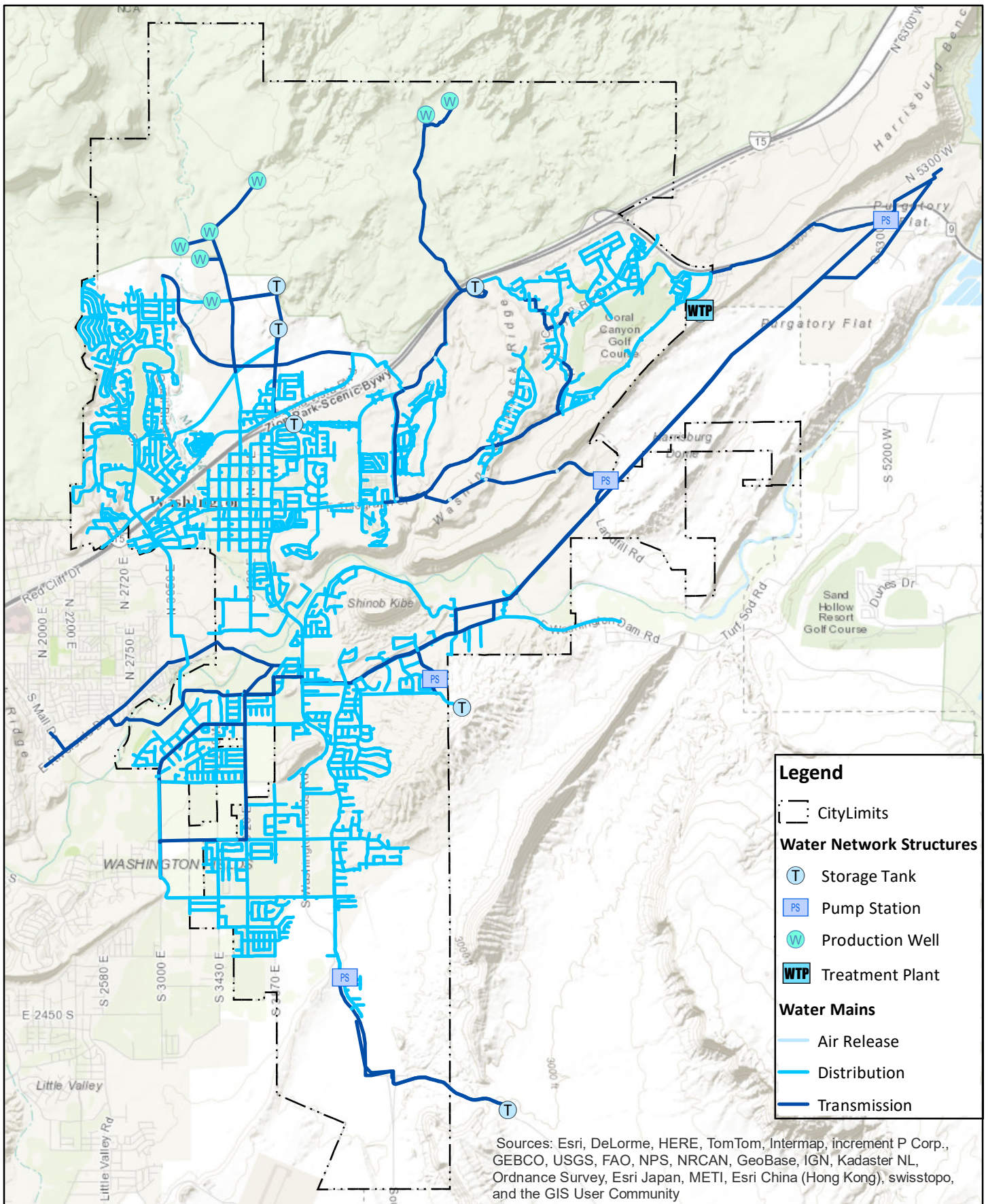
City staff must understand that impact fees can only be expended for a system improvement that is identified in the Impact Fee Facilities Plan and that is for the specific facility type for which the fee was collected. Impact fees must be expended or encumbered for a permissible use within six years of their receipt unless 11-36a-602(2)(b) applies. Also, impact fees must have a proper accounting (track each fee in and out) in accordance with Utah Code 11-36a-601

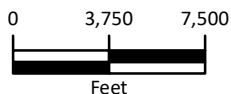
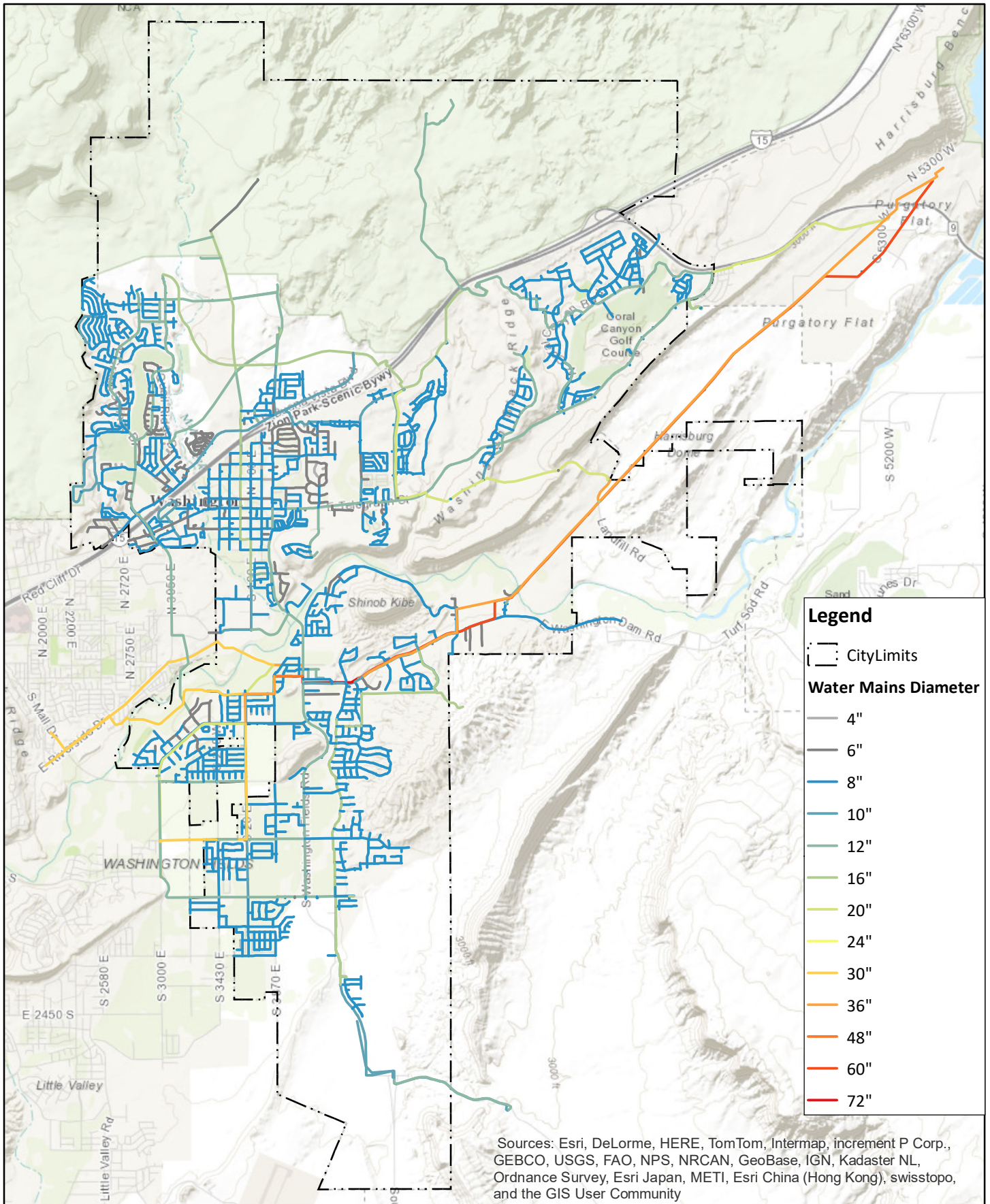
In accordance with Utah Code 11-36a-306 a certification of impact fee analysis is located in Appendix E.

APPENDIX A

Maps

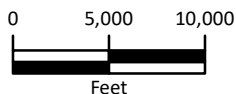
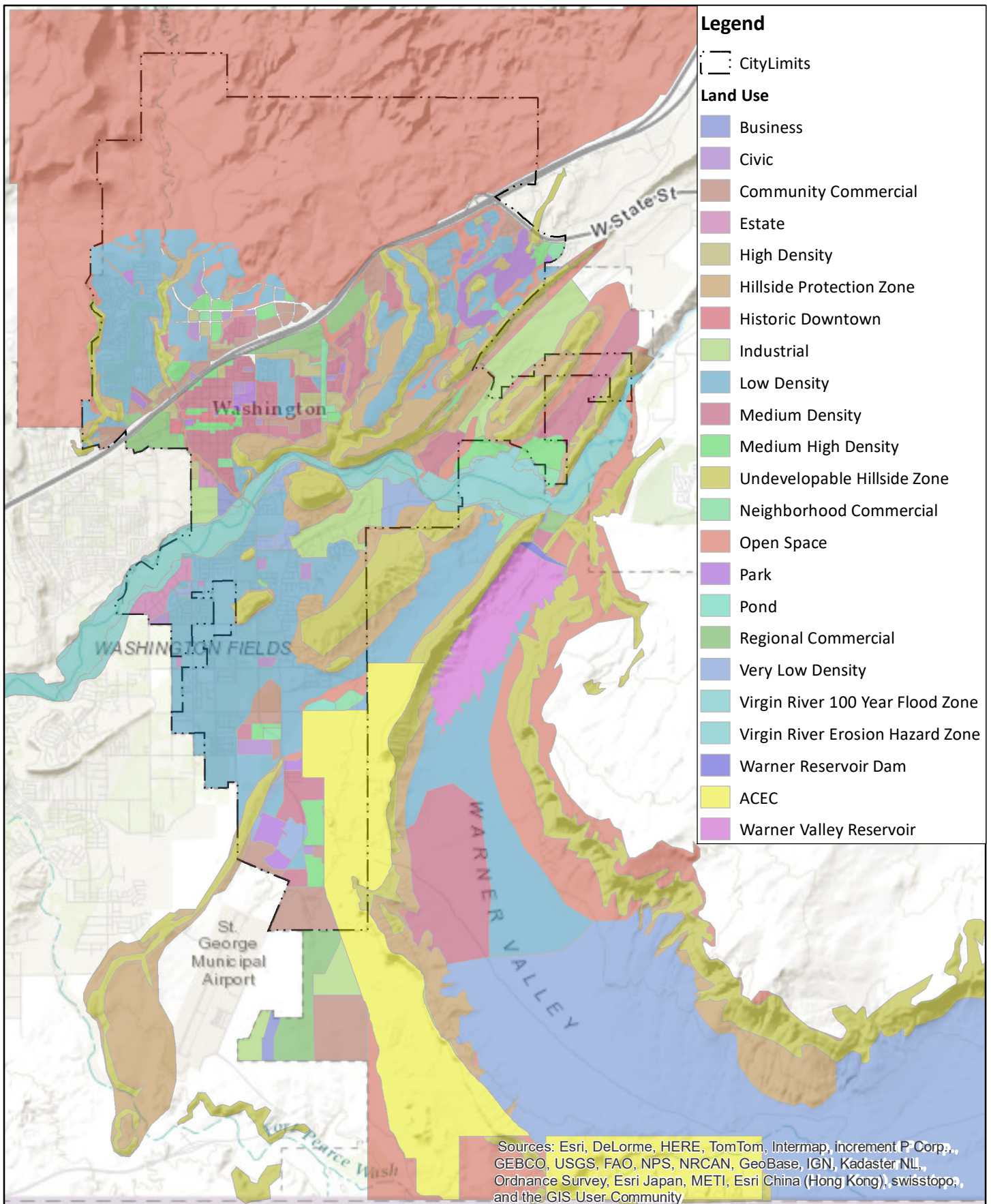
| | |
|-------|---|
| Map 1 | Existing Facilities |
| Map 2 | Existing Distribution System by Pipe Size |
| Map 3 | Washington City Land Use |
| Map 4 | Existing Pressure Zones |
| Map 5 | Future Pressure Zones |
| Map 6 | Recommendations |

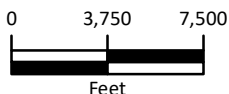
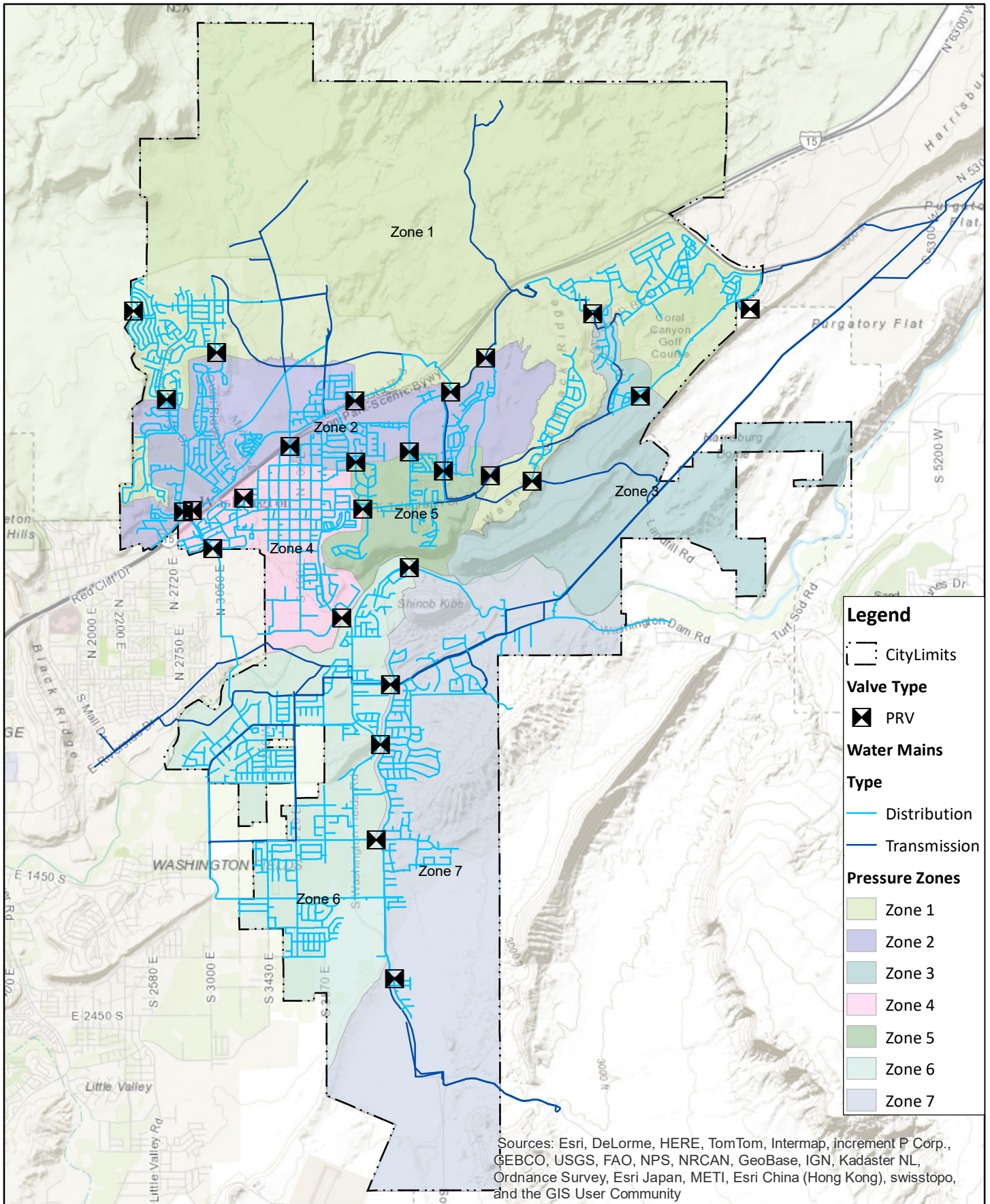


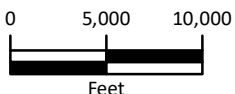
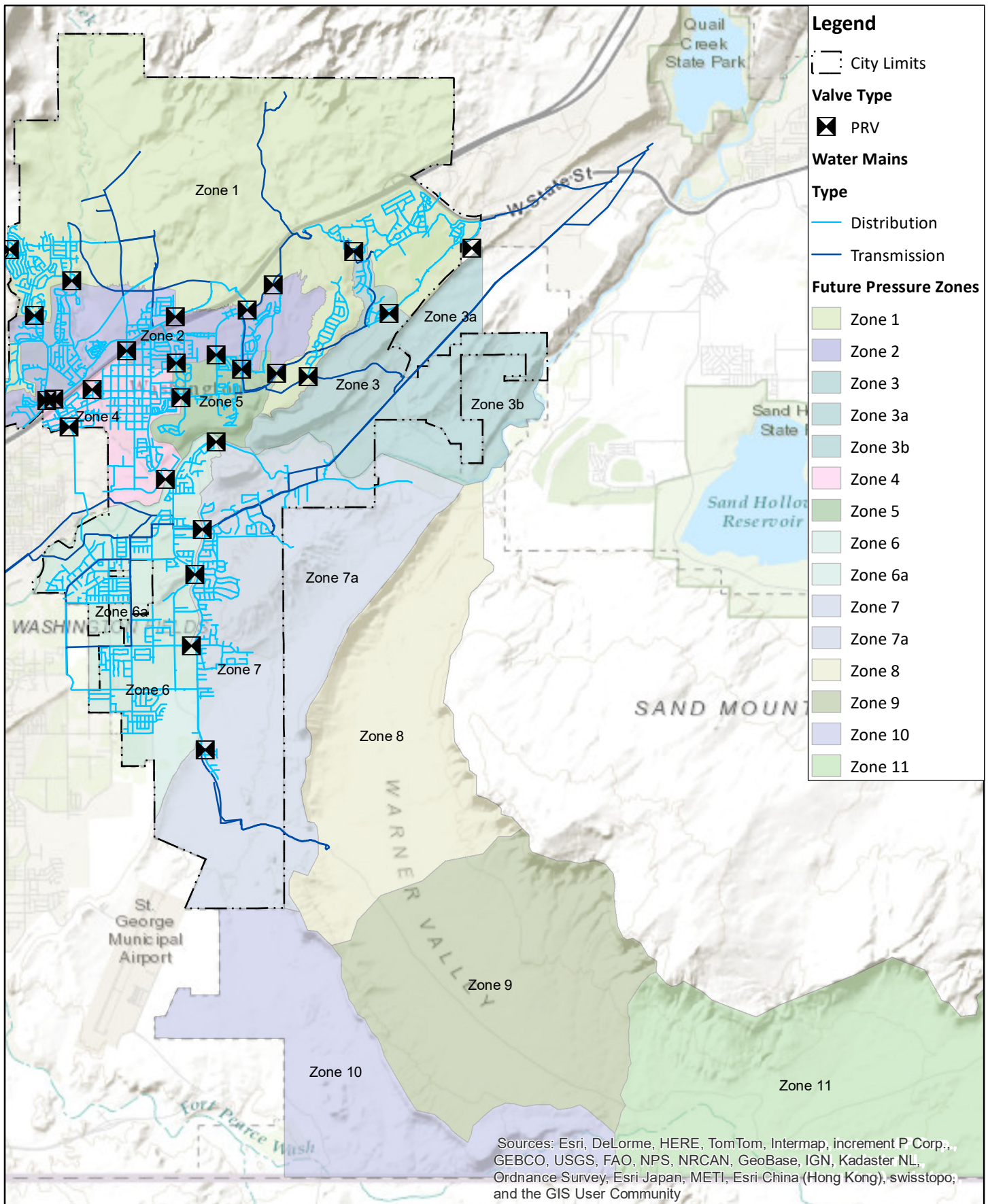


CULINARY WATER MASTER PLAN
EXISTING FACILITIES BY PIPE SIZE

Map 2

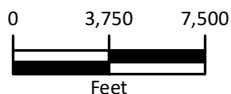
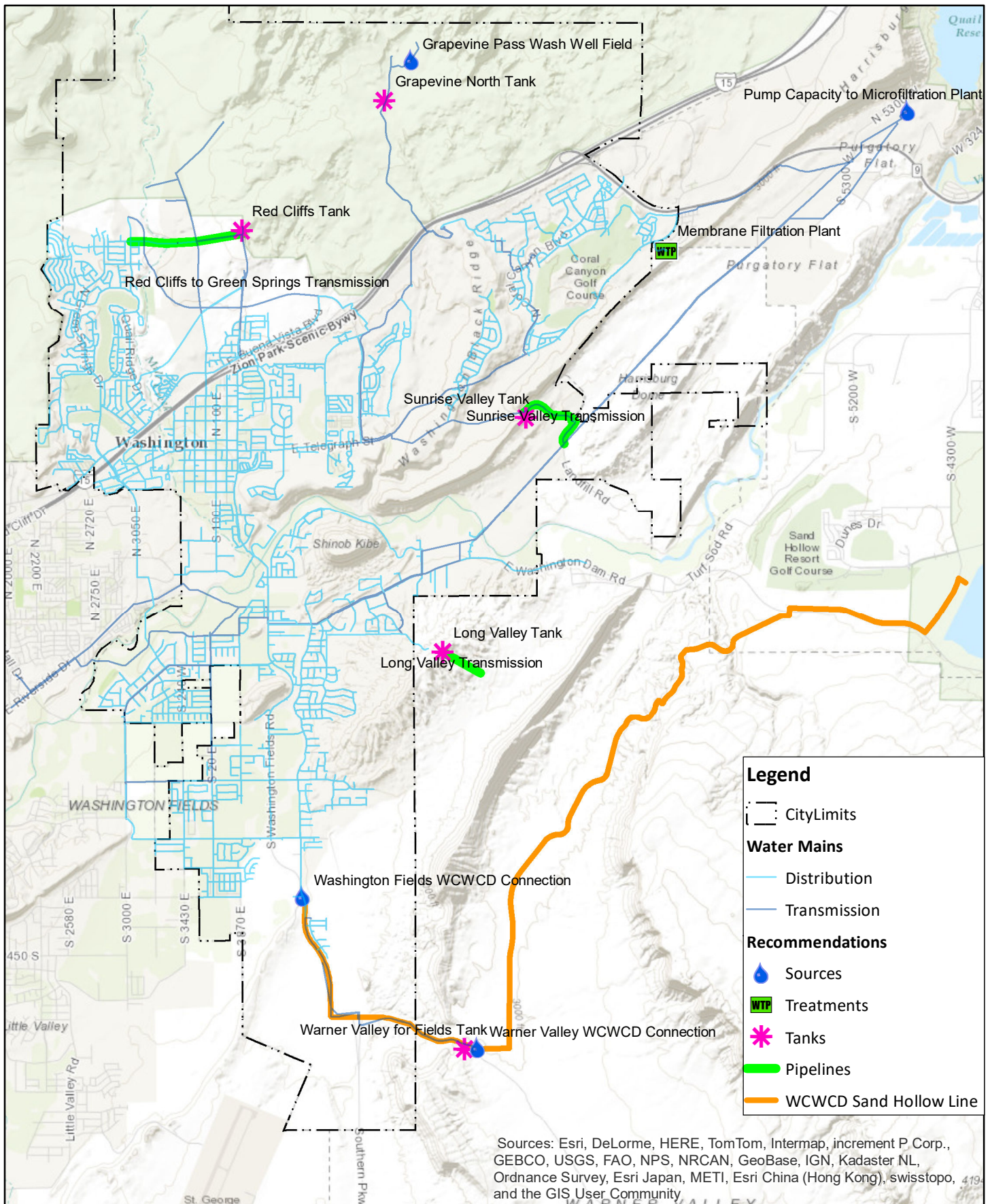






CULINARY WATER MASTER PLAN
FUTURE PRESSURE ZONES

Map 5



APPENDIX B

Tables & Figures

Potential Source Capacity Calculations

Potential Storage Capacity Calculations

Preliminary Pipe Sizing from Tanks

Storage per Pressure Zone Summary at Buildout

Instantaneous Demand Calculations

Potential Source Capacity Calculations

| Year | No. ERU's | Existing Capacity (gpm) | Projected Req. Capacity (gpm) | Projected Req.-Avg. Indoor Use (gpm) | Added Source | Added Capacity (gpm) | Potential Capacity (gpm) | | |
|------|-----------|-------------------------|-------------------------------|--------------------------------------|-----------------------------|----------------------|-------------------------------|-------|--------|
| 2010 | 9,235 | 14,926 | 5,481 | 1,421 | | | 14,926 | | |
| 2011 | 9,512 | 14,926 | 5,645 | 1,464 | | | 14,926 | | |
| 2012 | 9,798 | 14,926 | 5,814 | 1,508 | | | 14,926 | | |
| 2013 | 10,091 | 14,926 | 5,989 | 1,553 | | | 14,926 | | |
| 2014 | 10,394 | 14,926 | 6,168 | 1,599 | | | 14,926 | | |
| 2015 | 10,706 | 14,926 | 6,353 | 1,647 | | | 14,926 | | |
| 2016 | 11,219 | 14,926 | 6,658 | 1,726 | | | 14,926 | | |
| 2017 | 11,801 | 14,926 | 7,003 | 1,816 | | | 14,926 | | |
| 2018 | 12,155 | 14,926 | 7,214 | 1,870 | | | 14,926 | | |
| 2019 | 12,520 | 14,926 | 7,430 | 1,927 | | | Additional Microfiltration | 560 | 15,486 |
| 2020 | 12,896 | 14,926 | 7,653 | 1,984 | Washington Fields WCWCD cor | 4,000 | 19,486 | | |
| 2021 | 13,282 | 14,926 | 7,882 | 2,044 | | | 19,486 | | |
| 2022 | 13,681 | 14,926 | 8,119 | 2,105 | | | 19,486 | | |
| 2023 | 14,091 | 14,926 | 8,362 | 2,168 | | | 19,486 | | |
| 2024 | 14,514 | 14,926 | 8,613 | 2,233 | | | 19,486 | | |
| 2025 | 14,949 | 14,926 | 8,872 | 2,300 | | | 19,486 | | |
| 2026 | 15,398 | 14,926 | 9,138 | 2,369 | | | 19,486 | | |
| 2027 | 15,860 | 14,926 | 9,412 | 2,441 | | | Grapevine Pass Wash Well Fiel | 500 | 19,986 |
| 2028 | 16,336 | 14,926 | 9,694 | 2,514 | | | 19,986 | | |
| 2029 | 16,826 | 14,926 | 9,985 | 2,589 | | | 19,986 | | |
| 2030 | 17,331 | 14,926 | 10,285 | 2,667 | | | 19,986 | | |
| 2031 | 17,850 | 14,926 | 10,593 | 2,747 | | | 19,986 | | |
| 2032 | 18,386 | 14,926 | 10,911 | 2,829 | | | 19,986 | | |
| 2033 | 18,938 | 14,926 | 11,238 | 2,914 | | | Warner Valley WCWCD connec | 6,000 | 25,986 |
| 2034 | 19,506 | 14,926 | 11,576 | 3,002 | | | | | 25,986 |
| 2035 | 20,091 | 14,926 | 11,923 | 3,092 | 25,986 | | | | |
| 2036 | 20,694 | 14,926 | 12,281 | 3,184 | 25,986 | | | | |
| 2037 | 21,314 | 14,926 | 12,649 | 3,280 | 25,986 | | | | |

Potential Storage Capacity Calculations

| Year | No. ERU's | Existing Capacity (GAL.) | Projected Req. Avg. Total Use (GAL.) | Projected Req. Avg. Total Use + 40% (GAL.) | Projected Req. Avg. Indoor Use (GAL.) | Proposed Project | Added Storage (GAL.) | Potential Capacity (GAL.) |
|------|-----------|--------------------------|--------------------------------------|--|---------------------------------------|--|---|---------------------------|
| 2010 | 9,235 | 7,800,000 | 4,126,001 | 5,776,402 | 2,226,408 | Red Cliffs Long Valley Grapevine Pass Wash Warner Valley for Fields Sunrise Valley | 2,000,000 1,000,000 500,000 2,800,000 2,000,000 | 7,800,000 |
| 2011 | 9,512 | 7,800,000 | 4,244,381 | 5,942,134 | 2,287,800 | | | 7,800,000 |
| 2012 | 9,798 | 7,800,000 | 4,366,313 | 6,112,838 | 2,351,034 | | | 7,800,000 |
| 2013 | 10,091 | 7,800,000 | 4,491,902 | 6,288,663 | 2,416,165 | | | 7,800,000 |
| 2014 | 10,394 | 7,800,000 | 4,621,259 | 6,469,763 | 2,483,250 | | | 7,800,000 |
| 2015 | 10,706 | 7,800,000 | 4,754,497 | 6,656,296 | 2,552,347 | | | 7,800,000 |
| 2016 | 11,219 | 7,800,000 | 4,973,693 | 6,963,171 | 2,666,023 | | | 7,800,000 |
| 2017 | 11,801 | 7,800,000 | 5,222,486 | 7,311,481 | 2,795,048 | | | 7,800,000 |
| 2018 | 12,155 | 7,800,000 | 5,373,761 | 7,523,265 | 2,873,499 | | | 9,800,000 |
| 2019 | 12,520 | 7,800,000 | 5,529,574 | 7,741,403 | 2,954,304 | | | 9,800,000 |
| 2020 | 12,896 | 7,800,000 | 5,690,061 | 7,966,085 | 3,037,534 | | | 10,800,000 |
| 2021 | 13,282 | 7,800,000 | 5,855,363 | 8,197,508 | 3,123,260 | | | 10,800,000 |
| 2022 | 13,681 | 7,800,000 | 6,025,623 | 8,435,873 | 3,211,557 | | | 11,300,000 |
| 2023 | 14,091 | 7,800,000 | 6,200,992 | 8,681,389 | 3,302,504 | | | 11,300,000 |
| 2024 | 14,514 | 7,800,000 | 6,381,622 | 8,934,271 | 3,396,179 | | | 14,100,000 |
| 2025 | 14,949 | 7,800,000 | 6,567,671 | 9,194,739 | 3,492,665 | | | 14,100,000 |
| 2026 | 15,398 | 7,800,000 | 6,759,301 | 9,463,021 | 3,592,044 | | | 14,100,000 |
| 2027 | 15,860 | 7,800,000 | 6,956,680 | 9,739,352 | 3,694,406 | | | 16,100,000 |
| 2028 | 16,336 | 7,800,000 | 7,159,980 | 10,023,972 | 3,799,838 | | | 16,100,000 |
| 2029 | 16,826 | 7,800,000 | 7,369,379 | 10,317,131 | 3,908,433 | | | 16,100,000 |
| 2030 | 17,331 | 7,800,000 | 7,585,061 | 10,619,085 | 4,020,286 | | | 16,100,000 |
| 2031 | 17,850 | 7,800,000 | 7,807,213 | 10,930,098 | 4,135,495 | | | 16,100,000 |
| 2032 | 18,386 | 7,800,000 | 8,036,029 | 11,250,441 | 4,254,160 | | | 16,100,000 |
| 2033 | 18,938 | 7,800,000 | 8,271,710 | 11,580,394 | 4,376,384 | | | 16,100,000 |
| 2034 | 19,506 | 7,800,000 | 8,514,461 | 11,920,246 | 4,502,276 | | | 16,100,000 |
| 2035 | 20,091 | 7,800,000 | 8,764,495 | 12,270,293 | 4,631,944 | | | 16,100,000 |
| 2036 | 20,694 | 7,800,000 | 9,022,030 | 12,630,842 | 4,765,502 | | | 16,100,000 |
| 2037 | 21,314 | 7,800,000 | 9,287,291 | 13,002,207 | 4,903,067 | | | 16,100,000 |

Preliminary Pipe Sizing from Tanks

Peaking factor 5

Max Vel [ft/s] 5

| Size | Est ERUs serviced | Flow [cfs] (Avg x peak hour) | Flow [gpm] | Area = Q/V [sq-ft] | Diameter [in] |
|-----------|-------------------|------------------------------|------------|--------------------|---------------|
| 500,000 | 585 | 1.9 | 868 | 0.387 | 8.4 |
| 1,000,000 | 1,170 | 3.9 | 1,736 | 0.774 | 11.9 |
| 2,000,000 | 2,340 | 7.7 | 3,472 | 1.547 | 16.8 |
| 2,800,000 | 3,277 | 10.8 | 4,861 | 2.166 | 19.9 |
| 3,000,000 | 3,511 | 11.6 | 5,208 | 2.321 | 20.6 |

| Name/Description | | Zone | BO ERUs | BO Storage (indoor + outdoor) [gal] * | BO Storage (indoor) [gal] * | Existing Storage | Future Storage | Additional |
|-----------------------------------|-------------------------|------|---------------|--|--------------------------------|---------------------|-------------------|------------|
| Coral Canyon/Upper Green Springs | | 1 | 7,177 | 3,083,000 | 1,607,000 | 4,300,000 | 2,500,000 | 1,500,000 |
| Sienna Hills/Lower Green Springs | | 2 | 7,965 | 3,420,000 | 1,781,000 | 500,000 | 2,000,000 | |
| Lower Coral Canyon/Sunrise Valley | | 3 | 3,017 | 1,305,000 | 685,000 | | | |
| Downtown/Millcreek | | 4 | 3,481 | 1,504,000 | 788,000 | | | |
| Ridge Pointe/East Telegraph | | 5 | 3,234 | 1,398,000 | 733,000 | | | |
| Washington Fields | | 6 | 7,345 | 3,155,000 | 1,644,000 | 3,000,000 | 2,800,000 | 2,500,000 |
| Washington Dam/Long Valley | | 7 | 9,049 | 3,883,000 | 2,022,000 | | 1,000,000 | |
| Future Zones | North Warner Valley | 8 | 6,699 | 2,879,000 | 1,501,000 | | | 1,000,000 |
| | South Warner Valley | 9 | 9,138 | 3,921,000 | 2,041,000 | | | 4,100,000 |
| | South Washington Fields | 10 | 4,431 | 1,910,000 | 998,000 | | | 2,000,000 |
| | Fort Pearce Wash | 11 | 7,379 | 3,169,000 | 1,651,000 | | | 3,250,000 |
| Total | | | 68,915 | 29,627,000 | 15,451,000 | | | |
| Total + 40% | | | | 41,477,800 | | | | |

Storage Per Pressure Zone Summary at Buildout

Water Distribution:

Total Current ERU's = 11,801

Existing Distribution Requirement:

Indoor Peak Instantaneous Demand:

$$Q = 10.8 \times N^{.64}$$

N= Number of ERU's

$$Q = 10.8 \times 11,801^{.64}$$

$$Q = 4,360 \text{ gpm}$$

Outdoor Peak Instantaneous Demand:

$$11,801 \text{ ERU} \times \frac{0.1 \text{ acre} \times 9.8 \text{ gpm}}{\text{ERU irr. acre}} = 17,348 \text{ gpm}$$

$$\text{Current Peak Instantaneous Demand} = \underline{\underline{21,708 \text{ gpm}}}$$

Peak Day Demand & Fire Flow

$$11,801 \text{ ERUs} \times \frac{855 \text{ gpd} \times 1 \text{ day} \times 1 \text{ hr}}{\text{ERU} \times 24 \text{ hr} \times 60 \text{ min.}} = 7,003 \text{ gpm}$$

$$\text{Fire Flow} = 1,500 \text{ gpm}$$

$$\text{Current Peak Day Demand + Fire Flow} = \underline{\underline{8,503 \text{ gpm}}}$$

Total Projected ERU's = 21,314

Distribution Requirement for projected 20 year growth:

Indoor Peak Instantaneous Demand:

$$Q = 10.8 \times N^{.64}$$

N= Number of ERU's

$$Q = 10.8 \times 21,314^{.64}$$

$$Q = 6,365 \text{ gpm}$$

Outdoor Peak Instantaneous Demand:

$$21,314 \text{ ERUs} \times \frac{0.1 \text{ irr. acre} \times 9.8 \text{ gpm}}{\text{ERU irr. acre}} = 31,332 \text{ gpm}$$

$$\text{Projected Peak Instantaneous Demand} = \underline{\underline{37,697 \text{ gpm}}}$$

Peak Day Demand & Fire Flow

$$21,314 \text{ ERUs} \times \frac{855 \text{ gpd} \times 1 \text{ day} \times 1 \text{ hr}}{\text{ERU} \times 24 \text{ hr} \times 60 \text{ min.}} = 12,649 \text{ gpm}$$

$$\text{Fire Flow} = 1,500 \text{ gpm}$$

$$\text{Projected Peak Day Demand + Fire Flow} = \underline{\underline{14,149 \text{ gpm}}}$$

APPENDIX C

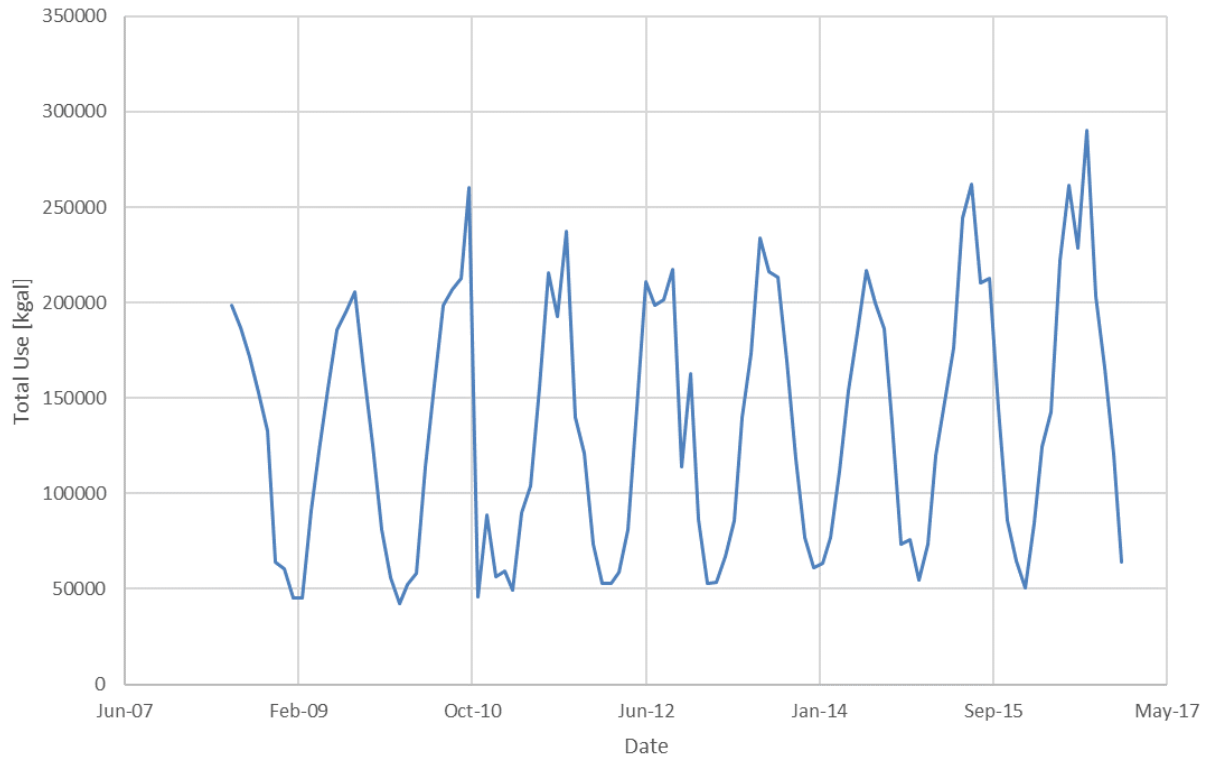
Historic Meter Data

Count of ERUs from Shared Meters
Monthly Water Use
Annual Water Use
Water Use and Connections Summary
Use per Connection
Summary of Winter Use per ERU
Average Use Calculation
ERU and Average Use Calculations

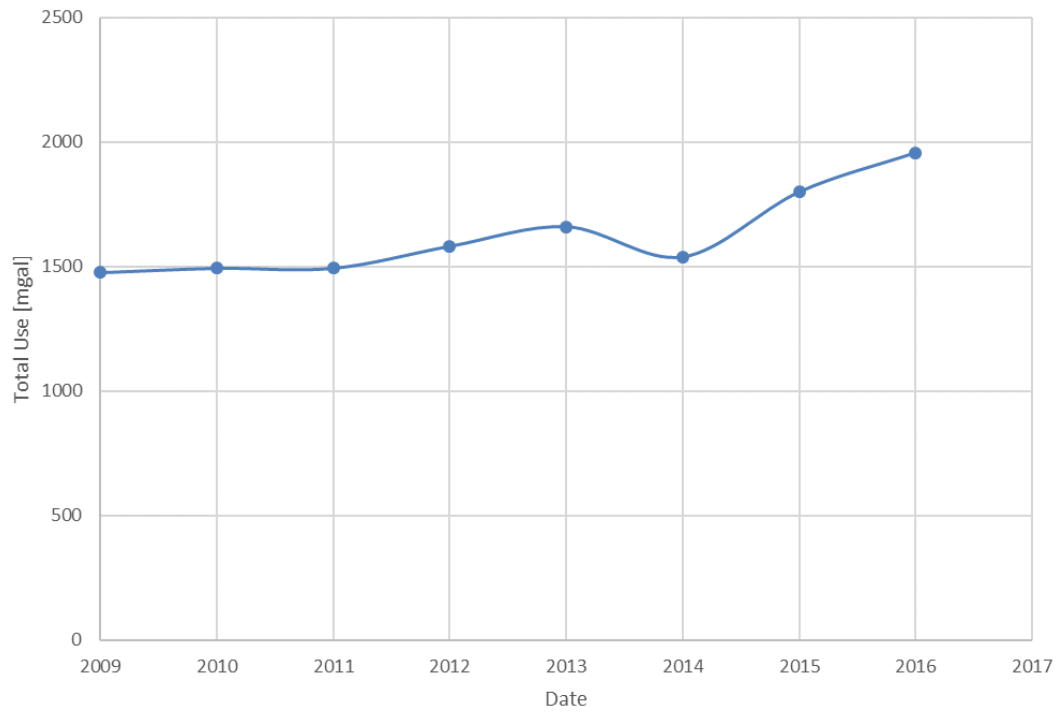
Count of ERUs from Shared Meters

| | Serviced Units | Meter Size [in] | |
|--------------|----------------|-----------------|-------|
| | 8 | 1.5 | |
| | 4 | 1.5 | |
| | 4 | 1 | |
| | 4 | 1 | |
| | 5 | 1 | |
| | 3 | 0.625 | |
| | 62 | 4 | 1 |
| | 19 | 2 | |
| | 24 | 3 | 0.625 |
| | 5 | 1.5 | |
| | 5 | 1.5 | |
| | 6 | 1.5 | |
| | 6 | 1.5 | |
| | 187 | 2 | 2 |
| | 25 | 2 | |
| | 48 | 3 | |
| | 12 | 2 | |
| | 199 | 6 | 1.5 |
| | 2 | 0.625 | |
| | 219 | 6 | 1.5 |
| | 2 | 0.625 | |
| | 4 | 1 | |
| | 4 | 1 | |
| | 2 | 0.625 | |
| | 9 | 2 | |
| | 8 | 2 | 0.625 |
| | 128 | 6 | 0.625 |
| | 3 | 2 | |
| | 8 | 2 | |
| | 8 | 2 | |
| | 8 | 1.5 | |
| | 12 | 2 | |
| | 10 | 2 | |
| | 8 | 2 | |
| | 8 | 2 | |
| | 8 | 2 | |
| | 8 | 2 | |
| | 8 | 2 | |
| | 8 | 2 | |
| | 8 | 2 | |
| | 2 | 1 | |
| TOTAL | 1111 | | |
| Count | 41 | | |

Monthly Water Use



Annual Water Use



Water Use and Connections Summary for 2015-2016

| Water Use | 1000 Gal | | | | | | | |
|-------------|--------------|------------|------------|------------|---------------|-------------|-----------|--------|
| | Agricultural | Commercial | Government | Industrial | Institutional | Residential | Landscape | Total |
| Jan-15 | 74 | 9963 | 519 | 32 | 258 | 42774 | 1142 | 54762 |
| Feb-15 | 73 | 10253 | 1108 | 44 | 986 | 57765 | 3032 | 73261 |
| Mar-15 | 114 | 15222 | 1379 | 92 | 3252 | 93750 | 6031 | 119840 |
| Apr-15 | 95 | 13693 | 2960 | 152 | 5152 | 118211 | 11583 | 151846 |
| May-15 | 131 | 14271 | 3163 | 133 | 4630 | 140982 | 12941 | 176251 |
| Jun-15 | 201 | 22205 | 4175 | 157 | 6995 | 193694 | 16718 | 244145 |
| Jul-15 | 181 | 18501 | 8317 | 207 | 9281 | 204878 | 20881 | 262246 |
| Aug-15 | 176 | 17646 | 3391 | 144 | 7231 | 162633 | 19371 | 210592 |
| Sep-15 | 117 | 19956 | 3878 | 87 | 6914 | 162877 | 18597 | 212426 |
| Oct-15 | 80 | 14872 | 2405 | 115 | 4522 | 111045 | 11714 | 144753 |
| Nov-15 | 48 | 9163 | 4257 | 59 | 1091 | 66320 | 5008 | 85946 |
| Dec-15 | 40 | 8100 | 972 | 63 | 352 | 52190 | 2684 | 64401 |
| Jan-16 | 26 | 6299 | 531 | 27 | 250 | 41782 | 1434 | 50349 |
| Feb-16 | 82 | 9574 | 787 | 128 | 937 | 69485 | 3585 | 84578 |
| Mar-16 | 140 | 9071 | 1731 | 84 | 2748 | 102644 | 8356 | 124774 |
| Apr-16 | 90 | 27026 | 1809 | 71 | 4259 | 99626 | 9807 | 142688 |
| May-16 | 172 | 46877 | 3875 | 72 | 12609 | 145827 | 12564 | 221996 |
| Jun-16 | 211 | 9655 | 4499 | 176 | 8799 | 216421 | 21618 | 261379 |
| Jul-16 | 215 | 9554 | 4583 | 114 | 8579 | 184526 | 20760 | 228331 |
| Aug-16 | 250 | 24285 | 4763 | 156 | 9442 | 225912 | 25196 | 290004 |
| Sep-16 | 158 | 18658 | 3493 | 62 | 7272 | 151556 | 22196 | 203395 |
| Oct-16 | 130 | 14824 | 2507 | 38 | 4466 | 129950 | 13813 | 165728 |
| Nov-16 | 62 | 8664 | 1823 | 54 | 2164 | 99434 | 8433 | 120634 |
| Dec-16 | 37 | 6853 | 747 | 44 | 382 | 54008 | 2016 | 64087 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Connections | Agricultural | Commercial | Government | Industrial | Institutional | Residential | Landscape | Total |
| Jan-15 | 15 | 243 | 39 | 12 | 20 | 7941 | 170 | 8440 |
| Feb-15 | 15 | 244 | 39 | 12 | 21 | 7975 | 171 | 8477 |
| Mar-15 | 15 | 248 | 39 | 12 | 21 | 8027 | 172 | 8534 |
| Apr-15 | 15 | 250 | 39 | 12 | 21 | 8037 | 173 | 8547 |
| May-15 | 15 | 249 | 39 | 12 | 21 | 8142 | 178 | 8656 |
| Jun-15 | 15 | 250 | 39 | 12 | 21 | 8087 | 178 | 8602 |
| Jul-15 | 15 | 249 | 39 | 12 | 21 | 8138 | 180 | 8654 |
| Aug-15 | 15 | 249 | 39 | 12 | 21 | 8138 | 180 | 8654 |
| Sep-15 | 15 | 250 | 39 | 13 | 21 | 8168 | 182 | 8688 |
| Oct-15 | 15 | 252 | 39 | 13 | 21 | 8218 | 187 | 8745 |
| Nov-15 | 15 | 251 | 39 | 13 | 21 | 8245 | 187 | 8771 |
| Dec-15 | 15 | 250 | 39 | 13 | 20 | 8278 | 188 | 8803 |
| Jan-16 | 15 | 249 | 39 | 13 | 20 | 8293 | 188 | 8817 |
| Feb-16 | 15 | 251 | 39 | 13 | 21 | 8359 | 188 | 8886 |
| Mar-16 | 16 | 250 | 39 | 13 | 21 | 8381 | 189 | 8909 |
| Apr-16 | 16 | 253 | 39 | 13 | 21 | 8406 | 190 | 8938 |
| May-16 | 17 | 254 | 39 | 13 | 21 | 8443 | 192 | 8979 |
| Jun-16 | 17 | 262 | 40 | 14 | 21 | 8451 | 192 | 8997 |
| Jul-16 | 17 | 257 | 40 | 13 | 22 | 8475 | 192 | 9016 |
| Aug-16 | 17 | 263 | 39 | 13 | 22 | 8530 | 192 | 9076 |
| Sep-16 | 16 | 264 | 39 | 13 | 22 | 8569 | 193 | 9116 |
| Oct-16 | 16 | 266 | 39 | 13 | 22 | 8608 | 194 | 9158 |
| Nov-16 | 16 | 268 | 39 | 13 | 22 | 8640 | 192 | 9190 |
| Dec-16 | 16 | 270 | 39 | 13 | 23 | 8685 | 193 | 9239 |

Use Per Connection for 2015-2016

| Use/Conn | Agricultural | Commercial | Government | Industrial | Institutional | Residential or | Landscape | Total |
|----------|--------------|------------|------------|------------|---------------|----------------|-----------|----------|
| Jan-15 | 4.9 | 41.0 | 13.3 | 2.7 | 12.9 | 5.4 | 6.7 | 6.488389 |
| Feb-15 | 4.9 | 42.0 | 28.4 | 3.7 | 47.0 | 7.2 | 17.7 | 8.642326 |
| Mar-15 | 7.6 | 61.4 | 35.4 | 7.7 | 154.9 | 11.7 | 35.1 | 14.04265 |
| Apr-15 | 6.3 | 54.8 | 75.9 | 12.7 | 245.3 | 14.7 | 67.0 | 17.766 |
| May-15 | 8.7 | 57.3 | 81.1 | 11.1 | 220.5 | 17.3 | 72.7 | 20.36171 |
| Jun-15 | 13.4 | 88.8 | 107.1 | 13.1 | 333.1 | 24.0 | 93.9 | 28.38235 |
| Jul-15 | 12.1 | 74.3 | 213.3 | 17.3 | 442.0 | 25.2 | 116.0 | 30.30344 |
| Aug-15 | 11.7 | 70.9 | 86.9 | 12.0 | 344.3 | 20.0 | 107.6 | 24.33464 |
| Sep-15 | 7.8 | 79.8 | 99.4 | 6.7 | 329.2 | 19.9 | 102.2 | 24.45051 |
| Oct-15 | 5.3 | 59.0 | 61.7 | 8.8 | 215.3 | 13.5 | 62.6 | 16.55266 |
| Nov-15 | 3.2 | 36.5 | 109.2 | 4.5 | 52.0 | 8.0 | 26.8 | 9.798883 |
| Dec-15 | 2.7 | 32.4 | 24.9 | 4.8 | 17.6 | 6.3 | 14.3 | 7.315801 |
| Jan-16 | 1.7 | 25.3 | 13.6 | 2.1 | 12.5 | 5.0 | 7.6 | 5.710446 |
| Feb-16 | 5.5 | 38.1 | 20.2 | 9.8 | 44.6 | 8.3 | 19.1 | 9.518118 |
| Mar-16 | 8.8 | 36.3 | 44.4 | 6.5 | 130.9 | 12.2 | 44.2 | 14.00539 |
| Apr-16 | 5.6 | 106.8 | 46.4 | 5.5 | 202.8 | 11.9 | 51.6 | 15.9642 |
| May-16 | 10.1 | 184.6 | 99.4 | 5.5 | 600.4 | 17.3 | 65.4 | 24.72391 |
| Jun-16 | 12.4 | 36.9 | 112.5 | 12.6 | 419.0 | 25.6 | 112.6 | 29.0518 |
| Jul-16 | 12.6 | 37.2 | 114.6 | 8.8 | 390.0 | 21.8 | 108.1 | 25.32509 |
| Aug-16 | 14.7 | 92.3 | 122.1 | 12.0 | 429.2 | 26.5 | 131.2 | 31.95284 |
| Sep-16 | 9.9 | 70.7 | 89.6 | 4.8 | 330.5 | 17.7 | 115.0 | 22.31187 |
| Oct-16 | 8.1 | 55.7 | 64.3 | 2.9 | 203.0 | 15.1 | 71.2 | 18.09653 |
| Nov-16 | 3.9 | 32.3 | 46.7 | 4.2 | 98.4 | 11.5 | 43.9 | 13.12666 |
| Dec-16 | 2.3 | 25.4 | 19.2 | 3.4 | 16.6 | 6.2 | 10.4 | 6.936573 |

Summary of Winter Use Per ERU

| ERU | Gal |
|--------------|-------|
| Winter 14-15 | 6,744 |
| Winter 15-16 | 6,552 |

Average Use Calculation

| Year | Total Annual Residential Use [gal] | Average Residential Connections | gpd/ERU |
|------|------------------------------------|---------------------------------|--------------|
| 2015 | 1,407,119,000 | 9186.2 | 419.7 |
| 2016 | 1,521,171,000 | 9556.7 | 434.9 |
| | | Average | 427.3 |

ERU and Average Use Calculations

| | res use (1000 gals) | comm use (1000 gals) | avg res conn | avg comm conn | Avg annual use per ERU | avg # ERUs per comm conn | Total Comm ERUs | TOTAL ERUs | gpd/ERU |
|------|---------------------|----------------------|--------------|---------------|------------------------|--------------------------|-----------------|------------|---------|
| 2015 | 1407119 | 393350 | 9186 | 514.8 | 153178.04 | 4.99 | 2567.93 | 11754.09 | 419.67 |
| 2016 | 1521171 | 436772 | 9557 | 540.1 | 159173.81 | 5.08 | 2743.99 | 12300.66 | 434.90 |

APPENDIX D

Financial Analysis

Recommended Source Improvements Engineer's Opinion of Probable Cost (EOPC)

Recommended Storage Improvements EOPC

Recommended Treatment Improvements EOPC

Recommended Distribution Improvements EOPC

User Rate Analysis

Existing and Optional Base and Overage Rate Structures

Impact Fee Analysis

20-Year Cash Flow



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ENGINEER'S OPINION OF PROBABLE COST

Culinary Water Master Plan Recommended Source Improvements
Washington City

August 8, 2017
KCS/DWS

| NO. | DESCRIPTION | EST QTY | UNIT | UNIT PRICE | AMOUNT |
|---|--|---------|------|----------------------------|-----------------|
| South Washington Fields WCWCD Connection (2020) | | | | | |
| 1 | Mobilization | 1 | LS | \$ 11,000.00 | \$ 11,000.00 |
| 2 | Project Lump Sum Costs (traffic & dust control, project DVD, SWPPP compliance) | 1 | LS | \$ 20,000.00 | \$ 20,000.00 |
| 3 | 20" DIP Installation, Tracer Wire, Bedding, Backfill & Installation (Pressure Class 250) | 100 | LF | \$ 120.00 | \$ 12,000.00 |
| 4 | 20" Butterfly Valve Assembly (Rated at 250 PSI) | 1 | EA | \$ 6,000.00 | \$ 6,000.00 |
| 5 | PRV Station | 1 | LS | \$ 45,000.00 | \$ 45,000.00 |
| 6 | Water Meter | 1 | LS | \$ 25,000.00 | \$ 25,000.00 |
| 7 | Vault | 1 | LS | \$ 60,000.00 | \$ 60,000.00 |
| 8 | Bituminous Patch (2.5", including 8" UBC) | 2,500 | SF | \$ 5.00 | \$ 12,500.00 |
| 9 | Miscellaneous Fittings, Connections, & Tie-Ins | 1 | LS | \$ 40,000.00 | \$ 40,000.00 |
| 10 | Subtotal | | | | \$ 231,500.00 |
| Grapevine Pass Wash Well Field (2027) | | | | | |
| 11 | Well Drilling | 5 | EA | \$ 400,000.00 | \$ 2,000,000.00 |
| 12 | Well Equipping and Pump | 5 | EA | \$ 50,000.00 | \$ 250,000.00 |
| 13 | Power & Well Site | 5 | EA | \$ 30,000.00 | \$ 150,000.00 |
| 14 | Expanded Chlorination Treatment at Site | 1 | LS | \$ 150,000.00 | \$ 150,000.00 |
| 15 | Miscellaneous Fittings, Connections, & Tie-Ins | 1 | LS | \$ 50,000.00 | \$ 50,000.00 |
| 21 | Subtotal | | | | \$ 2,666,000.00 |
| | | | | Grand Subtotal | \$ 2,897,500.00 |
| | | | 20% | Contingency | \$ 579,500.00 |
| | | | | General Construction Total | \$ 3,477,000.00 |
| | | | | | |
| Professional Services & Incidentals | | | | | |
| 1 | Funding & Administrative Services | | EST | | \$ - |
| 2 | Topographical Survey | | EST | | \$ - |
| 3 | Engineering Design | 4.4% | LS | \$ 173,900.00 | \$ 173,900.00 |
| 4 | Bidding & Negotiating | 0.4% | HR | \$ 15,000.00 | \$ 15,000.00 |
| 5 | Construction Administration Services (City Provided Observation) | 3.3% | HR | \$ 130,400.00 | \$ 130,400.00 |
| 6 | Permit Acquisition | | EST | | \$ - |
| 7 | Preliminary Engineering Report (PER) | | EST | | \$ - |
| 8 | Wastewater Facilities Plan | | EST | | \$ - |
| 9 | Water Conservation Plan | | EST | | \$ - |
| 10 | Operation and Maintenance Manual | | EST | | \$ - |
| 11 | Plan of Operations | | EST | | \$ - |
| 12 | Ground Water Discharge / UPDES /Reuse | | EST | | \$ - |
| 13 | SWPPP (Storm Water Pollution Protection Plan) | | EST | | \$ - |
| 14 | Environmental Report (EIS,EA, CATEX,) | 1.3% | EST | \$ 50,000.00 | \$ 50,000.00 |
| 15 | Archeology (Survey/monitor) | | EST | | \$ - |
| 16 | Biological (Survey/monitor) | 0.6% | EST | \$ 25,000.00 | \$ 25,000.00 |
| 17 | Building and Safety Plan Review | | EST | | \$ - |
| 18 | Geotechnical Report | 0.1% | EST | \$ 5,000.00 | \$ 5,000.00 |
| 19 | Geotechnical and Materials Testing | 0.1% | EST | \$ 2,500.00 | \$ 2,500.00 |
| 20 | SCADA Design | 0.2% | EST | \$ 7,500.00 | \$ 7,500.00 |
| 21 | SCADA Improvements | 0.5% | EST | \$ 20,000.00 | \$ 20,000.00 |
| 22 | Controls Integration | | EST | | \$ - |
| 23 | Cathodic Protection Design | | EST | | \$ - |
| 24 | Cathodic Protection Installation | | EST | | \$ - |
| 25 | Construction Staking | 0.1% | EST | \$ 2,000.00 | \$ 2,000.00 |
| 26 | Property Surveys | | EST | | \$ - |
| 27 | Land & RoW Acquisition | | EST | | \$ - |
| 28 | Land & RoW Negotiation | | EST | | \$ - |

| | | | | | |
|--|--|------|-----|--------------|-----------------|
| 29 | GIS Mapping | | EST | | \$ - |
| 30 | GPS points during construction for GIS system | | EST | | \$ - |
| 31 | CRD conversion to GIS | | EST | | \$ - |
| 32 | GIS PanoView | | EST | | \$ - |
| 33 | Community Viz Modeling | | EST | | \$ - |
| 34 | Aerial Photography | | EST | | \$ - |
| 35 | Aerial Photography Survey Control | | EST | | \$ - |
| 36 | Water Rights Research and POD Applications | 0.4% | EST | \$ 15,000.00 | \$ 15,000.00 |
| 37 | Well Siting Study | | EST | | \$ - |
| 38 | Well PER | | EST | | \$ - |
| 39 | Well/Spring Source Protection Plan | 0.1% | EST | \$ 5,000.00 | \$ 5,000.00 |
| 40 | Loan Origination Fee | | EST | | \$ - |
| 41 | Bond Attorney | | EST | | \$ - |
| 42 | Interim Financing Costs | | EST | | \$ - |
| 43 | Miscellaneous Engineering Services | 0.5% | EST | \$ 20,000.00 | \$ 20,000.00 |
| 44 | Radio Read Meters/Equipment/Software - Materials, no Install | | EST | | \$ - |
| Subtotal | | | | | \$ 471,300.00 |
| TOTAL PROJECT COST | | | | | \$ 3,948,300.00 |
| <p><i>In providing opinions of probable construction cost, the Client understands that the Engineer has no control over costs or the price of labor, equipment or materials, or over the Contractor's method of pricing, and that the opinion of probable construction cost provided herein is made on the basis of the Engineer's qualifications and experience. The Engineer makes no warranty, expressed or implied, as to the accuracy of such opinions compared to bid or actual costs.</i></p> | | | | | |



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ENGINEER'S OPINION OF PROBABLE COST

Culinary Water Master Plan Recommended Storage Improvements
Washington City

August 8, 2017
KCS/DWS

| NO. | DESCRIPTION | EST QTY | UNIT | UNIT PRICE | AMOUNT |
|---|--|---------|------|-----------------|-----------------|
| 2,000,000 Gallon Tank Red Cliffs (2018) | | | | | |
| 1 | Mobilization | 1 | LS | \$ 58,400.00 | \$ 58,400.00 |
| 2 | Project Lump Sum Costs (traffic & dust control, project DVD, SWPPP compliance) | 1 | LS | \$ 20,000.00 | \$ 20,000.00 |
| 3 | Site Earthwork | 1 | LS | \$ 10,000.00 | \$ 10,000.00 |
| 4 | Construct 2MG Concrete Water Tank with Pad | 1 | LS | \$ 975,000.00 | \$ 975,000.00 |
| 5 | 16" PVC Lines, Fittings, Tracer Wire, Bedding, Backfill, & Installation (C900 DR-18) | 100 | LF | \$ 100.00 | \$ 10,000.00 |
| 6 | 16" Butterfly Valve Assembly | 2 | EA | \$ 4,000.00 | \$ 8,000.00 |
| 7 | Outlet and Overflow Vaults | 1 | LS | \$ 75,000.00 | \$ 75,000.00 |
| 8 | Tank Appurtenances | 1 | LS | \$ 35,000.00 | \$ 35,000.00 |
| 9 | Flow Meter Vault | 1 | LS | \$ 20,000.00 | \$ 20,000.00 |
| 10 | Miscellaneous Fittings, Connections, & Tie-Ins | 1 | LS | \$ 15,000.00 | \$ 15,000.00 |
| 11 | Subtotal | | | | \$ 1,226,400.00 |
| 1,000,000 Gallon Tank Long Valley (2020) | | | | | |
| 12 | Mobilization | 1 | LS | \$ 71,100.00 | \$ 71,100.00 |
| 13 | Project Lump Sum Costs (traffic & dust control, project DVD, SWPPP compliance) | 1 | LS | \$ 20,000.00 | \$ 20,000.00 |
| 14 | Site Earthwork | 1 | LS | \$ 40,000.00 | \$ 40,000.00 |
| 15 | Construct 1MG Concrete Water Tank with Pad | 1 | LS | \$ 1,000,000.00 | \$ 1,000,000.00 |
| 16 | 16" PVC Lines, Fittings, Tracer Wire, Bedding, Backfill, & Installation (C900 DR-18) | 2000 | LF | \$ 75.00 | \$ 150,000.00 |
| 17 | 16" Butterfly Valve Assembly | 4 | EA | \$ 4,000.00 | \$ 16,000.00 |
| 18 | Outlet and Overflow Vaults | 1 | LS | \$ 75,000.00 | \$ 75,000.00 |
| 19 | Tank Appurtenances | 1 | LS | \$ 35,000.00 | \$ 35,000.00 |
| 20 | Flow Meter Vault | 1 | LS | \$ 20,000.00 | \$ 20,000.00 |
| 21 | Miscellaneous Fittings, Connections, & Tie-Ins | 1 | LS | \$ 15,000.00 | \$ 15,000.00 |
| 22 | 8" Untreated Base Course | 30,000 | SF | \$ 1.50 | \$ 45,000.00 |
| 23 | Bituminous Surface Course (2-1/2") | 0 | SF | \$ 3.50 | \$ - |
| 24 | Additional Drainage Improvements | 1 | LS | \$ 6,000.00 | \$ 6,000.00 |
| 25 | Subtotal | | | | \$ 1,493,100.00 |
| 500,000 Gallon Tank Grapevine Pass Wash (2022) | | | | | |
| 26 | Mobilization | 1 | LS | \$ 30,900.00 | \$ 30,900.00 |
| 27 | Project Lump Sum Costs (traffic & dust control, project DVD, SWPPP compliance) | 1 | LS | \$ 20,000.00 | \$ 20,000.00 |
| 28 | Site Earthwork | 1 | LS | \$ 30,000.00 | \$ 30,000.00 |
| 29 | Construct 500,000 Gallon Concrete Water Tank with Pad | 1 | LS | \$ 400,000.00 | \$ 400,000.00 |
| 30 | 12" PVC Lines, Fittings, Tracer Wire, Bedding, Backfill, & Installation (C900 DR-18) | 100 | LF | \$ 100.00 | \$ 10,000.00 |
| 31 | 12" Gate Valve Assembly | 2 | EA | \$ 2,500.00 | \$ 5,000.00 |
| 32 | Outlet and Overflow Vaults | 1 | LS | \$ 75,000.00 | \$ 75,000.00 |
| 33 | Tank Appurtenances | 1 | LS | \$ 35,000.00 | \$ 35,000.00 |
| 34 | Flow Meter Vault | 1 | LS | \$ 20,000.00 | \$ 20,000.00 |
| 35 | Miscellaneous Fittings, Connections, & Tie-Ins | 1 | LS | \$ 15,000.00 | \$ 15,000.00 |
| 36 | 8" Untreated Base Course | 1500 | SF | \$ 1.50 | \$ 2,250.00 |
| 37 | Bituminous Surface Course (2-1/2") | 0 | SF | \$ 3.50 | \$ - |
| 38 | Additional Drainage Improvements | 1 | LS | \$ 5,000.00 | \$ 5,000.00 |
| 39 | Subtotal | | | | \$ 648,150.00 |
| 2,800,000 Gallon Tank Warner Valley for Fields (2024) | | | | | |
| 40 | Mobilization | 1 | LS | \$ 61,600.00 | \$ 61,600.00 |
| 41 | Project Lump Sum Costs (traffic & dust control, project DVD, SWPPP compliance) | 1 | LS | \$ 20,000.00 | \$ 20,000.00 |

| | | | | | |
|---|--|--------|-----|----------------------------|-----------------|
| 42 | Site Earthwork | 1 | LS | \$ 30,000.00 | \$ 30,000.00 |
| 43 | Construct 2.8MG Concrete Water Tank with Pad | 1 | LS | \$ 1,000,000.00 | \$ 1,000,000.00 |
| 44 | 16" PVC Lines, Fittings, Tracer Wire, Bedding, Backfill, & Installation (C900 DR-18) | 100 | LF | \$ 100.00 | \$ 10,000.00 |
| 45 | 16" Butterfly Valve Assembly | 4 | EA | \$ 4,000.00 | \$ 16,000.00 |
| 46 | Outlet and Overflow Vaults | 1 | LS | \$ 75,000.00 | \$ 75,000.00 |
| 47 | Tank Appurtenances | 1 | LS | \$ 35,000.00 | \$ 35,000.00 |
| 48 | Flow Meter Vault | 1 | LS | \$ 20,000.00 | \$ 20,000.00 |
| 49 | Miscellaneous Fittings, Connections, & Tie-Ins | 1 | LS | \$ 15,000.00 | \$ 15,000.00 |
| 50 | 8" Untreated Base Course | 3000 | SF | \$ 1.50 | \$ 4,500.00 |
| 51 | Bituminous Surface Course (2-1/2") | 0 | SF | \$ 3.50 | \$ - |
| 52 | Additional Drainage Improvements | 1 | LS | \$ 6,000.00 | \$ 6,000.00 |
| 53 | Subtotal | | | | \$ 1,293,100.00 |
| 2,000,000 Gallon Tank Sunrise Valley (2027) | | | | | |
| 54 | Mobilization | 1 | LS | \$ 71,100.00 | \$ 71,100.00 |
| 55 | Project Lump Sum Costs (traffic & dust control, project DVD, SWPPP compliance) | 1 | LS | \$ 15,000.00 | \$ 15,000.00 |
| 56 | Site Earthwork | 1 | LS | \$ 50,000.00 | \$ 50,000.00 |
| 57 | Construct 2MG Concrete Water Tank with Pad | 1 | LS | \$ 1,000,000.00 | \$ 1,000,000.00 |
| 58 | 16" PVC Lines, Fittings, Tracer Wire, Bedding, Backfill, & Installation (C900 DR-18) | 2000 | LF | \$ 75.00 | \$ 150,000.00 |
| 59 | 16" Butterfly Valve Assembly | 4 | EA | \$ 4,000.00 | \$ 16,000.00 |
| 60 | Outlet and Overflow Vaults | 1 | LS | \$ 75,000.00 | \$ 75,000.00 |
| 61 | Tank Appurtenances | 1 | LS | \$ 35,000.00 | \$ 35,000.00 |
| 62 | Flow Meter Vault | 1 | LS | \$ 20,000.00 | \$ 20,000.00 |
| 63 | Miscellaneous Fittings, Connections, & Tie-Ins | 1 | LS | \$ 15,000.00 | \$ 15,000.00 |
| 64 | 8" Untreated Base Course | 30,000 | SF | \$ 1.50 | \$ 45,000.00 |
| 65 | Bituminous Surface Course (2-1/2") | 0 | SF | \$ 3.50 | \$ - |
| 66 | Additional Drainage Improvements | 1 | LS | \$ 6,000.00 | \$ 6,000.00 |
| 67 | Subtotal | | | | \$ 1,498,100.00 |
| | | | | Grand Subtotal | \$ 4,660,750.00 |
| | | | 20% | Contingency | \$ 932,200.00 |
| | | | | General Construction Total | \$ 5,592,950.00 |
| | | | | | |
| Professional Services & Incidentals | | | | | |
| 1 | Funding & Adminstrative Services | | EST | | \$ - |
| 2 | Topographical Survey | | EST | | \$ - |
| 3 | Engineering Design | 6.3% | LS | \$ 419,000.00 | \$ 419,000.00 |
| 4 | Bidding & Negotiating | 0.3% | HR | \$ 20,000.00 | \$ 20,000.00 |
| 5 | Construction Administration Services (City Provided Observation) | 4.2% | HR | \$ 279,600.00 | \$ 279,600.00 |
| 6 | Permit Acquisition | | EST | | \$ - |
| 7 | Preliminary Engineering Report (PER) | | EST | | \$ - |
| 8 | Wastewater Facilities Plan | | EST | | \$ - |
| 9 | Water Conservation Plan | | EST | | \$ - |
| 10 | Operation and Maintenance Manual | | EST | | \$ - |
| 11 | Plan of Operations | | EST | | \$ - |
| 12 | Ground Water Discharge / UPDES /Reuse | | EST | | \$ - |
| 13 | SWPPP (Storm Water Pollution Protection Plan) | | EST | | \$ - |
| 14 | Environmental Report (EIS,EA, CATEX,) | 1.5% | EST | \$ 100,000.00 | \$ 100,000.00 |
| 15 | Archeology (Survey/monitor) | | EST | | \$ - |
| 16 | Biological (Survey/monitor) | | EST | | \$ - |
| 17 | Building and Safety Plan Review | | EST | | \$ - |
| 18 | Geotechnical Report | | EST | | \$ - |
| 19 | Geotechnical and Materials Testing | 0.7% | EST | \$ 43,000.00 | \$ 43,000.00 |
| 20 | SCADA Design | | EST | | \$ - |
| 21 | SCADA Improvements | | EST | | \$ - |
| 22 | Controls Integration | | EST | | \$ - |
| 23 | Cathodic Protection Design | | EST | | \$ - |
| 24 | Cathodic Protection Installation | | EST | | \$ - |
| 25 | Construction Staking | 0.5% | EST | \$ 35,000.00 | \$ 35,000.00 |
| 26 | Property Surveys | | EST | | \$ - |
| 27 | Land & RoW Acquisition | 1.5% | EST | \$ 100,000.00 | \$ 100,000.00 |
| 28 | Land & RoW Negotiation | 0.2% | EST | \$ 10,000.00 | \$ 10,000.00 |
| 29 | GIS Mapping | | EST | | \$ - |
| 30 | GPS points during construction for GIS system | | EST | | \$ - |

| | | | | | |
|----|--|--|-----|--|------|
| 31 | CRD conversion to GIS | | EST | | \$ - |
| 32 | GIS PanoView | | EST | | \$ - |
| 33 | Community Viz Modeling | | EST | | \$ - |
| 34 | Aerial Photography | | EST | | \$ - |
| 35 | Aerial Photography Survey Control | | EST | | \$ - |
| 36 | Water Rights Research and POD Applications | | EST | | \$ - |
| 37 | Well Siting Study | | EST | | \$ - |
| 38 | Well PER | | EST | | \$ - |
| 39 | Well/Spring Source Protection Plan | | EST | | \$ - |
| 40 | Loan Origination Fee | | EST | | \$ - |
| 41 | Bond Attorney | | EST | | \$ - |
| 42 | Interim Financing Costs | | EST | | \$ - |
| 43 | Miscellaneous Engineering Services | | EST | | \$ - |
| 44 | Radio Read Meters/Equipment/Software - Materials, no Install | | EST | | \$ - |

Subtotal \$ 1,006,600.00

TOTAL PROJECT COST \$ 6,599,550.00

In providing opinions of probable construction cost, the Client understands that the Engineer has no control over costs or the price of labor, equipment or materials, or over the Contractor's method of pricing, and that the opinion of probable construction cost provided herein is made on the basis of the Engineer's qualifications and experience. The Engineer makes no warranty, expressed or implied, as to the accuracy of such opinions compared to bid or actual costs.



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ENGINEER'S OPINION OF PROBABLE COST

Culinary Water Master Plan Recommended Treatment Improvements
Washington City

August 8, 2017
KCS/DWS

| NO. | DESCRIPTION | EST QTY | UNIT | UNIT PRICE | AMOUNT |
|---|--|---------|------|---------------|---------------|
| 560 GPM Increase to Microfiltration Plant (2019) | | | | | |
| 1 | Mobilization | 1 | LS | \$ 19,300.00 | \$ 19,300.00 |
| 2 | Project Lump Sum Costs (traffic & dust control, project DVD, SWPPP compliance) | 1 | LS | \$ 15,000.00 | \$ 15,000.00 |
| 3 | PALL Filter with 580 gpm Capacity | 1 | LS | \$ 360,000.00 | \$ 360,000.00 |
| 4 | Increased Pump Capacity at Quail Lake | 1 | LS | \$ 178,500.00 | \$ 178,500.00 |
| 5 | Treatment Plant Modifications | 1 | LS | \$ 50,000.00 | \$ 50,000.00 |
| 6 | Miscellaneous Fittings, Connections, & Tie-Ins | 1 | LS | \$ 20,000.00 | \$ 20,000.00 |
| 7 | Grapevine Booster Pump | 1 | LS | \$ 123,000.00 | \$ 123,000.00 |
| Subtotal | | | | | \$ 765,800.00 |
| | | | 10% | Contingency | \$ 77,300.00 |
| General Construction Total | | | | | \$ 843,100.00 |
| Professional Services & Incidentals | | | | | |
| 1 | Funding & Administrative Services | | EST | | \$ - |
| 2 | Topographical Survey | | EST | | \$ - |
| 3 | Engineering Design | 4.3% | LS | \$ 40,000.00 | \$ 40,000.00 |
| 4 | Bidding & Negotiating | 1.1% | HR | \$ 10,000.00 | \$ 10,000.00 |
| 5 | Construction Administration Services (City Provided Observation) | 1.3% | HR | \$ 12,000.00 | \$ 12,000.00 |
| 6 | Permit Acquisition | | EST | | \$ - |
| 7 | Preliminary Engineering Report (PER) | | EST | | \$ - |
| 8 | Wastewater Facilities Plan | | EST | | \$ - |
| 9 | Water Conservation Plan | | EST | | \$ - |
| 10 | Operation and Maintenance Manual | | EST | | \$ - |
| 11 | Plan of Operations | | EST | | \$ - |
| 12 | Ground Water Discharge / UPDES /Reuse | | EST | | \$ - |
| 13 | SWPPP (Storm Water Pollution Protection Plan) | | EST | | \$ - |
| 14 | Environmental Report (EIS,EA, CATEX,) | | EST | | \$ - |
| 15 | Archeology (Survey/monitor) | | EST | | \$ - |
| 16 | Biological (Survey/monitor) | | EST | | \$ - |
| 17 | Building and Safety Plan Review | | EST | | \$ - |
| 18 | Geotechnical Report | | EST | | \$ - |
| 19 | Geotechnical and Materials Testing | 0.6% | EST | \$ 5,500.00 | \$ 5,500.00 |
| 20 | SCADA Design | 1.1% | EST | \$ 10,000.00 | \$ 10,000.00 |
| 21 | Electrical Engineering | 0.8% | EST | \$ 7,500.00 | \$ 7,500.00 |
| 22 | Controls Integration | | EST | | \$ - |
| 23 | Cathodic Protection Design | | EST | | \$ - |
| 24 | Cathodic Protection Installation | | EST | | \$ - |
| 25 | Construction Staking | 0.2% | EST | \$ 2,000.00 | \$ 2,000.00 |
| 26 | Property Surveys | | EST | | \$ - |
| 27 | Land & RoW Acquisition | | EST | | \$ - |
| 28 | Land & RoW Negotiation | | EST | | \$ - |
| 29 | GIS Mapping | | EST | | \$ - |
| 30 | GPS points during construction for GIS system | | EST | | \$ - |
| 31 | CRD conversion to GIS | | EST | | \$ - |
| 32 | GIS PanoView | | EST | | \$ - |
| 33 | Community Viz Modeling | | EST | | \$ - |
| 34 | Aerial Photography | | EST | | \$ - |
| 35 | Aerial Photography Survey Control | | EST | | \$ - |
| 36 | Water Rights Research and POD Applications | | EST | | \$ - |
| 37 | Well Siting Study | | EST | | \$ - |
| 38 | Well PER | | EST | | \$ - |
| 39 | Well/Spring Source Protection Plan | | EST | | \$ - |
| 40 | Loan Origination Fee | | EST | | \$ - |

| | | | | | | |
|----|--|--|-----|-------------|--------------------|---------------|
| 41 | Bond Attorney | | EST | | \$ | - |
| 42 | Interim Financing Costs | | EST | | \$ | - |
| 43 | Miscellaneous Engineering Services | | EST | \$ 5,000.00 | \$ | 5,000.00 |
| 44 | Radio Read Meters/Equipment/Software - Materials, no Install | | EST | | \$ | - |
| | | | | | Subtotal | \$ 92,000.00 |
| | | | | | TOTAL PROJECT COST | \$ 935,100.00 |

In providing opinions of probable construction cost, the Client understands that the Engineer has no control over costs or the price of labor, equipment or materials, or over the Contractor's method of pricing, and that the opinion of probable construction cost provided herein is made on the basis of the Engineer's qualifications and experience. The Engineer makes no warranty, expressed or implied, as to the accuracy of such opinions compared to bid or actual costs.



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ENGINEER'S OPINION OF PROBABLE COST

Culinary Water Master Plan Recommended Distribution Improvements
Washington City

August 8, 2017
KCS/DWS

| NO. | DESCRIPTION | EST QTY | UNIT | UNIT PRICE | AMOUNT |
|--|--|---------|------|--------------|---------------|
| Red Cliffs Transmission Pipeline (2018) | | | | | |
| 1 | Mobilization | 1 | LS | \$ 51,500.00 | \$ 51,500.00 |
| 2 | Project Lump Sum Costs (traffic & dust control, project DVD, SWPPP compliance) | 1 | LS | \$ 15,000.00 | \$ 15,000.00 |
| 3 | 16" PVC Lines, Fittings, Tracer Wire, Bedding, Backfill, & Installation (C900 DR-18) | 5400 | LF | \$ 75.00 | \$ 405,000.00 |
| 4 | 16" Butterfly Valve Assembly | 10 | EA | \$ 4,000.00 | \$ 40,000.00 |
| 5 | Miscellaneous Fittings, Connections, & Tie-Ins | 1 | LS | \$ 30,000.00 | \$ 30,000.00 |
| 6 | 8" Untreated Base Course | 5000 | SF | \$ 1.50 | \$ 7,500.00 |
| 7 | Bituminous Surface Course (2-1/2") | 5000 | SF | \$ 3.50 | \$ 17,500.00 |
| 8 | Subtotal | | | | \$ 566,500.00 |
| | | | 20% | Contingency | \$ 113,300.00 |
| General Construction Total | | | | | \$ 679,800.00 |
| Professional Services & Incidentals | | | | | |
| 1 | Funding & Administrative Services | | EST | | \$ - |
| 2 | Topographical Survey | | EST | | \$ - |
| 3 | Engineering Design | 5.6% | LS | \$ 47,600.00 | \$ 47,600.00 |
| 4 | Bidding & Negotiating | 1.8% | HR | \$ 15,000.00 | \$ 15,000.00 |
| 5 | Construction Administration Services | 4.3% | HR | \$ 36,800.00 | \$ 36,800.00 |
| 6 | Permit Acquisition | | EST | | \$ - |
| 7 | Preliminary Engineering Report (PER) | | EST | | \$ - |
| 8 | Wastewater Facilities Plan | | EST | | \$ - |
| 9 | Water Conservation Plan | | EST | | \$ - |
| 10 | Operation and Maintenance Manual | | EST | | \$ - |
| 11 | Plan of Operations | | EST | | \$ - |
| 12 | Ground Water Discharge / UPDES / Reuse | | EST | | \$ - |
| 13 | SWPPP (Storm Water Pollution Protection Plan) | | EST | | \$ - |
| 14 | Environmental Report (EIS, EA, CATEX,) | | EST | | \$ - |
| 15 | Archeology (Survey/monitor) | | EST | | \$ - |
| 16 | Biological (Survey/monitor) | | EST | | \$ - |
| 17 | Building and Safety Plan Review | | EST | | \$ - |
| 18 | Geotechnical Report | | EST | | \$ - |
| 19 | Geotechnical and Materials Testing | 0.9% | EST | \$ 8,000.00 | \$ 8,000.00 |
| 20 | SCADA Design | | EST | | \$ - |
| 21 | SCADA Improvements | | EST | | \$ - |
| 22 | Controls Integration | | EST | | \$ - |
| 23 | Cathodic Protection Design | | EST | | \$ - |
| 24 | Cathodic Protection Installation | | EST | | \$ - |
| 25 | Construction Staking | 0.5% | EST | \$ 4,000.00 | \$ 4,000.00 |
| 26 | Property Surveys | | EST | | \$ - |
| 27 | Land & RoW Acquisition | 5.9% | EST | \$ 50,000.00 | \$ 50,000.00 |
| 28 | Land & RoW Negotiation | 0.9% | EST | \$ 7,500.00 | \$ 7,500.00 |
| 29 | GIS Mapping | | EST | | \$ - |
| 30 | GPS points during construction for GIS system | | EST | | \$ - |
| 31 | CRD conversion to GIS | | EST | | \$ - |
| 32 | GIS PanoView | | EST | | \$ - |
| 33 | Community Viz Modeling | | EST | | \$ - |
| 34 | Aerial Photography | | EST | | \$ - |
| 35 | Aerial Photography Survey Control | | EST | | \$ - |
| 36 | Water Rights Research and POD Applications | | EST | | \$ - |
| 37 | Well Siting Study | | EST | | \$ - |
| 38 | Well PER | | EST | | \$ - |
| 39 | Well/Spring Source Protection Plan | | EST | | \$ - |

| | | | | | | |
|--|--|--|-----|--|--------------------|---------------|
| 40 | Loan Origination Fee | | EST | | \$ | - |
| 41 | Bond Attorney | | EST | | \$ | - |
| 42 | Interim Financing Costs | | EST | | \$ | - |
| 43 | Miscellaneous Engineering Services | | EST | | \$ | - |
| 44 | Radio Read Meters/Equipment/Software - Materials, no Install | | EST | | \$ | - |
| | | | | | Subtotal | \$ 168,900.00 |
| | | | | | TOTAL PROJECT COST | \$ 848,700.00 |
| <p><i>In providing opinions of probable construction cost, the Client understands that the Engineer has no control over costs or the price of labor, equipment or materials, or over the Contractor's method of pricing, and that the opinion of probable construction cost provided herein is made on the basis of the Engineer's qualifications and experience. The Engineer makes no warranty, expressed or implied, as to the accuracy of such opinions compared to bid or actual costs.</i></p> | | | | | | |

Average Water Rate Analysis Washington City

| FY 2018 | % | Fixed | % | Variable | Total |
|--|------|--------------|------|--------------|--------------|
| Salaries & Wages | 50% | \$ 408,803 | 50% | \$ 408,803 | \$ 817,607 |
| Employee Benefits | 50% | \$ 257,546 | 50% | \$ 257,546 | \$ 515,092 |
| Overtime | 0% | \$ - | 100% | \$ 10,000 | \$ 10,000 |
| Uniforms | 80% | \$ 3,784 | 20% | \$ 946 | \$ 4,730 |
| Dues And Memberships | 0% | \$ - | 100% | \$ 2,613 | \$ 2,613 |
| Conference & Travel | 0% | \$ - | 100% | \$ 14,212 | \$ 14,212 |
| Office Expense & Supplies | 25% | \$ 575 | 75% | \$ 1,724 | \$ 2,299 |
| Equipment- Supplies & Maint. | 25% | \$ 17,047 | 75% | \$ 51,140 | \$ 68,186 |
| Fuel & Oil | 0% | \$ - | 100% | \$ 30,828 | \$ 30,828 |
| Building & Grounds | 75% | \$ 18,876 | 25% | \$ 6,292 | \$ 25,168 |
| Utilities | 25% | \$ 127,839 | 75% | \$ 383,518 | \$ 511,357 |
| Telephone | 25% | \$ 2,365 | 75% | \$ 7,096 | \$ 9,461 |
| Professional & Technical | 25% | \$ 10,000 | 75% | \$ 30,000 | \$ 40,000 |
| Water Purchase Sandhollow | 50% | \$ 488,723 | 50% | \$ 488,723 | \$ 977,445 |
| Water Purchase Quail Lake Raw | 50% | \$ 104,500 | 50% | \$ 104,500 | \$ 209,000 |
| Administrative Costs | 50% | \$ 148,760 | 50% | \$ 148,760 | \$ 297,520 |
| District Surcharge | 0% | \$ - | 100% | \$ 250,800 | \$ 250,800 |
| Special Department Supplies | 25% | \$ 36,771 | 75% | \$ 110,313 | \$ 147,084 |
| Bank Charges | 75% | \$ 22,102 | 25% | \$ 7,367 | \$ 29,469 |
| Uncollectable Accts | 100% | \$ 7,062 | 0% | \$ - | \$ 7,062 |
| Other Projects | 50% | \$ 350,000 | 50% | \$ 350,000 | \$ 700,000 |
| Capital Projects or Equipment | 0% | \$ - | 100% | \$ 150,000 | \$ 150,000 |
| Lease Purchase | 100% | \$ 2,979 | 0% | \$ - | \$ 2,979 |
| Cost of Issuance | 0% | \$ - | 100% | \$ 10,000 | \$ 10,000 |
| Funded Depreciation | 100% | \$ - | 0% | \$ - | \$ - |
| EXISTING DEBT SERVICE NOT IMPACT FEE ELIGIBLE | | | | | |
| Water Revenue Refunding Bonds 2016A | 100% | \$ 268,258 | 0% | \$ - | \$ 268,258 |
| Water Revenue Refunding Bonds 2016B | 100% | \$ 196,874 | 0% | \$ - | \$ 196,874 |
| NEW DEBT SERVICE | | | | | |
| Bond | | | | | |
| Total Expenses: | | \$ 2,472,863 | | \$ 2,825,180 | \$ 5,298,043 |
| OTHER INCOME (BESIDES WATER SALES) | | | | | |
| Connection Fees | 0% | \$ - | 100% | \$ 79,659 | \$ 79,659 |
| Other Revenue (Hydrant Meters, etc.) | 0% | \$ - | 100% | \$ 282,689 | \$ 282,689 |
| Interest | 30% | \$ 27,247 | 70% | \$ 63,577 | \$ 90,824 |
| Total Other Income: | | \$ 27,247 | | \$ 425,924 | \$ 453,171 |
| Total Expenses - Total Other Income: | | \$ 2,445,616 | | \$ 2,399,256 | \$ 4,844,872 |
| Total Project System Billed ERU's in FY 2018 | | 11,219 | | 11,219 | 11,219 |
| Monthly Cost Per Billed ERU in FY 2018 | | \$ 18.17 | | \$ 17.82 | \$ 35.99 |
| BASE AND OVERAGE RATE DETERMINATION | | | | | |
| Resident Base Cost (0 Gallons) | | \$ 18.17 | | | |
| Non-Resident Base Cost (0 Gallons) | | \$ 36.33 | | | |
| Resident Variable Cost (Avg Usage) | | | | \$ 17.82 | |
| Non-Resident Variable Cost (Avg Usage) | | | | \$ 35.64 | |
| Average Use/Billed ERU (Gal) | | | | 13,228 | |
| Resident Cost/1000 Gallons | | | | \$ 1.35 | |
| Total Average Monthly Resident Rate/Billed ERU | | | | | \$ 35.99 |
| Total Average Monthly Non-Resident Rate/Billed ERU | | | | | \$ 71.97 |
| WCWCD Surcharge | | | | | \$ 1.75 |

Existing Water Base Rate
Structure

| Meter Size | Base Rate |
|------------|------------|
| 5/8" | \$18.25 |
| 3/4" | \$18.25 |
| 1" | \$33.00 |
| 1 1/2" | \$73.00 |
| 2" | \$130.00 |
| 3" | \$292.00 |
| 4" | \$518.00 |
| 6" | \$1,168.00 |

Option 1 Water Base Rate
Structure

| Meter Size | Base Rate |
|------------|------------|
| 5/8" | \$18.17 |
| 3/4" | \$18.17 |
| 1" | \$33.00 |
| 1 1/2" | \$73.00 |
| 2" | \$130.00 |
| 3" | \$291.00 |
| 4" | \$517.00 |
| 6" | \$1,163.00 |

Option 2 Water Base Rate
Structure

| Meter Size | Base Rate |
|------------|------------|
| 5/8" | \$19.00 |
| 3/4" | \$19.00 |
| 1" | \$34.00 |
| 1 1/2" | \$76.00 |
| 2" | \$136.00 |
| 3" | \$304.00 |
| 4" | \$541.00 |
| 6" | \$1,216.00 |

Option 1 Non-Resident
Water Base Rate Structure

| Meter Size | Base Rate |
|------------|------------|
| 5/8" | \$36.33 |
| 3/4" | \$36.33 |
| 1" | \$66.00 |
| 1 1/2" | \$146.00 |
| 2" | \$260.00 |
| 3" | \$582.00 |
| 4" | \$1,034.00 |
| 6" | \$2,326.00 |

Existing Water Tiered Rate Structure

| Tier | Threshold Gallons | Washington City | WCWCD* | Rate/1000 gal |
|---|--------------------|-----------------|--------|---------------|
| 1 | 0 - 5,000 | \$0.64 | \$0.46 | \$1.10 |
| 2 | 5,001 - 10,000 | \$0.74 | \$0.46 | \$1.20 |
| 3 | 10,001 - 15,000 | \$0.84 | \$0.46 | \$1.30 |
| 4 | 15,001 - 20,000 | \$0.94 | \$0.46 | \$1.40 |
| 5 | 20,001 - 25,000 | \$1.04 | \$0.46 | \$1.50 |
| 6 | 25,001 - 30,000 | \$1.14 | \$0.46 | \$1.60 |
| 7 | 30,001 - 35,000 | \$1.29 | \$0.46 | \$1.75 |
| 8 | 35,001 - 40,000 | \$1.44 | \$0.46 | \$1.90 |
| 9 | 40,001 - Unlimited | \$1.59 | \$0.46 | \$2.05 |
| Average Water Use Cost (for 13,228 gal) | | | | \$15.70 |

*WCWCD has a planned \$0.10 increase per year for the next 10 years

Option 1 Water Tiered Rate Structure

| Tier | Threshold Gallons | Washington City | WCWCD* | Rate/1000 gal |
|---|--------------------|-----------------|--------|---------------|
| 1 | 0 - 5,000 | \$0.74 | \$0.46 | \$1.20 |
| 2 | 5,001 - 10,000 | \$0.86 | \$0.46 | \$1.32 |
| 3 | 10,001 - 15,000 | \$0.98 | \$0.46 | \$1.44 |
| 4 | 15,001 - 20,000 | \$1.10 | \$0.46 | \$1.56 |
| 5 | 20,001 - 25,000 | \$1.22 | \$0.46 | \$1.68 |
| 6 | 25,001 - 30,000 | \$1.34 | \$0.46 | \$1.80 |
| 7 | 30,001 - 35,000 | \$1.51 | \$0.46 | \$1.97 |
| 8 | 35,001 - 40,000 | \$1.68 | \$0.46 | \$2.14 |
| 9 | 40,001 - Unlimited | \$1.85 | \$0.46 | \$2.31 |
| Average Water Use Cost (for 13,228 gal) | | | | \$17.25 |

*WCWCD has a planned \$0.10 increase per year for the next 10 years

Option 2 Water Tiered Rate Structure

| Tier | Threshold Gallons | Washington City | WCWCD* | Rate/1000 gal |
|---|--------------------|-----------------|--------|---------------|
| 1 | 0 - 5,000 | \$0.70 | \$0.46 | \$1.16 |
| 2 | 5,001 - 10,000 | \$0.85 | \$0.46 | \$1.31 |
| 3 | 10,001 - 15,000 | \$1.00 | \$0.46 | \$1.46 |
| 4 | 15,001 - 20,000 | \$1.15 | \$0.46 | \$1.61 |
| 5 | 20,001 - 25,000 | \$1.30 | \$0.46 | \$1.76 |
| 6 | 25,001 - 30,000 | \$1.45 | \$0.46 | \$1.91 |
| 7 | 30,001 - 35,000 | \$1.65 | \$0.46 | \$2.11 |
| 8 | 35,001 - 40,000 | \$1.85 | \$0.46 | \$2.31 |
| 9 | 40,001 - Unlimited | \$2.05 | \$0.46 | \$2.51 |
| Average Water Use Cost (for 13,228 gal) | | | | \$17.06 |

*WCWCD has a planned \$0.10 increase per year for the next 10 years

Option 1 Non-Resident Water Tiered Rate Structure

| Tier | Threshold Gallons | Washington City | WCWCD* | Rate/1000 gal |
|---|--------------------|-----------------|--------|---------------|
| 1 | 0 - 5,000 | \$1.94 | \$0.46 | \$2.40 |
| 2 | 5,001 - 10,000 | \$2.18 | \$0.46 | \$2.64 |
| 3 | 10,001 - 15,000 | \$2.42 | \$0.46 | \$2.88 |
| 4 | 15,001 - 20,000 | \$2.66 | \$0.46 | \$3.12 |
| 5 | 20,001 - 25,000 | \$2.90 | \$0.46 | \$3.36 |
| 6 | 25,001 - 30,000 | \$3.14 | \$0.46 | \$3.60 |
| 7 | 30,001 - 35,000 | \$3.48 | \$0.46 | \$3.94 |
| 8 | 35,001 - 40,000 | \$3.82 | \$0.46 | \$4.28 |
| 9 | 40,001 - Unlimited | \$4.16 | \$0.46 | \$4.62 |
| Average Water Use Cost (for 13,228 gal) | | | | \$34.50 |

*WCWCD has a planned \$0.10 increase per year for the next 10 years

| Impact Fee Analysis Washington City | | | | |
|---|--------------------------------|----------------------------------|--------------------------|---------------------|
| Existing Debt Service | Debt to be Paid FY2018-2028 | Inflation Adjusted Costs | Impact Fee % Eligible | Eligible Costs |
| Water Revenue Refunding Bonds 2016A | \$ 1,219,608 | N/A | 34% | \$ 414,667 |
| Water Revenue Refunding Bonds 2016B | \$ 4,573,338 | N/A | 34% | \$ 1,554,935 |
| Regional Pipeline Bond | \$ 1,500,000 | N/A | 100% | \$ 1,500,000 |
| Subtotal | | | | \$ 3,469,601 |
| Past Projects | Total Actual Project Costs | Inflation Adjusted Costs | Impact Fee % Eligible | Eligible Costs |
| East Regional Connection Project (2014) | \$ 4,198,478 | N/A | 100% | \$ 4,198,478 |
| Subtotal | | | | \$ 4,198,478 |
| Subtotal Multiplied by 10-yr ERU Factor | | | 32% | \$ 1,343,513 |
| Proposed Improvement Projects (FY2018-2028) | Total EOPC | Inflation Adjusted Costs (3%) | Impact Fee % Eligible | Eligible Costs |
| Culinary Water Master Plan | \$ 50,000 | \$ 57,964 | 100% | \$ 57,964 |
| Subtotal | | | | \$ 57,964 |
| South Washington Fields WCWCD Connection (2020) | \$ 315,455 | \$ 344,706 | 100% | \$ 344,706 |
| Grapevine Pass Wash Well Field (2027) | \$ 3,632,845 | \$ 4,882,240 | 100% | \$ 4,882,240 |
| 560 GPM Increase to Microfiltration Plant (2019) | \$ 935,100 | \$ 992,048 | 100% | \$ 992,048 |
| Subtotal | | | | \$ 6,218,994 |
| Subtotal Multiplied by Source 10-yr ERU Factor | | | 32% | \$ 1,990,078 |
| 2,000,000 Gallon Tank Red Cliffs (2018) | \$ 1,314,156 | \$ 1,353,580 | 100% | \$ 1,353,580 |
| 1,000,000 Gallon Tank Long Valley (2020) | \$ 1,599,940 | \$ 1,748,297 | 100% | \$ 1,748,297 |
| 500,000 Gallon Tank Grapevine Pass Wash (2022) | \$ 694,529 | \$ 805,149 | 100% | \$ 805,149 |
| 2,800,000 Gallon Tank Warner Valley for Fields (2024) | \$ 1,385,629 | \$ 1,704,148 | 100% | \$ 1,704,148 |
| 2,000,000 Gallon Tank Sunrise Valley (2027) | \$ 1,605,297 | \$ 2,157,385 | 100% | \$ 2,157,385 |
| Red Cliffs Transmission Pipeline (2018) | \$ 848,700 | \$ 874,161 | 100% | \$ 874,161 |
| Subtotal | | | | \$ 8,642,722 |
| Subtotal Multiplied by Storage 10-yr ERU Factor | | | 31% | \$ 2,679,244 |
| Water Utility Warehouse (2019) | \$ 500,000 | N/A | 50% | \$ 250,000 |
| Subtotal | | | | \$ 250,000 |
| Total Cost Eligible For Impact Fee | | | | \$ 9,790,400 |
| Projected No. of Existing Culinary ERUs (beginning FY 2018) | | | | 11,801 |
| Anticipated No. of Culinary ERUs (beginning FY 2028) | | | | 15,860 |
| No. of New ERUs Due to Growth | | | | 4,059 |
| Maximum Impact Fee = Total Eligible Cost / New ERU's | | | | \$ 2,412.23 |

| Water Acquisition Impact Fee Credit | | | |
|--|-------------|------------------|-------------------------|
| Historic Average Consumption | 427.3 | gpd/ERU | (Total Indoor/Outdoor) |
| Historic Average Indoor Consumption | 221.6 | gpd/ERU | (Approx. Indoor Use) |
| Historic Average Outdoor Consumption | 205.7 | gpd/ERU | (Estimated Outdoor Use) |
| Peak Day Demand (Historic times 2) | 855 | gpd/ERU | (Total Indoor/Outdoor) |
| Peak Day Indoor Demand Estimate (Historic times 1.1) | 244 | gpd/ERU | (Estimated Indoor Use) |
| Peak Day Outdoor Demand Estimate (Historic times 2.75) | 611 | gpd/ERU | (Estimated Outdoor Use) |
| Indoor peaking factor of 1.1. Outdoor peaking factor of 2.76 | | | |
| Peak Day Outdoor Demand/Peak Day Demand | 71.4% | | |
| % of Full Impact Fee | \$ 1,723.48 | | |
| Water Acquisition Credit per gpd | \$ 2.02 | Credit per ac-ft | \$ 1,800.47 |

| | Cash Flow | Actual | Actual | Actual | Actual | Budgeted | Projected | Projected | Projected | Projected | |
|----|---|---------------|---------------|---------------|---------------|---------------|-----------------------------------|-----------------------------------|--|---------------|---------------|
| | Annual Inflation rate of 3.0% | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| | Fiscal Year | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| 4 | WATER SYSTEM INFORMATION | | | | | | | | | | |
| 5 | Annual Population Growth Rate | - | - | - | - | 5.2% | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% |
| 6 | Annual Interest Rate (Inflation) | - | - | - | - | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% |
| 7 | Average Rate/ERU/Month (Annual Change =) | \$ 31.59 | \$ 32.06 | \$ 34.05 | \$ 34.11 | \$ 33.57 | \$ 35.27 | \$ 36.59 | \$ 37.91 | \$ 39.23 | \$ 39.23 |
| 8 | Impact fee | \$ 2,121 | \$ 2,121 | \$ 2,121 | \$ 2,121 | \$ 2,121 | \$ 2,121 | \$ 2,412 | \$ 2,412 | \$ 2,412 | \$ 2,412 |
| 9 | Connection Fee | \$ 225 | \$ 225 | \$ 225 | \$ 225 | \$ 225 | \$ 225 | \$ 225 | \$ 225 | \$ 225 | \$ 225 |
| 10 | Residential ERU's | 7,671 | 7,901 | 8,138 | 8,475 | 8,915 | 9,182 | 9,458 | 9,742 | 10,034 | 10,034 |
| 11 | Commercial ERU's (Billed) | 2,421 | 2,493 | 2,568 | 2,744 | 2,886 | 2,973 | 3,062 | 3,154 | 3,249 | 3,249 |
| 12 | Total Existing ERU's (FY Year End June 30) | 10,091 | 10,394 | 10,706 | 11,219 | 11,801 | 12,155 | 12,520 | 12,896 | 13,282 | 13,282 |
| 13 | New ERU's | - | 303 | 312 | 513 | 582 | 354 | 365 | 376 | 387 | 387 |
| 14 | | | | | | | | | | | |
| 15 | WATER FUND ACCOUNTING | | | | | | | | | | |
| 16 | Water Revenues | | | | | | | | | | |
| 17 | Water Sales | \$ 3,824,868 | \$ 3,998,698 | \$ 4,374,354 | \$ 4,591,820 | \$ 4,754,092 | \$ 5,069,172 | \$ 5,416,675 | \$ 5,780,466 | \$ 6,161,210 | \$ 6,161,210 |
| 18 | Connection Fees | \$ 97,575 | \$ 92,650 | \$ 75,771 | \$ 98,592 | \$ 112,350 | \$ 79,659 | \$ 82,048 | \$ 84,510 | \$ 87,045 | \$ 87,045 |
| 19 | Other Revenue (Hydrant Meters, etc.) | \$ 73,764 | \$ 227,133 | \$ 232,167 | \$ 268,530 | \$ 280,380 | \$ 282,689 | \$ 289,980 | \$ 294,925 | \$ 301,226 | \$ 301,226 |
| 20 | Interest | \$ 56,851 | \$ 63,780 | \$ 79,948 | \$ 84,094 | \$ 79,300 | \$ 81,107 | \$ 86,667 | \$ 92,487 | \$ 98,579 | \$ 98,579 |
| 21 | TOTAL WATER FUND REVENUE | \$ 4,053,059 | \$ 4,382,261 | \$ 4,762,240 | \$ 5,043,035 | \$ 5,226,122 | \$ 5,512,626 | \$ 5,875,371 | \$ 6,252,388 | \$ 6,648,061 | \$ 6,648,061 |
| 22 | | | | | | | | | | | |
| 23 | Water Expenses | 0.622345512 | | | | | | | | | |
| 24 | Salaries & Wages | \$ 592,376 | \$ 644,469 | \$ 705,235 | \$ 736,701 | \$ 782,399 | \$ 817,607 | \$ 854,399 | \$ 892,847 | \$ 933,025 | \$ 933,025 |
| 25 | Employee Benefits | \$ 368,663 | \$ 377,332 | \$ 387,649 | \$ 420,660 | \$ 492,166 | \$ 515,092 | \$ 538,272 | \$ 562,494 | \$ 587,806 | \$ 587,806 |
| 26 | Overtime | \$ 11,187 | \$ 6,027 | \$ 7,123 | \$ 5,725 | \$ 14,309 | \$ 10,000 | \$ 10,450 | \$ 10,920 | \$ 11,412 | \$ 11,412 |
| 27 | Uniforms | \$ - | \$ 1,716 | \$ 2,110 | \$ 2,576 | \$ 4,526 | \$ 4,730 | \$ 4,943 | \$ 5,165 | \$ 5,397 | \$ 5,397 |
| 28 | Dues And Memberships | \$ 1,856 | \$ 1,689 | \$ 1,839 | \$ 1,885 | \$ 2,500 | \$ 2,613 | \$ 2,730 | \$ 2,853 | \$ 2,981 | \$ 2,981 |
| 29 | Conference & Travel | \$ 4,688 | \$ 3,733 | \$ 6,000 | \$ 5,875 | \$ 13,600 | \$ 14,212 | \$ 14,852 | \$ 15,520 | \$ 16,218 | \$ 16,218 |
| 30 | Office Expense & Supplies | \$ 1,294 | \$ 1,352 | \$ 834 | \$ 1,447 | \$ 2,200 | \$ 2,299 | \$ 2,402 | \$ 2,511 | \$ 2,624 | \$ 2,624 |
| 31 | Equipment- Supplies & Maint. | \$ 42,122 | \$ 34,015 | \$ 54,248 | \$ 51,425 | \$ 65,250 | \$ 68,186 | \$ 71,255 | \$ 74,461 | \$ 77,812 | \$ 77,812 |
| 32 | Fuel & Oil | \$ 25,200 | \$ 29,101 | \$ 26,380 | \$ 26,521 | \$ 29,500 | \$ 30,828 | \$ 32,215 | \$ 33,664 | \$ 35,179 | \$ 35,179 |
| 33 | Building & Grounds | \$ 5,773 | \$ 6,015 | \$ 12,599 | \$ 19,440 | \$ 24,084 | \$ 25,168 | \$ 26,300 | \$ 27,484 | \$ 28,721 | \$ 28,721 |
| 34 | Utilities | \$ 371,424 | \$ 369,046 | \$ 368,066 | \$ 395,275 | \$ 583,400 | \$ 511,357 | \$ 534,369 | \$ 558,415 | \$ 583,544 | \$ 583,544 |
| 35 | Telephone | \$ 8,464 | \$ 7,989 | \$ 7,158 | \$ 8,023 | \$ 9,054 | \$ 9,461 | \$ 9,887 | \$ 10,332 | \$ 10,797 | \$ 10,797 |
| 36 | Professional & Technical | \$ 30,149 | \$ 41,243 | \$ 20,565 | \$ 40,539 | \$ 79,700 | \$ 40,000 | \$ 41,800 | \$ 43,681 | \$ 45,647 | \$ 45,647 |
| 37 | Water Purchase Sandhollow | \$ 600,903 | \$ 609,386 | \$ 650,710 | \$ 744,978 | \$ 920,000 | \$ 977,445 | \$ 1,054,483 | \$ 1,153,001 | \$ 1,275,017 | \$ 1,275,017 |
| 38 | Water Purchase Quail Lake Raw | \$ 413,529 | \$ 333,818 | \$ 191,397 | \$ 232,358 | \$ 200,000 | \$ 209,000 | \$ 218,405 | \$ 228,233 | \$ 238,504 | \$ 238,504 |
| 39 | Administrative Costs | \$ - | \$ - | \$ - | \$ 277,191 | \$ 284,708 | \$ 297,520 | \$ 310,908 | \$ 324,899 | \$ 339,520 | \$ 339,520 |
| 40 | District Surcharge | \$ 206,022 | \$ 213,111 | \$ 219,687 | \$ 228,927 | \$ 240,000 | \$ 250,800 | \$ 262,086 | \$ 273,880 | \$ 286,204 | \$ 286,204 |
| 41 | Special Department Supplies | \$ 102,580 | \$ 131,605 | \$ 163,788 | \$ 154,400 | \$ 140,750 | \$ 147,084 | \$ 153,703 | \$ 160,619 | \$ 167,847 | \$ 167,847 |
| 42 | Bank Charges | \$ 22,530 | \$ 22,530 | \$ 20,110 | \$ 20,110 | \$ 28,200 | \$ 29,469 | \$ 30,795 | \$ 32,181 | \$ 33,629 | \$ 33,629 |
| 43 | Uncollectable Accts | \$ 11,597 | \$ 5,931 | \$ 4,628 | \$ 11,632 | \$ - | \$ 7,062 | \$ 7,379 | \$ 7,711 | \$ 8,058 | \$ 8,058 |
| 44 | Other Projects | \$ 72,536 | \$ 225,376 | \$ 226,579 | \$ 183,962 | \$ 264,450 | \$ 700,000 | \$ 334,477 | \$ 349,528 | \$ 365,257 | \$ 365,257 |
| 45 | Capital Projects or Equipment | \$ - | \$ 6,100 | \$ 95,343 | \$ 891 | \$ 245,000 | \$ 150,000 | \$ 156,750 | \$ 163,804 | \$ 171,175 | \$ 171,175 |
| 46 | Cost of Issuance | \$ - | \$ - | \$ 1,834 | \$ 965 | \$ 2,851 | \$ 2,979 | \$ 3,113 | \$ 3,253 | \$ 3,400 | \$ 3,400 |
| 47 | Funded Depreciation | \$ - | \$ - | \$ - | \$ 17,641 | \$ 121,000 | \$ 10,000 | \$ 10,450 | \$ 10,920 | \$ 11,412 | \$ 11,412 |
| 48 | Transfer To General Fund | \$ 200,000 | \$ 200,000 | \$ 200,000 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 49 | Sub-Total Expenses | \$ 3,092,894 | \$ 3,271,583 | \$ 3,373,882 | \$ 3,589,146 | \$ 4,549,647 | \$ 4,832,911 | \$ 4,686,422 | \$ 4,948,377 | \$ 5,241,186 | \$ 5,241,186 |
| 50 | Existing Debt Service | | | | | | | | | | |
| 51 | Water Revenue Refunding Bonds 2016A | 66% | \$ 212,522 | \$ 217,522 | \$ 212,522 | \$ 212,522 | \$ 212,522 | \$ 268,258 | \$ 268,469 | \$ 268,213 | \$ - |
| 52 | Water Revenue Refunding Bonds 2016B | 66% | \$ - | \$ - | \$ - | \$ - | \$ 120,859 | \$ 196,874 | \$ 196,874 | \$ 196,874 | \$ 457,574 |
| 53 | Sub-Total Existing Non-Impact Fee Debt Service | | \$ 212,522 | \$ 217,522 | \$ 212,522 | \$ 212,522 | \$ 333,380 | \$ 465,132 | \$ 465,343 | \$ 465,087 | \$ 457,574 |
| 54 | New Debt Service | | | | | | | | | | |
| 55 | N/A | | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 56 | Sub-Total New Non-Impact Fee Debt Service | | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 57 | TOTAL WATER FUND EXPENSES | | \$ 3,305,416 | \$ 3,484,105 | \$ 3,586,404 | \$ 3,801,668 | \$ 4,883,027 | \$ 5,298,043 | \$ 5,151,765 | \$ 5,413,465 | \$ 5,698,759 |
| 58 | | | | | | | | | | | |
| 59 | NET CASHFLOW WATER FUND | | \$ 747,643 | \$ 898,156 | \$ 1,175,835 | \$ 1,241,367 | \$ 343,095 | \$ 214,583 | \$ 723,605 | \$ 838,924 | \$ 949,301 |
| 60 | | | | | | | | | | | |
| 61 | IMPACT FEE FUND ACCOUNTING | | | | | | | | | | |
| 62 | Impact Fee Fund Revenues | | | | | | | | | | |
| 63 | Impact Fees | \$ 829,311 | \$ 839,174 | \$ 697,542 | \$ 918,095 | \$ 970,000 | \$ 854,022 | \$ 879,642 | \$ 906,031 | \$ 933,212 | \$ 933,212 |
| 64 | Interest | \$ 4,020 | \$ 2,062 | \$ 1,215 | \$ 202 | \$ 6,100 | \$ 2,647 | \$ 2,727 | \$ 2,809 | \$ 2,893 | \$ 2,893 |
| 65 | TOTAL IMPACT FEE FUND REVENUE | \$ 833,331 | \$ 841,235 | \$ 698,757 | \$ 918,296 | \$ 976,100 | \$ 856,669 | \$ 882,369 | \$ 908,840 | \$ 936,105 | \$ 936,105 |
| 66 | | | | | | | | | | | |
| 67 | | | | | | | | | | | |
| 68 | | | | | | | | | | | |
| 69 | | | | | | | | | | | |
| 70 | Sub-Total Impact Fee Debt Service | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 239,613 | \$ 239,722 | \$ 239,590 | \$ 235,720 | \$ 235,720 |
| 71 | New Debt Service | | | | | | | | | | |
| 72 | N/A | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 73 | Sub-Total New Impact Fee Debt Service | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 74 | Misc. Impact Fee Projects | \$ 110,433.40 | \$ 152,346.84 | \$ 116,832.00 | \$ 136,302.80 | \$ 250,000.00 | \$ - | \$ - | \$ - | \$ - | \$ - |
| 75 | | | | | | | | | | | |
| 76 | NET CASHFLOW IMPACT FEE FUND | \$ 722,898 | \$ 688,889 | \$ 581,925 | \$ 781,994 | \$ 726,100 | \$ 617,055 | \$ 642,647 | \$ 669,250 | \$ 700,385 | \$ 700,385 |
| 77 | | | | | | | | | | | |
| 78 | CASH ON HAND | | | | | | | | | | |
| 79 | Water Fund Balance (FY Year End June 30) | \$ 29,865,642 | \$ 30,613,285 | \$ 31,511,441 | \$ 33,016,863 | \$ 33,359,958 | \$ 31,787,399 | \$ 31,836,412 | \$ 31,234,610 | \$ 32,183,911 | \$ 32,183,911 |
| 80 | Impact Fee Fund Balance (FY Year End June 30) | | \$ 688,889 | \$ 1,270,814 | \$ 2,052,807 | \$ 2,778,907 | \$ 2,705,363 | \$ 2,530,554 | \$ 2,547,526 | \$ 3,247,911 | \$ 3,247,911 |
| 81 | Funded Depreciation (Renewal & Replacement) (FY Year End June 30) | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 82 | TOTAL | \$ 29,865,642 | \$ 31,302,173 | \$ 32,782,255 | \$ 35,069,670 | \$ 36,138,865 | \$ 34,492,761 | \$ 34,366,966 | \$ 33,782,136 | \$ 35,431,822 | \$ 35,431,822 |
| 83 | | | | | | | | | | | |
| 84 | PLAN FOR NEW PROJECTS | | | | | | | | | | |
| 85 | Project Name | | | | | | 2 MG Red Cliffs Tank and Pipeline | Increase to Microfiltration Plant | WCWCD Connection & 1 MG Long Valley Tank | | |
| 86 | Impact Fee Eligible Cost | | | | | | \$ 690,600 | \$ 317,455 | \$ 652,278 | | |
| 87 | Non-Impact Fee Eligible Cost | | | | | | \$ 1,537,142 | \$ 674,592 | \$ 1,440,725 | \$ - | |
| 88 | Total Project Cost | | | | | | \$ 2,227,741 | \$ 992,048 | \$ 2,093,004 | | |
| 89 | Other Project Name | | | | | | | Water Utility Warehouse | | | |
| 90 | Other Project Cost | | | | | | | \$ 500,000 | | | |
| 91 | RENEWAL & REPLACEMENT PROJECTS | | | | | | | | | | |
| 92 | Project Cost (Paid by Water Fund) | | | | | | \$ 250,000 | \$ 261,250 | \$ 273,006 | \$ 285,292 | |
| 93 | | | | | | | | | | | |

| | Cash Flow | Projected | Projected | Projected | Projected | Projected | Projected | Projected | Projected | Projected |
|--------------------------------|---|----------------|----------------|-------------------|---------------|---------------|----------------|---------------|---------------|---------------|
| | Annual Inflation rate of 3.0% | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
| | Fiscal Year | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| WATER SYSTEM INFORMATION | | | | | | | | | | |
| 5 | Annual Population Growth Rate | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% |
| 6 | Annual Interest Rate (Inflation) | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% |
| 7 | Average Rate/ERU/Month (Annual Change =) | \$ 40.55 | \$ 41.87 | \$ 43.19 | \$ 44.51 | \$ 45.83 | \$ 47.15 | \$ 48.47 | \$ 48.47 | \$ 48.47 |
| 8 | Impact fee | \$ 2,412 | \$ 2,412 | \$ 2,412 | \$ 2,412 | \$ 2,412 | \$ 2,412 | \$ 2,412 | \$ 2,412 | \$ 2,412 |
| 9 | Connection Fee | \$ 225 | \$ 225 | \$ 225 | \$ 225 | \$ 225 | \$ 225 | \$ 225 | \$ 225 | \$ 225 |
| 10 | Residential ERU's | 10,335 | 10,645 | 10,964 | 11,293 | 11,632 | 11,981 | 12,340 | 12,710 | 13,092 |
| 11 | Commercial ERU's (Billed) | 3,346 | 3,447 | 3,550 | 3,656 | 3,766 | 3,879 | 3,995 | 4,115 | 4,239 |
| 12 | Total Existing ERU's (FY Year End June 30) | 13,681 | 14,091 | 14,514 | 14,949 | 15,398 | 15,860 | 16,336 | 16,826 | 17,331 |
| 13 | New ERU's | 398 | 410 | 423 | 435 | 448 | 462 | 476 | 490 | 505 |
| WATER FUND ACCOUNTING | | | | | | | | | | |
| Water Revenues | | | | | | | | | | |
| 17 | Water Sales | \$ 6,559,596 | \$ 6,976,340 | \$ 7,412,185 | \$ 7,867,902 | \$ 8,344,291 | \$ 8,842,182 | \$ 9,362,437 | \$ 9,643,310 | \$ 9,932,609 |
| 18 | Connection Fees | \$ 89,656 | \$ 92,346 | \$ 95,116 | \$ 97,970 | \$ 100,909 | \$ 103,936 | \$ 107,054 | \$ 110,266 | \$ 113,574 |
| 19 | Other Revenue (Hydrant Meters, etc.) | \$ 307,018 | \$ 313,246 | \$ 319,436 | \$ 325,831 | \$ 332,312 | \$ 338,944 | \$ 345,697 | \$ 352,590 | \$ 359,617 |
| 20 | Interest | \$ 104,954 | \$ 111,621 | \$ 118,595 | \$ 125,886 | \$ 133,509 | \$ 141,475 | \$ 149,799 | \$ 154,293 | \$ 158,922 |
| 21 | TOTAL WATER FUND REVENUE | \$ 7,061,224 | \$ 7,493,553 | \$ 7,945,332 | \$ 8,417,589 | \$ 8,911,021 | \$ 9,426,537 | \$ 9,964,987 | \$ 10,260,459 | \$ 10,564,723 |
| Water Expenses | | | | | | | | | | |
| 24 | Salaries & Wages | \$ 975,012 | \$ 1,018,887 | \$ 1,064,737 | \$ 1,112,650 | \$ 1,162,719 | \$ 1,215,042 | \$ 1,269,719 | \$ 1,326,856 | \$ 1,386,564 |
| 25 | Employee Benefits | \$ 614,257 | \$ 641,899 | \$ 670,784 | \$ 700,970 | \$ 732,513 | \$ 765,476 | \$ 799,923 | \$ 835,919 | \$ 873,536 |
| 26 | Overtime | \$ 11,925 | \$ 12,462 | \$ 13,023 | \$ 13,609 | \$ 14,221 | \$ 14,861 | \$ 15,530 | \$ 16,229 | \$ 16,959 |
| 27 | Uniforms | \$ 5,640 | \$ 5,894 | \$ 6,159 | \$ 6,436 | \$ 6,726 | \$ 7,029 | \$ 7,345 | \$ 7,676 | \$ 8,021 |
| 28 | Dues And Memberships | \$ 3,115 | \$ 3,256 | \$ 3,402 | \$ 3,555 | \$ 3,715 | \$ 3,882 | \$ 4,057 | \$ 4,240 | \$ 4,430 |
| 29 | Conference & Travel | \$ 16,948 | \$ 17,711 | \$ 18,508 | \$ 19,341 | \$ 20,211 | \$ 21,120 | \$ 22,071 | \$ 23,064 | \$ 24,102 |
| 30 | Office Expense & Supplies | \$ 2,742 | \$ 2,865 | \$ 2,994 | \$ 3,129 | \$ 3,269 | \$ 3,417 | \$ 3,570 | \$ 3,731 | \$ 3,899 |
| 31 | Equipment- Supplies & Maint. | \$ 81,313 | \$ 84,972 | \$ 88,796 | \$ 92,792 | \$ 96,968 | \$ 101,331 | \$ 105,891 | \$ 110,656 | \$ 115,636 |
| 32 | Fuel & Oil | \$ 36,762 | \$ 38,417 | \$ 40,145 | \$ 41,952 | \$ 43,840 | \$ 45,813 | \$ 47,874 | \$ 50,029 | \$ 52,280 |
| 33 | Building & Grounds | \$ 30,013 | \$ 31,364 | \$ 32,775 | \$ 34,250 | \$ 35,791 | \$ 37,402 | \$ 39,085 | \$ 40,844 | \$ 42,682 |
| 34 | Utilities | \$ 609,803 | \$ 637,244 | \$ 665,920 | \$ 695,887 | \$ 727,202 | \$ 759,926 | \$ 794,123 | \$ 829,858 | \$ 867,202 |
| 35 | Telephone | \$ 11,283 | \$ 11,791 | \$ 12,321 | \$ 12,876 | \$ 13,455 | \$ 14,061 | \$ 14,693 | \$ 15,355 | \$ 16,045 |
| 36 | Professional & Technical | \$ 47,701 | \$ 49,847 | \$ 52,090 | \$ 54,434 | \$ 56,884 | \$ 59,444 | \$ 62,119 | \$ 64,914 | \$ 67,835 |
| 37 | Water Purchase Sandhollow | \$ 1,422,687 | \$ 1,598,311 | \$ 1,804,345 | \$ 2,043,407 | \$ 2,318,289 | \$ 2,631,962 | \$ 2,750,401 | \$ 2,874,169 | \$ 3,003,506 |
| 38 | Water Purchase Quail Lake Raw | \$ 249,236 | \$ 260,452 | \$ 272,172 | \$ 284,420 | \$ 297,219 | \$ 310,594 | \$ 324,571 | \$ 339,176 | \$ 354,439 |
| 39 | Administrative Costs | \$ 354,798 | \$ 370,764 | \$ 387,448 | \$ 404,883 | \$ 423,103 | \$ 442,143 | \$ 462,039 | \$ 482,831 | \$ 504,558 |
| 40 | District Surcharge | \$ 299,084 | \$ 312,542 | \$ 326,607 | \$ 341,304 | \$ 356,663 | \$ 372,713 | \$ 389,485 | \$ 407,012 | \$ 425,327 |
| 41 | Special Department Supplies | \$ 175,400 | \$ 183,293 | \$ 191,541 | \$ 200,161 | \$ 209,168 | \$ 218,580 | \$ 228,417 | \$ 238,695 | \$ 249,437 |
| 42 | Bank Charges | \$ 35,142 | \$ 36,724 | \$ 38,376 | \$ 40,103 | \$ 41,908 | \$ 43,794 | \$ 45,764 | \$ 47,824 | \$ 49,976 |
| 43 | Uncollectable Accts | \$ 8,421 | \$ 8,800 | \$ 9,196 | \$ 9,610 | \$ 10,042 | \$ 10,494 | \$ 10,966 | \$ 11,460 | \$ 11,975 |
| 44 | Other Projects | \$ 381,694 | \$ 398,870 | \$ 416,819 | \$ 435,576 | \$ 455,177 | \$ 475,660 | \$ 497,064 | \$ 519,432 | \$ 542,807 |
| 45 | Capital Projects or Equipment | \$ 178,878 | \$ 186,927 | \$ 195,339 | \$ 204,129 | \$ 213,315 | \$ 222,914 | \$ 232,945 | \$ 243,428 | \$ 254,382 |
| 46 | Cost of Issuance | \$ 3,553 | \$ 3,713 | \$ 3,880 | \$ 4,054 | \$ 4,237 | \$ 4,428 | \$ 4,627 | \$ 4,835 | \$ 5,053 |
| 47 | Funded Depreciation | \$ 11,925 | \$ 12,462 | \$ 13,023 | \$ 13,609 | \$ 14,221 | \$ 14,861 | \$ 15,530 | \$ 16,229 | \$ 16,959 |
| 48 | Transfer To General Fund | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 49 | Sub-Total Expenses % Non-Impact Fee Eligible | \$ 5,567,333 | \$ 5,929,466 | \$ 6,330,402 | \$ 6,773,137 | \$ 7,260,856 | \$ 7,796,945 | \$ 8,147,808 | \$ 8,514,459 | \$ 8,897,610 |
| Existing Debt Service | | | | | | | | | | |
| 51 | Water Revenue Refunding Bonds 2016A 66% | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 52 | Water Revenue Refunding Bonds 2016B 66% | \$ 410,846 | \$ 411,770 | \$ 382,598 | \$ 209,018 | \$ 157,538 | \$ 398,438 | \$ 398,702 | \$ 398,570 | \$ 401,342 |
| 53 | Sub-Total Existing Non-Impact Fee Debt Service | \$ 410,846 | \$ 411,770 | \$ 382,598 | \$ 209,018 | \$ 157,538 | \$ 398,438 | \$ 398,702 | \$ 398,570 | \$ 401,342 |
| New Debt Service | | | | | | | | | | |
| 55 | N/A | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 56 | Sub-Total New Non-Impact Fee Debt Service | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 57 | TOTAL WATER FUND EXPENSES | \$ 5,978,179 | \$ 6,341,236 | \$ 6,713,000 | \$ 6,982,155 | \$ 7,418,394 | \$ 8,195,383 | \$ 8,546,510 | \$ 8,913,029 | \$ 9,298,952 |
| 58 | NET CASHFLOW WATER FUND | \$ 1,083,045 | \$ 1,152,317 | \$ 1,232,332 | \$ 1,435,434 | \$ 1,492,627 | \$ 1,231,154 | \$ 1,418,477 | \$ 1,347,430 | \$ 1,265,771 |
| IMPACT FEE FUND ACCOUNTING | | | | | | | | | | |
| Impact Fee Fund Revenues | | | | | | | | | | |
| 63 | Impact Fees | \$ 961,209 | \$ 990,045 | \$ 1,019,746 | \$ 1,050,339 | \$ 1,081,849 | \$ 1,114,304 | \$ 1,147,734 | \$ 1,182,166 | \$ 1,217,630 |
| 64 | Interest | \$ 2,980 | \$ 3,069 | \$ 3,161 | \$ 3,256 | \$ 3,354 | \$ 3,454 | \$ 3,558 | \$ 3,665 | \$ 3,775 |
| 65 | TOTAL IMPACT FEE FUND REVENUE | \$ 964,188 | \$ 993,114 | \$ 1,022,908 | \$ 1,053,595 | \$ 1,085,203 | \$ 1,117,759 | \$ 1,151,291 | \$ 1,185,830 | \$ 1,221,405 |
| % Impact Fee Eligible | | | | | | | | | | |
| 67 | Existing Eligible Debt Service | | | | | | | | | |
| 68 | Water Revenue Refunding Bonds 2016A 34% | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 69 | Water Revenue Refunding Bonds 2016B 34% | \$ 211,648 | \$ 212,124 | \$ 197,096 | \$ 107,676 | \$ 81,156 | \$ 205,256 | \$ 205,392 | \$ 205,324 | \$ 206,752 |
| 70 | Sub-Total Impact Fee Debt Service | \$ 211,648 | \$ 212,124 | \$ 197,096 | \$ 107,676 | \$ 81,156 | \$ 205,256 | \$ 205,392 | \$ 205,324 | \$ 206,752 |
| New Debt Service | | | | | | | | | | |
| 72 | N/A | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 73 | Sub-Total New Impact Fee Debt Service | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 74 | Misc. Impact Fee Projects | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 75 | NET CASHFLOW IMPACT FEE FUND | \$ 752,541 | \$ 780,990 | \$ 825,812 | \$ 945,919 | \$ 1,004,047 | \$ 912,503 | \$ 945,900 | \$ 980,506 | \$ 1,014,653 |
| CASH ON HAND | | | | | | | | | | |
| 79 | Water Fund Balance (FY Year End June 30) | \$ 32,711,403 | \$ 33,863,720 | \$ 33,920,189 | \$ 35,355,623 | \$ 36,848,250 | \$ 33,270,885 | \$ 34,689,362 | \$ 36,036,791 | \$ 37,302,562 |
| 80 | Impact Fee Fund Balance (FY Year End June 30) | \$ 3,750,856 | \$ 4,473,882 | \$ 4,771,408 | \$ 5,717,327 | \$ 6,721,374 | \$ 5,402,770 | \$ 6,348,670 | \$ 7,329,176 | \$ 8,343,830 |
| 81 | Funded Depreciation (Renewal & Replacement) (FY Year End June 30) | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 82 | TOTAL | \$ 36,462,258 | \$ 38,337,602 | \$ 38,691,597 | \$ 41,072,950 | \$ 43,569,624 | \$ 38,673,655 | \$ 41,038,032 | \$ 43,365,968 | \$ 45,646,392 |
| PLAN FOR NEW PROJECTS | | | | | | | | | | |
| | | 0.5 MG | | 2.8 MG Warner | | | Grapevine Well | | | |
| | | Grapevine Pass | Culinary Water | Valley for Fields | | | Field & 2 MG | | | |
| 85 | Project Name | Tank | Master Plan | Tank | | | Sunrise Valley | | | |
| 86 | Impact Fee Eligible Cost | \$ 249,596 | \$ 57,964 | \$ 528,286 | | | \$ 2,231,106 | | | |
| 87 | Non-Impact Fee Eligible Cost | \$ 555,553 | \$ - | \$ 1,175,862 | \$ - | \$ - | \$ 4,808,519 | \$ - | \$ - | \$ - |
| 88 | Total Project Cost | \$ 805,149 | \$ 57,964 | \$ 1,704,148 | | | \$ 7,039,625 | | | |
| Other Project Name | | | | | | | | | | |
| Other Project Cost | | | | | | | | | | |
| RENEWAL & REPLACEMENT PROJECTS | | | | | | | | | | |
| 92 | Project Cost (Paid by Water Fund) | \$ 298,130 | \$ 311,545 | \$ 325,565 | \$ 340,215 | \$ 355,525 | \$ 371,524 | \$ 388,242 | \$ 405,713 | \$ 423,970 |

| | | | | | | | | | | |
|----|---|--|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 1 | Cash Flow | | Projected | Projected | Projected | Projected | Projected | Projected | Projected | Projected |
| 2 | Annual Inflation rate of 3.0% | | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 |
| 3 | Fiscal Year | | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 |
| 4 | WATER SYSTEM INFORMATION | | | | | | | | | |
| 5 | Annual Population Growth Rate | | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% |
| 6 | Annual Interest Rate (Inflation) | | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% | 3.0% |
| 7 | Average Rate/ERU/Month (Annual Change =) | | \$ 48.47 | \$ 48.47 | \$ 48.47 | \$ 48.47 | \$ 48.47 | \$ 48.47 | \$ 48.47 | \$ 48.47 |
| 8 | Impact fee | | \$ 2,412 | \$ 2,412 | \$ 2,412 | \$ 2,412 | \$ 2,412 | \$ 2,412 | \$ 2,412 | \$ 2,412 |
| 9 | Connection Fee | | \$ 225 | \$ 225 | \$ 225 | \$ 225 | \$ 225 | \$ 225 | \$ 225 | \$ 225 |
| 10 | Residential ERU's | | 13,485 | 13,889 | 14,306 | 14,735 | 15,177 | 15,632 | 16,101 | 16,584 |
| 11 | Commercial ERU's (Billed) | | 4,366 | 4,497 | 4,632 | 4,771 | 4,914 | 5,061 | 5,213 | 5,370 |
| 12 | Total Existing ERU's (FY Year End June 30) | | 17,850 | 18,386 | 18,938 | 19,506 | 20,091 | 20,694 | 21,314 | 21,954 |
| 13 | New ERU's | | 520 | 536 | 552 | 568 | 585 | 603 | 621 | 639 |
| 14 | | | | | | | | | | |
| 15 | WATER FUND ACCOUNTING | | | | | | | | | |
| 16 | Water Revenues | | | | | | | | | |
| 17 | Water Sales | | \$ 10,230,588 | \$ 10,537,505 | \$ 10,853,630 | \$ 11,179,239 | \$ 11,514,616 | \$ 11,860,055 | \$ 12,215,857 | \$ 12,582,332 |
| 18 | Connection Fees | | \$ 116,981 | \$ 120,491 | \$ 124,105 | \$ 127,829 | \$ 131,663 | \$ 135,613 | \$ 139,682 | \$ 143,872 |
| 19 | Other Revenue (Hydrant Meters, etc.) | | \$ 366,787 | \$ 374,098 | \$ 381,556 | \$ 389,162 | \$ 396,919 | \$ 404,832 | \$ 412,902 | \$ 421,133 |
| 20 | Interest | | \$ 163,689 | \$ 168,600 | \$ 173,658 | \$ 178,868 | \$ 184,234 | \$ 189,761 | \$ 195,454 | \$ 201,317 |
| 21 | TOTAL WATER FUND REVENUE | | \$ 10,878,045 | \$ 11,200,694 | \$ 11,532,950 | \$ 11,875,097 | \$ 12,227,433 | \$ 12,590,261 | \$ 12,963,894 | \$ 13,348,655 |
| 22 | | | | | | | | | | |
| 23 | Water Expenses | | | | | | | | | |
| 24 | Salaries & Wages | | \$ 1,448,960 | \$ 1,514,163 | \$ 1,582,300 | \$ 1,653,504 | \$ 1,727,912 | \$ 1,805,668 | \$ 1,886,923 | \$ 1,971,834 |
| 25 | Employee Benefits | | \$ 912,845 | \$ 953,923 | \$ 996,849 | \$ 1,041,707 | \$ 1,088,584 | \$ 1,137,571 | \$ 1,188,761 | \$ 1,242,256 |
| 26 | Overtime | | \$ 17,722 | \$ 18,519 | \$ 19,353 | \$ 20,224 | \$ 21,134 | \$ 22,085 | \$ 23,079 | \$ 24,117 |
| 27 | Uniforms | | \$ 8,382 | \$ 8,759 | \$ 9,153 | \$ 9,565 | \$ 9,996 | \$ 10,445 | \$ 10,915 | \$ 11,407 |
| 28 | Dues And Memberships | | \$ 4,630 | \$ 4,838 | \$ 5,056 | \$ 5,283 | \$ 5,521 | \$ 5,770 | \$ 6,029 | \$ 6,301 |
| 29 | Conference & Travel | | \$ 25,186 | \$ 26,320 | \$ 27,504 | \$ 28,742 | \$ 30,035 | \$ 31,387 | \$ 32,799 | \$ 34,275 |
| 30 | Office Expense & Supplies | | \$ 4,074 | \$ 4,258 | \$ 4,449 | \$ 4,649 | \$ 4,859 | \$ 5,077 | \$ 5,306 | \$ 5,545 |
| 31 | Equipment- Supplies & Maint. | | \$ 120,839 | \$ 126,277 | \$ 131,960 | \$ 137,898 | \$ 144,103 | \$ 150,588 | \$ 157,364 | \$ 164,446 |
| 32 | Fuel & Oil | | \$ 54,632 | \$ 57,091 | \$ 59,660 | \$ 62,345 | \$ 65,150 | \$ 68,082 | \$ 71,146 | \$ 74,347 |
| 33 | Building & Grounds | | \$ 44,602 | \$ 46,609 | \$ 48,707 | \$ 50,899 | \$ 53,189 | \$ 55,583 | \$ 58,084 | \$ 60,697 |
| 34 | Utilities | | \$ 906,226 | \$ 947,000 | \$ 989,621 | \$ 1,034,154 | \$ 1,080,691 | \$ 1,129,322 | \$ 1,180,142 | \$ 1,233,248 |
| 35 | Telephone | | \$ 16,768 | \$ 17,522 | \$ 18,311 | \$ 19,135 | \$ 19,996 | \$ 20,895 | \$ 21,836 | \$ 22,818 |
| 36 | Professional & Technical | | \$ 70,888 | \$ 74,078 | \$ 77,411 | \$ 80,895 | \$ 84,535 | \$ 88,339 | \$ 92,314 | \$ 96,469 |
| 37 | Water Purchase Sandhollow | | \$ 3,138,664 | \$ 3,279,904 | \$ 3,427,500 | \$ 3,581,737 | \$ 3,742,915 | \$ 3,911,347 | \$ 4,087,357 | \$ 4,271,288 |
| 38 | Water Purchase Quail Lake Raw | | \$ 370,389 | \$ 387,056 | \$ 404,474 | \$ 422,675 | \$ 441,696 | \$ 461,572 | \$ 482,343 | \$ 504,048 |
| 39 | Administrative Costs | | \$ 527,264 | \$ 550,990 | \$ 575,785 | \$ 601,695 | \$ 628,772 | \$ 657,066 | \$ 686,634 | \$ 717,533 |
| 40 | District Surcharge | | \$ 444,467 | \$ 464,468 | \$ 485,369 | \$ 507,210 | \$ 530,035 | \$ 553,886 | \$ 578,811 | \$ 604,858 |
| 41 | Special Department Supplies | | \$ 260,661 | \$ 272,391 | \$ 284,649 | \$ 297,458 | \$ 310,843 | \$ 324,831 | \$ 339,449 | \$ 354,724 |
| 42 | Bank Charges | | \$ 52,225 | \$ 54,575 | \$ 57,031 | \$ 59,597 | \$ 62,279 | \$ 65,082 | \$ 68,010 | \$ 71,071 |
| 43 | Uncollectable Accts | | \$ 12,514 | \$ 13,078 | \$ 13,666 | \$ 14,281 | \$ 14,924 | \$ 15,595 | \$ 16,297 | \$ 17,030 |
| 44 | Other Projects | | \$ 567,233 | \$ 592,759 | \$ 619,433 | \$ 647,307 | \$ 676,436 | \$ 706,876 | \$ 738,685 | \$ 771,926 |
| 45 | Capital Projects or Equipment | | \$ 265,829 | \$ 277,792 | \$ 290,292 | \$ 303,356 | \$ 317,007 | \$ 331,272 | \$ 346,179 | \$ 361,757 |
| 46 | Cost of Issuance | | \$ 5,280 | \$ 5,517 | \$ 5,766 | \$ 6,025 | \$ 6,296 | \$ 6,580 | \$ 6,876 | \$ 7,185 |
| 47 | Funded Depreciation | | \$ 17,722 | \$ 18,519 | \$ 19,353 | \$ 20,224 | \$ 21,134 | \$ 22,085 | \$ 23,079 | \$ 24,117 |
| 48 | Transfer To General Fund | | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 49 | Sub-Total Expenses | | \$ 9,298,002 | \$ 9,716,413 | \$ 10,153,651 | \$ 10,610,565 | \$ 11,088,041 | \$ 11,587,003 | \$ 12,108,418 | \$ 12,653,297 |
| 50 | Existing Debt Service | | | | | | | | | |
| 51 | Water Revenue Refunding Bonds 2016A 66% | | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 52 | Water Revenue Refunding Bonds 2016B 66% | | \$ 400,286 | \$ 398,834 | \$ 400,286 | \$ 397,910 | \$ 395,138 | \$ 378,770 | \$ 233,834 | \$ 214,892 |
| 53 | Sub-Total Existing Non-Impact Fee Debt Service | | \$ 400,286 | \$ 398,834 | \$ 400,286 | \$ 397,910 | \$ 395,138 | \$ 378,770 | \$ 233,834 | \$ 214,892 |
| 54 | New Debt Service | | | | | | | | | |
| 55 | N/A | | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 56 | Sub-Total New Non-Impact Fee Debt Service | | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 57 | TOTAL WATER FUND EXPENSES | | \$ 9,698,288 | \$ 10,115,246 | \$ 10,553,937 | \$ 11,008,475 | \$ 11,483,179 | \$ 11,965,773 | \$ 12,342,252 | \$ 12,868,188 |
| 58 | | | | | | | | | | |
| 59 | NET CASHFLOW WATER FUND | | \$ 1,179,757 | \$ 1,085,448 | \$ 979,013 | \$ 866,622 | \$ 744,254 | \$ 624,488 | \$ 621,642 | \$ 480,466 |
| 60 | | | | | | | | | | |
| 61 | IMPACT FEE FUND ACCOUNTING | | | | | | | | | |
| 62 | Impact Fee Fund Revenues | | | | | | | | | |
| 63 | Impact Fees | | \$ 1,254,159 | \$ 1,291,784 | \$ 1,330,538 | \$ 1,370,454 | \$ 1,411,567 | \$ 1,453,914 | \$ 1,497,532 | \$ 1,542,458 |
| 64 | Interest | | \$ 3,888 | \$ 4,005 | \$ 4,125 | \$ 4,248 | \$ 4,376 | \$ 4,507 | \$ 4,642 | \$ 4,782 |
| 65 | TOTAL IMPACT FEE FUND REVENUE | | \$ 1,258,047 | \$ 1,295,789 | \$ 1,334,662 | \$ 1,374,702 | \$ 1,415,943 | \$ 1,458,422 | \$ 1,502,174 | \$ 1,547,239 |
| 66 | | | | | | | | | | |
| 67 | % Impact Fee Eligible | | | | | | | | | |
| 68 | Water Revenue Refunding Bonds 2016A 34% | | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 69 | Water Revenue Refunding Bonds 2016B 34% | | \$ 206,208 | \$ 205,460 | \$ 206,208 | \$ 204,984 | \$ 203,556 | \$ 195,124 | \$ 120,460 | \$ 110,702 |
| 70 | Sub-Total Impact Fee Debt Service | | \$ 206,208 | \$ 205,460 | \$ 206,208 | \$ 204,984 | \$ 203,556 | \$ 195,124 | \$ 120,460 | \$ 110,702 |
| 71 | New Debt Service | | | | | | | | | |
| 72 | N/A | | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 73 | Sub-Total New Impact Fee Debt Service | | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 74 | Misc. Impact Fee Projects | | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 75 | | | | | | | | | | |
| 76 | NET CASHFLOW IMPACT FEE FUND | | \$ 1,051,839 | \$ 1,090,329 | \$ 1,128,454 | \$ 1,169,718 | \$ 1,212,387 | \$ 1,263,298 | \$ 1,381,714 | \$ 1,436,538 |
| 77 | | | | | | | | | | |
| 78 | CASH ON HAND | | | | | | | | | |
| 79 | Water Fund Balance (FY Year End June 30) | | \$ 38,482,319 | \$ 39,567,766 | \$ 40,546,779 | \$ 41,413,401 | \$ 42,157,655 | \$ 42,782,144 | \$ 43,403,786 | \$ 43,884,252 |
| 80 | Impact Fee Fund Balance (FY Year End June 30) | | \$ 9,395,669 | \$ 10,485,998 | \$ 11,614,452 | \$ 12,784,171 | \$ 13,996,558 | \$ 15,259,856 | \$ 16,641,570 | \$ 18,078,108 |
| 81 | Funded Depreciation (Renewal & Replacement) (FY Year End June 30) | | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 82 | TOTAL | | \$ 47,877,988 | \$ 50,053,764 | \$ 52,161,231 | \$ 54,197,572 | \$ 56,154,214 | \$ 58,042,000 | \$ 60,045,356 | \$ 61,962,360 |
| 83 | | | | | | | | | | |
| 84 | PLAN FOR NEW PROJECTS | | | | | | | | | |
| 85 | | | | | | | | | | |
| 86 | Project Name | | | | | | | | | |
| 87 | Impact Fee Eligible Cost | | | | | | | | | |
| 88 | Non-Impact Fee Eligible Cost | | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| 89 | Total Project Cost | | | | | | | | | |
| 90 | | | | | | | | | | |
| 91 | Other Project Name | | | | | | | | | |
| 92 | Other Project Cost | | | | | | | | | |
| 93 | RENEWAL & REPLACEMENT PROJECTS | | | | | | | | | |
| 94 | Project Cost (Paid by Water Fund) | | \$ 443,049 | \$ 462,986 | \$ 483,821 | \$ 504,593 | \$ 528,344 | \$ 552,120 | \$ 576,965 | \$ 602,929 |

APPENDIX E

Impact Fee Certification

CERTIFICATION OF IMPACT FEE ANALYSIS BY CONSULTANT

In accordance with Utah Code Annotated, § 11-36a-306 Dustyn W. Shaffer, P.E., on behalf of Sunrise Engineering, Inc., makes the following certification:

I certify that the attached impact fee facilities plan and impact fee analysis:

1. Includes only the costs for qualifying public facilities that are:
 - a. Allowed under the Impact Fees Act; and
 - b. Actually incurred; or
 - c. Projected to be incurred or encumbered within six years after each impact fee is paid;
2. Does not include:
 - a. costs of operation and maintenance of public facilities;
 - b. costs for qualifying public facilities that will raise the level of service for the facilities, through impact fees, above the level of service that is supported by existing residents;
 - c. an expense for overhead, unless the expense is calculated pursuant to a methodology that is consistent with generally accepted cost accounting practices and that methodological standards set forth by the federal Office of Management and Budget for federal grant reimbursement; and
3. Offsets costs with grants or other alternate sources of payment (if grants or other sources of payment have been applied for and received and such information was made available when the Impact Fee Analysis was prepared); and
4. Complies in each and every relevant respect with the Impact Fees Act.

Dustyn W. Shaffer, P.E. makes this certification with the following qualifications:

1. All the recommendations for implementations of the Impact Fee Facilities Plan (“IFFP”) made in the IFFP documents or in the Impact Fee Analysis documents are followed in their entirety by Washington City, Utah staff and elected officials.
2. If all or a portion of the IFFP’s or Impact Fee Analyses are modified or amended, this certification is no longer valid.

3. All information provided to Sunrise Engineering, Inc., its contractors or suppliers is assumed to be correct, complete and accurate. This includes information provided by Washington City, Utah, and outside sources.

4. The undersigned is trained and licensed as a professional engineer and has not been trained or licensed as a lawyer. Nothing in the foregoing certification shall be deemed an opinion of law or an opinion of compliance with law which under applicable professional licensing laws or regulations or other laws or regulations must be rendered by a lawyer licensed in the State of Utah.

5. The foregoing Certification is an expression of professional opinion based on the undersigned's best knowledge, information and belief and shall not be construed as a warranty or guaranty of any fact or circumstance.

6. The foregoing certification is made only to Washington City, Utah and may not be used or relied upon by any other person or entity without the expressed written authorization of the undersigned.

Sunrise Engineering, Inc.

By: _____

Dated: _____