Water and Sewer Master Plan, Impact Fee Facilities Plan, Impact Fee Analysis, and Rate Study

June 2015

Prepared by:

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

Prepared for:

Jordanelle Special Service District

WATER AND SEWER MASTER PLAN

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Project No. 056-12-02

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CHAPTER 1
INTRODUCTION

INTRODUCTION

In 2014, Jordanelle Special Service District (JSSD or District) contracted the services of Bowen, Collins & Associates, Inc. (BC&A) to complete a Water & Sewer System Master Plan and a Capital Facilities Plan. The study includes an updated master plan that will allow JSSD to maintain a viable and efficient water delivery system and a sewer collection system. The study also includes a financial plan that includes the operation and maintenance of the water and sewer system. The purpose of this report is to document the master plan and the financial plan of the water and sewer system.

PURPOSE OF THE STUDY

JSSD has relatively new water and sewer distribution systems, and has experienced significant growth over the past ten years. Since the economic downturn of 2008, development has slowed. However, over the next 10 ten years, development is anticipated to increase significantly, and JSSD will need to continue to meet the demands of future growth. This master plan will provide an inventory of the existing system and recommend improvements that will allow the JSSD system to continue to serve development in the future.

SCOPE OF SERVICES

To provide the District with the needed recommended improvements, the District retained the services of Bowen, Collins & Associates to perform this master plan. The following tasks are included as part of the JSSD Water & Sewer Master Plan:

- Task 1: Data Gathering
- Task 2: Evaluate Current Water Use Patterns and Project Future Water and Sewer Flows
- Task 3: Evaluate Water Supply and Treatment Facilities
- Task 4: Develop and Calibrate a Hydraulic Model of the Existing Water Distribution System and Sewer Collection System
- Task 5: Identify Operating Deficiencies
- Task 6: Develop System Capital Facilities Plans
- Task 7: Document Results

In addition to the scope to complete a master plan with a CFP, BC&A was also scoped to prepare a financial plan that includes the following:

- Task 1: Coordinate and Review Water and Sewer Capital Facility Plans
- Task 2: Evaluate Operations and Maintenance Costs

- Task 3: Project Rehabilitation and Replacement Costs
- Task 4: Develop a 10-year Budget Plan

This report was prepared to document the study efforts.

The project was completed in Bowen, Collins & Associates' Draper, Utah Office. Questions may be addressed to Keith Larson, Project Manager, at (801) 495-2224.

CHAPTER 2
EXISTING AND PROJECTED DEMAND REQUIREMENTS

INTRODUCTION

This chapter summarizes the work that was performed to estimate the water and sewer capacity that will be needed to meet both existing and future customer demands. Water needed to satisfy capacity requirements during peak periods of use, and to meet volumetric requirements on an annual basis, have been estimated. Wastewater flow rates have also been estimated for existing and future conditions.

Projected Demands vs. Sold Capacity

Before discussing demand projections, it will be useful to explain one unique aspect of the District. In the beginning of the District, many of the initial components of its water and sewer systems were constructed using a series of bonds. Because the District was new and had limited financial ability to pay for the bonds on its own, many property owners in the area joined together to pay for the bonds. In return for their payment, they received a commitment for capacity in the District facilities for which the bonds were issued.

While some of these properties have been developed, the majority have not. As a result, facilities may appear to have capacity based on existing demands, but may be completely full when the obligations to those who paid for the bonds are considered. To account for this issue, this report considers two demand scenarios. First, projected demands based on existing development only will be identified. Second, potential demand associated with sold capacity will be added to the total to identify how the District's existing commitments will affect its need for capacity in the long run.

DEMAND PROJECTION METHODOLOGY

Several methods can be used to estimate future water and sewer needs. This study develops demand projections based on JSSD development agreements and Wasatch County population projections adopted by the Governor's Office of Planning and Budget (GOPB). The methodology used in this study is as follows:

1. Define the service area
2. Divide the service area into a number of smaller sub-areas using geographic information system (GIS) mapping
3. Project the growth of the number of Equivalent Residential Units (ERUs) located in the service area through build-out based on JSSD development agreements and Wasatch County population projections adopted by the Governor's Office of Planning and Budget (GOPB)
4. Convert projections of system-wide growth to a water system production requirement and a sewer system capacity requirement

5. Consider the effect of State Water Conservation Goals on future demands

6. Consider the effect of capacity already sold as part of the bond process

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

SERVICE AREA AND PLANNING SUB-AREAS

The existing Jordanelle Special Service District service area is shown in Figure 2-1. This includes the current and future developments surrounding Jordanelle Reservoir and Jordanelle State Park located in Wasatch County, UT. For convenience in evaluating JSSD system needs and consistent with past bonding and development agreements, the service area was split into four smaller areas: Area A, Area B North, Area B South, and Area C as shown on Figure 2-1.

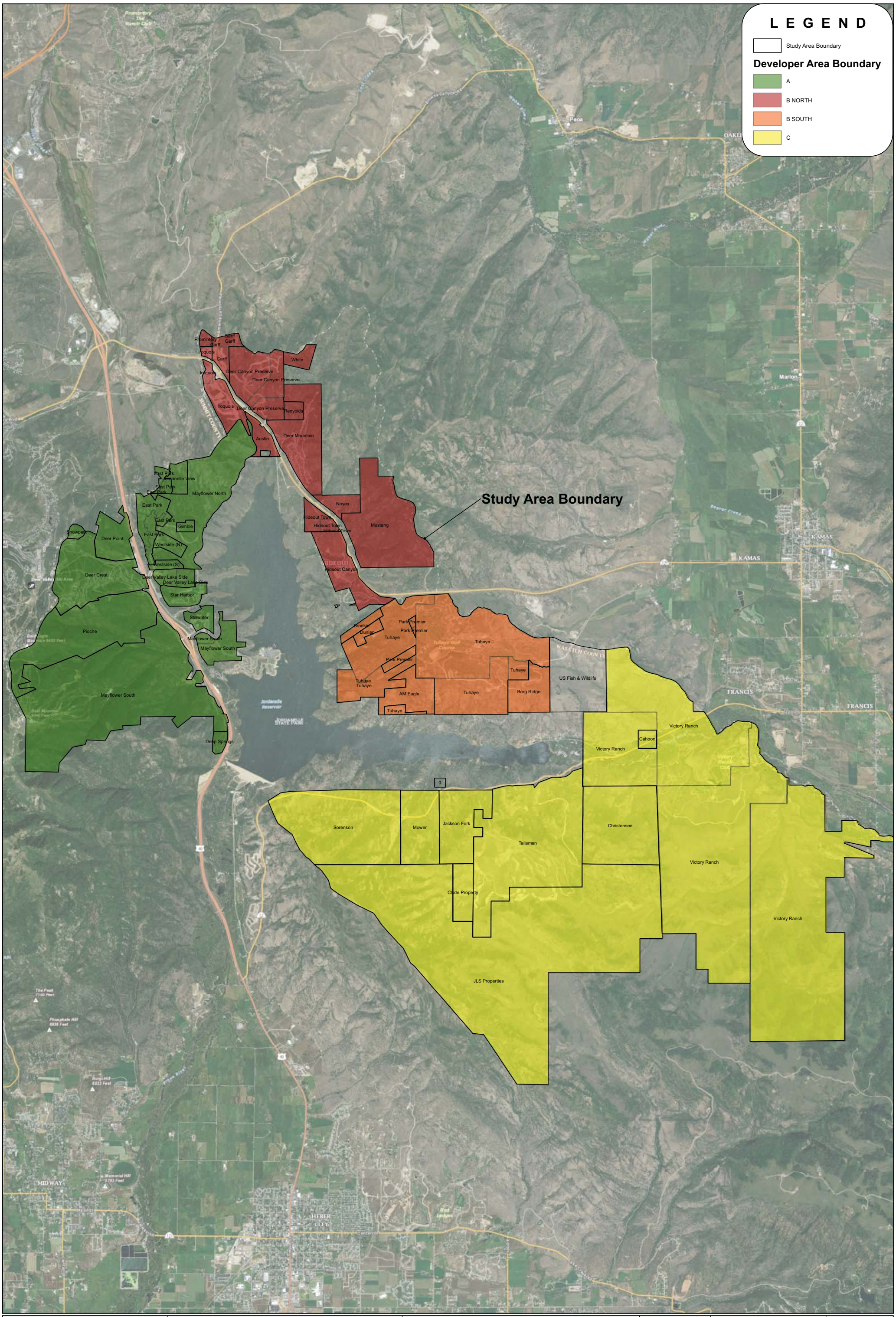
Also indicated on the figure are the major developments (both developed and undeveloped) in the region. The developments were used in the study to predict growth based on the current development plans and capacity purchased for each of the respective properties.

SYSTEM GROWTH

System growth will vary depending on economic and other conditions. To consider the full range of potential system growth, three growth scenarios were analyzed as part of this master plan. All three of the scenarios share two boundary conditions:

- **Existing Conditions:** There were approximately 1,256 Equivalent Residential Units (ERUs) being serviced by JSSD in the year 2015.
- **Build-out:** Potential build-out development densities were examined for each development sub-area. Estimates of total units to be developed on each property were taken from three sources:
    1. Where planning documents have been submitted to the District for specific properties, the quantity of units at build-out have been taken directly from the plans.
    2. Where plans have not been submitted but developers have already purchased capacity for their property in past bonding agreements, the quantity of units purchased has been used as the estimate of development at build-out.
    3. For developments which do not have submitted plans or purchased capacity, a demand was estimated by matching the unit densities of the surrounding developments.

    Based on this approach, the potential total development at build-out in the study area is 12,896 ERUs. It should be noted that this is less than might be allowed under max densities identified by Wasatch County. However, for the purposes of this document, this appears to be the most likely level of development based on current plans and development trends.



Bowen Collins & Associates, Inc. CONSULTING ENGINEERS	JORDANELLE SPECIAL SERVICE DISTRICT WATER AND SEWER MASTER PLAN	STUDY AREA	NORTH:	SCALE: 0 3,000 Feet	FIGURE NO. 2-1

P:\Jordanelle SSD\Water & Sewer Master Plan\4.0 GIS\Figures\Figure 2-1 Study Area.mxd kballentine 4/14/2015

Between these two points, different rates of growth were considered as described below and as shown on Figure 2-2.

1. **Preliminary 2013 JSSD Projection (Aggressive Growth)** – A previous study completed prior to 2008 projected the growth in JSSD through the year 2022. That projected growth curve was based on the economic climate prior to 2008, and represented a very aggressive growth curve. This projection is labeled "Preliminary JSSD Projection" on the figure.
2. **GOPB Estimated Projection** – This growth scenario is based on Wasatch County Population Projections from the Governor's Office of Planning and Budgets (GOPB). The GOPB publishes countywide population growth projections as well as population growth projections within cities and towns. Because the GOPB does not publish specific numbers for the District's service area, this projection is an approximation based on average growth in Wasatch County outside of the specific cities identified by the GOPB. Since this is an average growth value for unincorporated areas of the County as a whole, it very likely underestimates actual growth that will be seen in developing areas like JSSD. This growth scenario is labeled "GOPB: Estimated Projection" on the figure.
3. **Adjusted Average Growth** – Through 2022, this growth scenario averages the Preliminary 2013 JSSD Projection and the GOPB projection by applying the average growth rate of those two scenarios to the number of existing system ERUs. After the year 2022, this growth scenario is an extrapolation (using a cubic spline fit) to the estimated ERUs at build-out of 12,896.

After discussing the growth curves with JSSD representatives, the Adjusted Average Growth scenario was selected for use in this master plan. Since the economic downturn of 2008, the development observed in the study area has slowed significantly. Several of the developments that were in the planning process in 2007 have been discontinued. Thus, the aggressive growth scenario appears to be too ambitious for planning purposes. Conversely, the current development climate indicates that there will be approximately 10 to 15 percent annual growth in the study area over the next several years, which shows that the GOBP growth projections are not aggressive enough for planning purposes. Thus, the Adjusted Average Growth Curve was selected for this master plan.

Figure 2-2
System Growth Projections

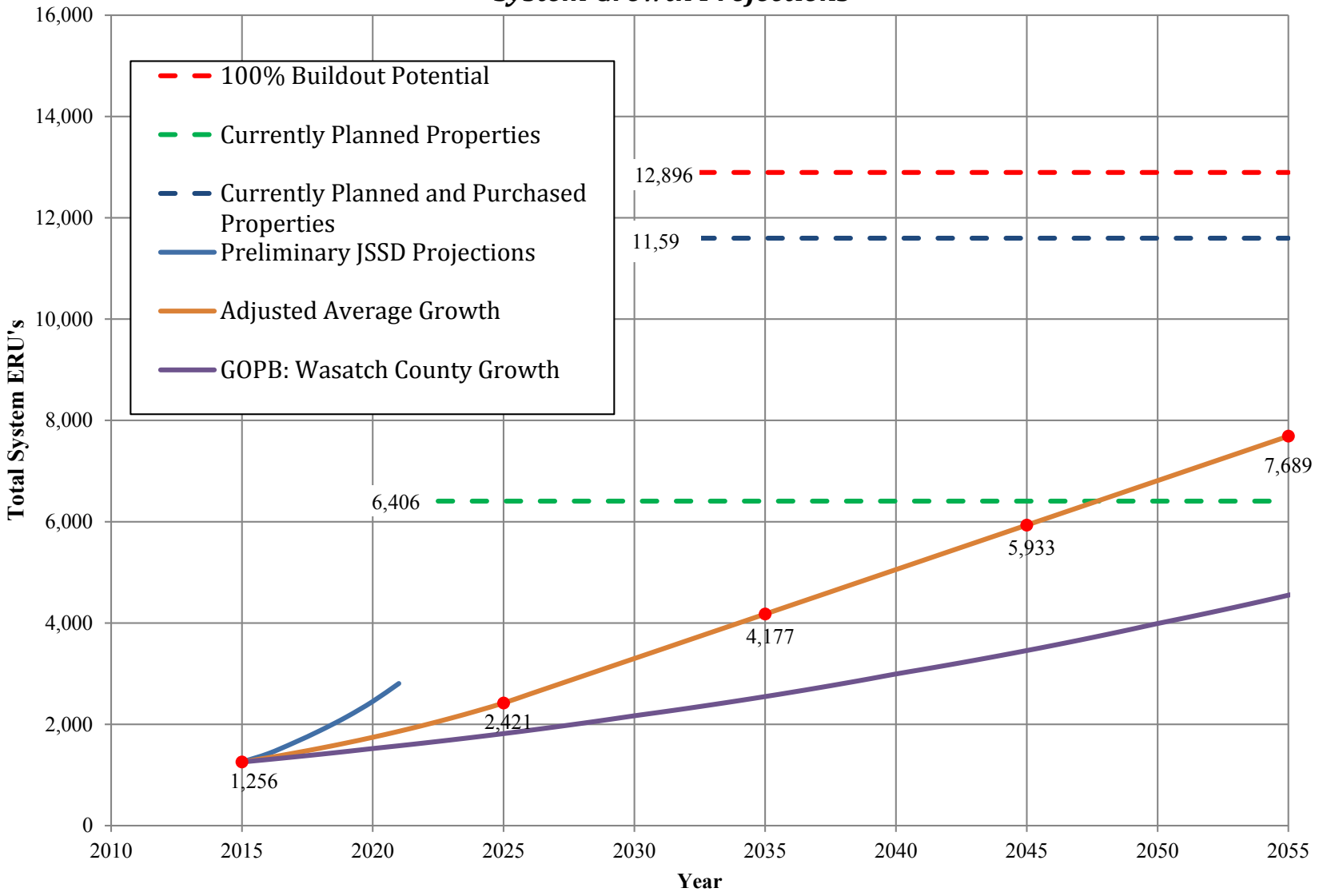


Table 2-1 summarizes the growth projections for the study area.

Table 2-1
Summary of Growth Projections for JSSD

	Preliminary JSSD Projection		GOPB: Estimated Projection		Adjusted Average Growth	
Year	ERUs	Average Annual Growth	ERUs	Average Annual Growth	ERUs	Average Annual Growth
2015	1,256	-	1,256	4.1%	1,256	4.1%
2020	2,451	14.2%	1,534	4.1%	1,744	9.1%
2025	-	-	1,912	4.5%	2,421	6.8%
2030	-	-	2,383	4.5%	3,236	5.3%
2035	-	-	2,963	4.5%	4,051	4.2%
2040	-	-	3,686	4.5%	4,866	3.5%
2045	-	-	4,703	5.0%	5,682	3.0%
2050	-	-	6,002	5.0%	6,497	2.6%
2055	-	-	6,899	2.8%	7,312	2.3%

CONVERSION TO WATER AND SEWER REQUIREMENTS

The next step in projecting water production requirements is to estimate the conversion of ERUs to water demand and sewer flow. Several different scenarios were considered as part of this study. They are described below:

- **Average Day Water Use** – The water distribution system average day demand refers to the amount of water consumed each year by JSSD consumers averaged over 365 days. Because the District is relatively new and includes only a fraction of the development it eventually expects, historical water use records are limited and may not be a reliable indication of future water needs. As a result, projected future water use has been estimated based on historic master plan projections by Jackson Engineering, consistent with the values used for dedicating capacity during the initial construction of District facilities. This equates to 810 GPD per ERU for the average day demand in the water distribution system. It should be emphasized that this includes both indoor and outdoor water use. Estimated indoor use is 325 GPD per ERU with 485 GPD per ERU for outdoor use. These values are consistent with other master plans for systems of similar size and nature to JSSD.

  The actual water use in the District will vary over time. As a result, it is important that JSSD continue to monitor water usage. If demands change over time, the recommended improvements contained in this plan may need to be adjusted accordingly. These potential fluctuations should be taken into account when JSSD considers the volume of

water required as developers connect into the system. Additional water beyond historic averages may be required to account for fluctuations in demands and inconsistency of supply.

- **Peak Day Water Use -** For planning purposes, it is valuable to have an estimate of not only the average day demand of the system, but also the maximum day demand of the system. Peak day demand, is the highest daily water demand during the year. Similar to historic average day demands, the peak day demand was estimated based on historic master plan projections by Jackson Engineering, consistent with the values used for dedicating capacity during the initial construction of the District. This equates to a peak day water demand of 1800 gpd per ERU. The peaking factor (the ratio of peak day demand to average day demand) for the water system is 2.2. This is consistent with other master plans for systems of similar size and nature to JSSD.
- **Peak Hour Water Use –** The final demand needed for the water system is the peak hour water demand. This will be used for sizing conveyance facilities to maintain adequate pressures during periods of peak demand. Based on data from other similar systems, peak hour demands have been estimated to be 1.5 times peak day demands for a total of 1.875 gpm/ERU.
- **Peak Month Average Day Sewer Production –** Because of some of the unique design issues associated with wastewater treatment, the flow number of greatest interest for evaluating sewer production is peak month average day. The peak month average day flow for the sewer collection system refers to the flow produced by JSSD consumers during the peak month of the year averaged over the number of days in the month. Historic wastewater flow is estimated to be 340 GPD per ERU for the peak month, average day flow in the sewer collection system.

  In addition to the domestic flows produced at each connection, total wastewater flows will include infiltration. Infiltration is the intrusion of groundwater into the sewer system through cracked pipes, broken and offset joints, improper connections, leaky manholes, etc. Because the JSSD sewer system is relatively new, infiltration is relatively low and is not expected to significantly increase in the future. Of the peak month, average day flow of 340 GPD per ERU, approximately 295 GPD is estimated to be domestic flow with the remaining 45 GPD coming from infiltration.

- **Peak Hour Sewer Production –** The peak hour factor for sewer production (essential for sizing and design of the collection system) is 2.5 based on State of Utah design requirements. This results in a peak hour sewer production rate of 0.59 gpm/ERU.

Table 2-2 shows a summary of the projected average day water demand and the average day sewer flow.

Table 2-2
Projected Water Production and Sewer Flow Requirements

Year	ERUs	Water Production		Sewer Flow
		Average Day Demand (gpd)	Acre-feet per Year	Peak Month, Average Day Flow (gpd)
2015	1256	1,017,400	1140	427,000
2020	1744	1,412,400	1582	592,900
2025	2421	1,960,900	2196	823,100
2030	3299	2,672,100	2993	1,121,600
2035	4177	3,383,300	3790	1,420,100
2040	5055	4,094,500	4586	1,718,700
2045	5933	4,805,700	5383	2,017,200
2050	6811	5,516,900	6180	2,315,700
2055	7689	6,2281,00	6976	2,614,300

CONSERVATION

The State's water conservation goal is to reduce per capita water usage 25 percent by the year 2025, measured from the year 2000. Since the JSSD water system is a relatively new system, there is no reliable data for the JSSD area in the year 2000. However, the observed water use in recent years is less than other systems of a similar nature. We would recommend that JSSD use the current demand numbers without further conservation for planning purposes. In future years, JSSD should monitor water use to see if any additional conservation is being achieved. If water is being conserved, such that actual water use is lower than projected, capital improvement projects can be adjusted accordingly.

SOLD CAPACITY

Through the initial construction and bonding process, significant capacity has already been sold in several facilities. Sold capacity is summarized in Table 2-3.

Table 2-3
Capacity Sold in Existing Facilities

Component	Sold Capacity (ERUs)
Area A – Water Conveyance	3,709
Area B North – Water Conveyance	1,705
Area B South – Water Conveyance	1,078
Area C – Water Conveyance	3,372
Keetley Water Treatment Plant	4,681[1]
Area A – Sewer Conveyance	4,174
Area B North – Sewer Conveyance	1,278
Area B South – Sewer Conveyance	625
Area C – Sewer Conveyance	3,318
Water Reclamation Facility	4,528[2]

[1] Includes 438 ERUs associated with Red Ledges

[2] Includes 1210 ERUs associated with Red Ledges

In subsequent chapters, sold capacity will need to be considered for each individual component to determine additional capacity needs.

CHAPTER 3
WATER SUPPLY EVALUATION

INTRODUCTION

The purpose of this chapter is to discuss JSSD's water supplies and the needed volume of water to meet projected system demand.

WATER SOURCES

JSSD currently relies on two sources, the Keetley Water Treatment Plant (Keetley WTP), and the Victory Ranch Well to provide water to its customers. JSSD also has a few other wells in the system to provide redundant backup supply. Each of the sources is discussed below.

Keetley WTP

The Keetley WTP currently services approximately 1240 of the 1256 ERUs in the JSSD system, which makes it the primary water source for the JSSD system. Its current peak capacity is 8 MGD, and it can be expanded to 16 MGD. The distribution system can currently supply water from the Keetley WTP to Areas A, B North and B South and the Highway 32 Tank of Area C (see Figure 2-1). There is no current connection to the victory portion of Area C.

The source for the Keetley WTP is water from several mine tunnels where mining activities have been abandoned. Reliable supply from the Ontario Drain Tunnel is currently limited to about 9 mgd (14 cfs). Improvements in the tunnel could increase to the capacity to 11.6 mgd (18 cfs).

Victory Ranch Well

A section of Area C (see Figure 2-1) known as Victory Ranch is supplied water from the Victory Ranch Well. The Victory Ranch Well has capacity for 800 GPM. If the well were reequipped with a larger pump, the Victory Ranch Well could produce as much as 1,700 GPM. This area also has a redundant well (Victory Ranch Well #2) that can currently supply 300 GPM. If the Well #2 were reequipped with a larger pump, it could produce up to 1,500 GPM.

Backup Wells

There are four wells in the JSSD water system that can provide redundant backup supply: Tuhaye Culinary Well, Deer Mountain Well, Deer Crest Well, and Victory Ranch Well #2. While these wells are important for redundancy, none of their capacity is relied on as permanent supply.

Water Rights

A detailed analysis of the water rights and actual availability of water to the Keetley WTP, Victory Ranch Wells, and Backup Wells was not completed as part of this study. It is recommended that a detailed study of the water rights and availability of water to the Keetley

WTP, Victory Ranch Wells, and Backup Wells be completed as part of subsequent planning efforts. Following the completion of a detailed study of water rights, the recommendations in this Master Plan may need to be updated accordingly.

EVALUATION OF WATER SUPPLY

This section discusses the adequacy of available water supply to meet existing and projected future water demand as documented in the previous chapter.

Wholesale Water Supply

In addition to servicing its residential and commercial customers, JSSD is also a wholesale water provider for the following entities:

- **Red Ledges** – Red Ledges currently has a potential peak day demand of approximately 123 GPM. Based on the current contract between JSSD and Twin Creeks, JSSD will provide up to 547 GPM to Red Ledges from the Keetley Treatment Plant.
- **NVSSD –** It is anticipated that NVSSD will have up to 2,370 ERUs at full buildout, though there are currently only approximately 165 ERUs. Though NVSSD has historically been a JSSD wholesale customer, it does not have any guaranteed capacity in the Keetley treatment plant. It plans to purchase a new well (best Ranches) to meet its demands in the near future. For the purposes of this master plan, only demands in excess of the NVSSD planned purchase of the Best Ranches Well are shown as potential future demands.
- **Park City –** JSSD currently supplies up to 1000 GPM for Park City. The agreement between JSSD and Park City expires in 2021, though it is anticipated that the 1000 GPM supply to Park City will continue to be needed after 2021.
- **Golf Course Irrigation–** JSSD supplies about 650 GPM peak day supply for irrigation of a golf course in Tuhaye. This is intended to be a temporary supply only and will eventually be disconnected from the system.
- **Hideout Town –** Hideout has recently incorporated, and will be a wholesale water customer for JSSD in the future. Currently it has approximately 117 ERUs, with the potential for up to 386 ERUs. It is important to note, that Hideout has additional capacity at the Keetley Treatment Plant to service additional connections (total of 625 ERUs). However, it would need to purchase additional capacity in the JSSD distribution system to expand beyond the 386 ERUs. Historically, the Hideout development has been included as part of the JSSD retail demand projections. To simply the analysis and keep demand projections consistent with previous master plans, we have left Hideout in the JSSD demand projections.

Of these wholesale demands, only Red Ledges has reserved capacity in the Keetley WTP. All other demands are satisfied through temporary surplus capacity at the plant.

Comparison of Source Yield to Projected Demand

Source yield is compared to projected demand in two figures. Figure 3-1 shows the projected actual peak demand for JSSD through 2055 (as calculated in Chapter 2). Figure 3-2 shows the same information but includes all capacity sold in the Keetley WTP and in the Victory Ranch Well. Also shown in the figure are the needed future water supplies to provide water for the JSSD system over the next 40 years.

Based on this analysis, the following conclusions can be made regarding the annual yield of JSSD sources:

- Based on current capacity sold, there is no excess available capacity at the Keetley WTP. However, if an agreement can be made to loan a portion of the sold capacity to new users, current supply could be adequate to satisfy existing demands and projected demands over the next 10 years with the golf course demand and even longer if the golf course demand is dropped.
- The expansion of the Keetley treatment plant and the Victory Ranch Well will meet the projected demands for JSSD over the next 25 to 30 years.
- An additional treatment plant will need to be constructed in the next 25 to 30 years to meet the projected demands.

Recommendations

BC&A would recommend the following actions based on the analysis included in this chapter.

- **SP–1 – Update IFFP –** An Impact Fee Facilities Plan (IFFP) was completed simultaneously with this master plan. The IFFP needs to be periodically updated because development patterns change from time to time and the recommendations in that report may need to be updated as well. It is recommended that the IFFP be updated at least every five years.
- **SP–2a – Mine Tunnel Improvement, Mine Shaft 6 Pump Improvements –** To increase reliable production from the Ontario Drain Tunnel, several projects should be considered. The first project needed is the installation of two new pumps at Mine Shaft 6. New pumps at this location will be used to pull water from lower levels up into the drain tunnel. This will provide two benefits. First, it will add to the usable capacity from the tunnel. Second, it will keep water levels in the soils near the tunnel below a geologic layer that becomes unstable when saturated.
- **SP–2b – Mine Tunnel Improvement, Silver Fissure Development –** A second improvement in the ODT to increase reliable production that should be considered is the development of the Silver Fissure. Additional improvements in this area could collect additional water and increase reliable production from the Tunnel. District personnel estimated completion of the Mine Tunnel improvements will increase reliable flow from the tunnel from 9 mgd (14 cfs) to approximately 11.6 mgd (18 cfs).

  SP–3 – Mine Tunnel Redundant Bore Hole – One of the District's greatest vulnerabilities is its dependence on the Keetley Treatment Plant for the vast majority of its water. Adding to this vulnerability is the treatment plant's dependence on the Ontario

Figure 3-1
Peak Day Capacity Requirements - Projected Demands

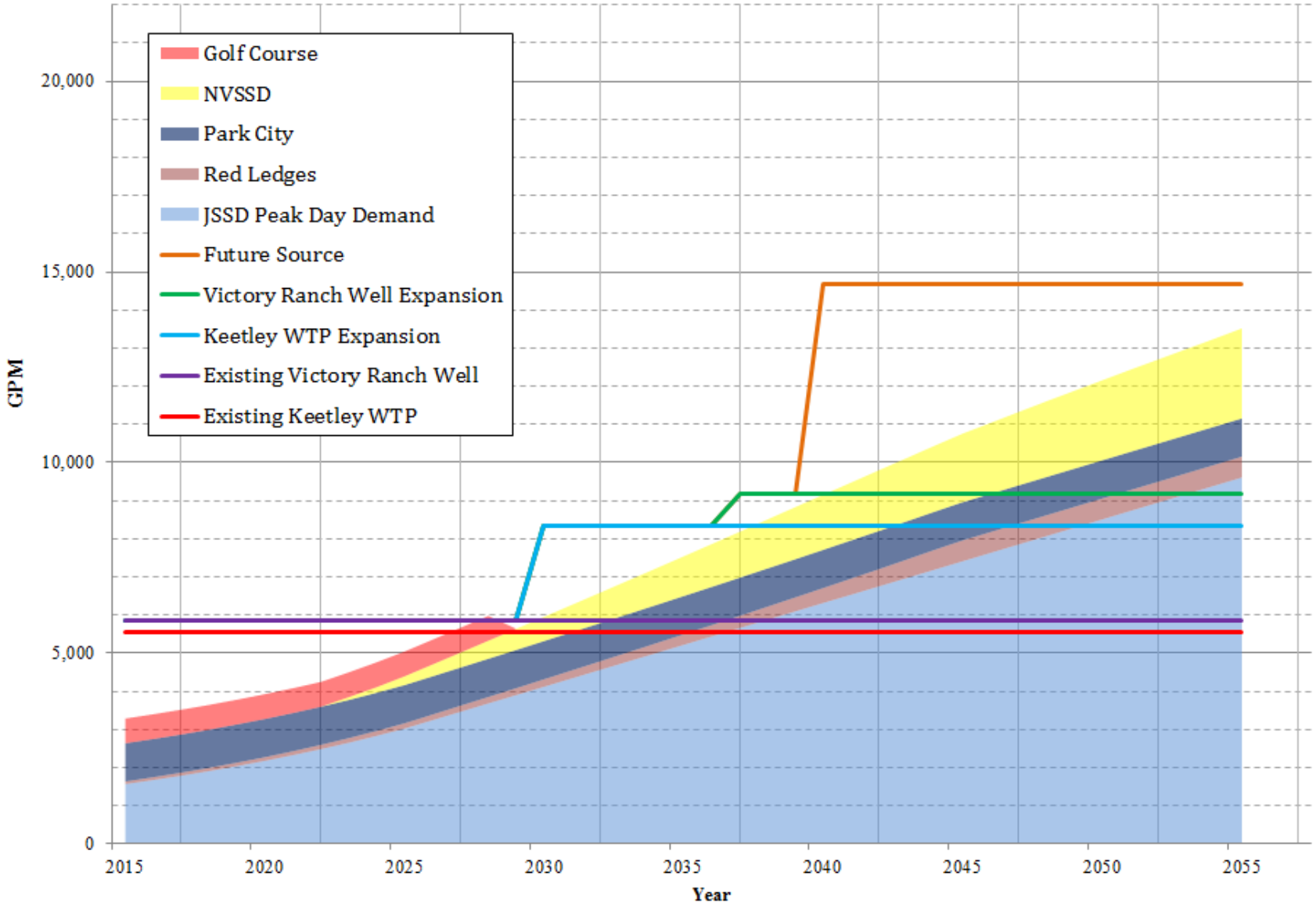
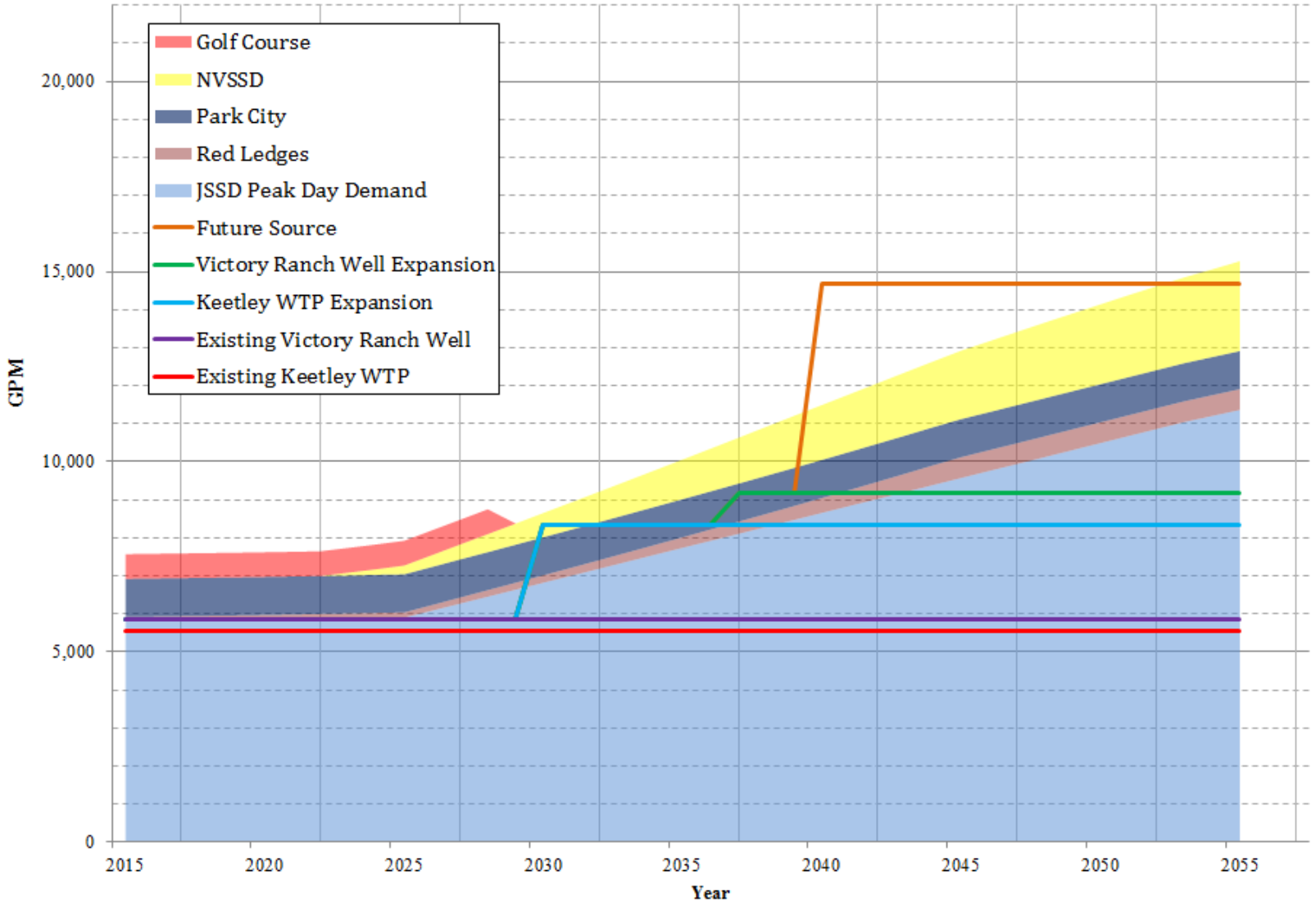


Figure 3-2
Peak Day Capacity Requirements - With Sold Capacity



Drain Tunnel as the source of all its raw water. While some redundancy has been designed into the treatment plant, a problem at any location along the full length of the Ontario Drain Tunnel could interrupt production for an extended period of time. Thus, adding redundancy to the raw water supply will be an important component of providing a reliable supply to District customers.

To meet this need, it is recommended that the District investigate the possibility of drilling a bore hole from the surface to the Ontario Drain Tunnel at some location near the head of the tunnel. This bore hole could then be equipped with a pump and pipeline to provide a redundant point of access to water from the tunnel. Because entities other than the District also receive water from the Ontario Drain Tunnel, it may be possible to work with these entities to participate in the costs of this project.

- **SP-4 – Keetley Treatment Plant, Alternative Source Improvements** – Another way in which the District could improve the reliability of the Keetley Water Treatment Plant would be to secure a second source of raw water supply. This could be used not only as a source of redundant supply to the Ontario Drain Tunnel but also as a way to access additional water rights and augment the total production capacity of the plant. The source of water rights for this alternative source would be the Provo River system. Access to this source could be obtained through either a "straw" into Jordanelle Reservoir or directly from the Provo River below the reservoir (with a pump station back up to the treatment plant).

  It is recommended that the District evaluate the water right and technical issues associated with this proposal to develop a detailed plan for its execution. Ideally, any alternative source development would have capacity for at least 4.4 mgd to take full advantage of potentially available capacity at the Keetley Water Treatment Plant after its next expansion (see Project SP-5).

  In the near term, only one of the following alternatives needs to be implemented: mine tunnel redundant bore hole (SP-3) or developing an alternative source improvement (SP-4). Because both of the alternatives address the same concerns for the Keetley Treatment plant, either project will be a significant improvement to the redundant raw water supply for the plant. In a future master plan, it is recommended that both options be explored again, as it could represent an increase in water supply for the JSSD system. To be conservative in the cost estimating, the highest cost alternative source improvement (diversion on the Provo River and pump station) for the Keetley Treatment Plant (SP-4) was included in the cost estimate in Chapter 7.

- **SP–5 - Expand the Keetley Treatment Plant –** The Keetley Water Treatment Plant currently provides the majority of water to the JSSD system, and was designed to treat 8 MGD. The Treatment Plant can be expanded to treat up to 16 MGD per day, although its reliable yield based on potential flows from the Ontario Drain Tunnel will likely be limited to 11.6 mgd in dry years. If the capacity that has already been sold is considered taken, expansion of the plant is needed immediately to service any future growth and wholesale customers NVSSD and Park City. If an agreement can be reached to loan currently unused capacity to new users, the treatment plant expansion may not be needed for several years. Once the plant is expanded, it will be able to meet projected demand for the next 25 to 30 years. At the time of expansion, it may be prudent to evaluate the performance of the treatment plant and determine if any upgrades are warranted. This

could include consideration of membranes and other treatment technology that could increase the performance or efficiency of the plant.

- **SP–6 - Expand the Victory Ranch Well –** The Victory Ranch Well is currently the only source for the Victory Ranch Development. It has a capacity of 800 GPM, but could be reequipped to supply up to 1700 GPM. The need for additional capacity from the Victory Ranch Well will be dictated by the development in Victory Ranch. Once the well is reequipped, it will be able to meet the projected demands in the Victory Ranch Development. It is also recommended that Victory Ranch be connected to the rest of the distribution system to provide additional redundancy (See Chapter 6).
- **SP–7 - Additional Treatment Plant –** Once the Keetley Treatment Plant and Victory Ranch reach capacity, another source will be needed. Though the scope of this report does not include population growth projections beyond 2055, it is likely that the population in the JSSD study area will continue to grow. A treatment plant would meet the source capacity requirements for JSSD through 2055, and for the years afterwards. An additional treatment plant may also be used to service future NVSSD demand. For the purpose of this master plan, it has been assumed that this plant would be located somewhere downstream of the Jordanelle Reservoir and would be approximately the same size as the existing Keetley Plant. The actual location and capacity will need to be more closely examined closer to the time it is needed.

CHAPTER 4
EXISTING WATER DISTRIBUTION FACILITIES

INTRODUCTION

The purpose of this chapter is to summarize the characteristics of the existing facilities within the JSSD water distribution system. It is intended to be used as a quick reference for JSSD personnel regarding information on the system. Included is information about storage tanks, transmission and distribution pipelines, pressure regulating valves, and pressure zones.

STORAGE TANKS

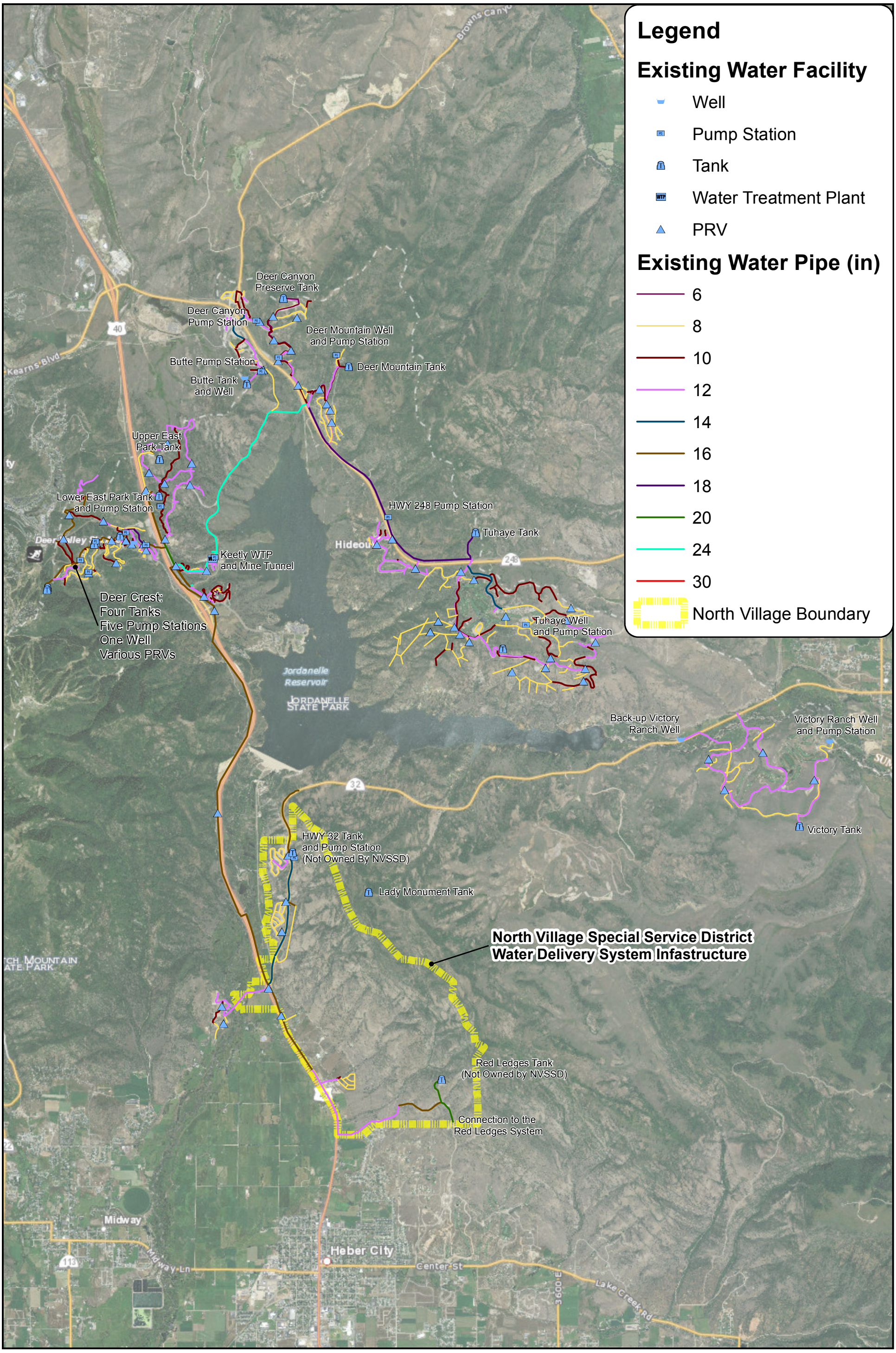
JSSD currently has 13 water storage tanks. The capacity of each tank is shown in Table 4-1.

Table 4-1
Summary of JSSD Storage

Name	Storage (gals)	Low Water Elevation (ft)	High Water Elevation (ft)	Year Constructed
Upper Deer Crest Tank	800,000	7,990	8,012	1998
Upper Upper Deer Crest Tank	200,000	8,025	8,042	1998
Middle Deer Crest Tank	75,000	7,568	7,584	1999
Lower Deer Crest Tank	500,000	7,055	7,080	1999
East Park Tank	1,100,000	6,819.5	6,848	2000
Upper East Park Tank	500,000	7,131	7,157	2000
HWY 32 Upper Tank	1,500,000	6,299	6,318	2008
Lady Monument Tank	1,500,000	7,485	7,503	2008
Butte Tank	850,000	7,000	7,020	2001
Deer Canyon Tank	500,000	7,222	7,244	2014
Deer Mountain Tank	850,000	6,864	6,884	2001
Tuhaye Tank	1,400,000	7,235	7,259	2006
Victory Ranch Tank	500,000	6,955	6,974	2007
Total	**10,275,000**			-

PIPELINES

The JSSD distribution system is composed of distribution and transmission pipelines up to 30 inches in diameter. Figure 4-1 shows the distribution piping and Table 4-1 summarizes the total length of pipe in the system. Based on data provided in the GIS database, most of the pipelines are made of ductile iron. It should be noted that some of JSSD's system is interconnected with infrastructure from NSSD. NVSSD infrastructure has been identified in the figure for reference.



Bowen Collins & Associates, Inc. CONSULTING ENGINEERS	JORDANELLE SPECIAL SERVICE DISTRICT WATER AND SEWER MASTER PLAN	WATER FACILITIES INVENTORY	NORTH: NORTH	SCALE: 0 2,000 4,000 Feet	FIGURE NO. 4-1

P:\Jordanelle SSD\Water & Sewer Master Plan\4.0 GIS\Figures\Figure 4-1 - System Inventory.mxd kballentine 4/14/2015

Table 4-2
Summary of Pipeline Data

Pipe Diameter (inches)	Total Length (feet)	Total Length (miles)	Percentage of Network
Unknown	380	0.1	0.1%
6	7,864	1.5	1.6%
8	158,644	30.0	32.3%
10	90,481	17.1	18.4%
12	135,887	25.7	27.6%
14	7,146	1.4	1.5%
16	45,563	8.6	9.3%
18	20,650	3.9	4.2%
20	3,029	0.6	0.6%
24	22,166	4.2	4.5%
Totals	**652,981**	**123.7**	**100%**

BOOSTER STATIONS

Figure 4-1 and Table 4-3 summarize the capacities of the 11 booster stations in the JSSD distribution system.

Table 4-3
Summary of Booster Stations

Name	Pump Capacity (GPM)	Year Constructed	Is there a Backup Generator?	Number of Pumps
Hwy 248	3000	2007	No	4
Butte	700	2001	No	2
Deer Crest Lower	4350	1999	No	5
Deer Crest Mid	1700	1999	No	4
Deer Crest Upper	1625	1999	No	4
Little Baldy	250	2000	Yes	4
East Park	430	2001	No	3
HWY 32	3000[1]	2008	No	4
Snow Making/Cooling Twr	2600	2000	No	10
Victory Ranch #1	800	2007	No	4
Victory Ranch #2	350	2012	No	1

WELLS

JSSD currently operates 5 wells to provide potable water in its service area, as listed in Figure 4-1 and listed in Table 4-4. As discussed in Chapter 3, only the Victory Ranch Wells are used as the sole supply for some District customers. The other wells are used primarily as redundant backup supply.

Table 4-4
Summary of Wells

Name	Well Capacity (GPM)
Best Ranches Well	600
Deer Crest Well	120
Deer Mountain Well	110
Tuhaye Culinary Well #1	500
Tuhaye Irrigation Well #1	1200
Tuhaye Irrigation Well #2	280
Tuhaye Irrigation Well #3	320
Victory Ranch Main Well	1600
Victory Ranch Back-up Well	300[1]

[1] Artesian well, capacity can be significantly higher if pressurized. 300 GPM is the capacity of the well's pump station if it is not pressurized

PRESSURE REGULATING VALVES

Pressure zones in the distribution system are separated by pressure reducing valves (PRVs). Figure 4-1 shows the locations of pressure regulating valves in the system. Table 4-5 shows a summary of the PRVs and their settings.

Table 4-5
Summary of PRVs

Identifier	Area	From HGL (ft)	To HGL (ft)	Elevation (ft)
PRV-1	A	6794	6552	6428
PRV-010-SW	A	6841	6611	6380
PRV-1-SW	A	6846	6680	6547
PRV-010-SH	A	6680	6560	6404
PRV-5-DC	A	7285	6900	6713
PRV-10-DC	A	7285	6900	6680
PRV-6-DC	A	7205	7285	6910
PRV-4-DC	A	7425	7205	6976
PRV-3-DC	A	7425	7584	7219
PRV-9-DC	A	7584	7425	7204
PRV-1-DC	A	7770	8008	7491
PRV-2-DC	A	8008	7770	7628
PRV-7-DC	A	8007	7695	7404
PRV-8-DC	A	7695	7450	7285
PRV-11-DC	A	7583	7450	7050
PRV-5-EP	A	6709	6847	5871
PRV-6-EP	A	6848	6709	6570
PRV-2 - EP-JSSD	A	7157	6849	6816
PRV-2 - EP	A	7368	6848	6727
PRV-3-EP	A	7156	6987	6860
PRV-2-EP	A	6987	6849	6710
PRV-4-EP	A	6988	6849	6705
PRV-1-EP	A	7153	6997	6870
PRV-3-Butte	B NORTH	7019	6804	6645
PRV-3a	B NORTH	7019	6950	6710
PRV-11	B NORTH	7135	6949	6805
PRV-12	B NORTH	7234	7135	7020
PRV-10	B NORTH	7135	7234	7020
PRV-8	B NORTH	6952	6805	6690
PRV-6	B NORTH	6805	6693	6558
PRV-13	B NORTH	6804	6693	6435
Deer Mtn Blvd PRV	B NORTH	6661	6583	6412
Curley Sage Dr. PRV	B NORTH	6862	6661	6504
Bone Hollow Dr. PRV	B NORTH	6661	6661	6517

Table 4-5
Summary of PRVs (continued)

Label	Area	From HGL (ft)	To HGL (ft)	Elevation (ft)
Big Dutch Dr. PRV	B NORTH	6661	6661	6466
PRV-1-1	B NORTH	7246	6882	6716
PRV-1-2	B NORTH	6881	6716	6600
PRV-3	B NORTH	6881	7246	6770
PRV-9	B NORTH	7135	6952	6860
PRV-25	B SOUTH	7240	7007	6912
PRV-37	B SOUTH	7239	7021	6940
PRV-15	B SOUTH	7239	7022	6899
PRV-4	B SOUTH	7234	7022	6899
PRV-5	B SOUTH	7021	6876	6775
PRV-212	B SOUTH	7038	6876	6755
PRV-2	B SOUTH	7114	7038	6865
PRV-218	B SOUTH	7038	6941	6725
PRV-24	B SOUTH	7115	6941	6855
PRV-16	B SOUTH	7114	7021	6905
PRV-14	B SOUTH	7116	6942	6900
PRV-31	B SOUTH	7234	7067	6896
PRV-33	B SOUTH	7234	7066	6886
PRV-29	B SOUTH	7065	6863	6810
PRV-27	B SOUTH	7067	6862	6770
PRV-35	B SOUTH	7234	7068	6848
PRV-11	C	6973	6738	6692
PRV-13	C	6970	6738	6587
PRV-12	C	6738	6521	6445
PRV-14	C	6521	6520	6440

CHAPTER 5
STORAGE CAPACITY EVALUATION

INTRODUCTION

The purpose of this chapter is to evaluate the JSSD storage capacity. As part of this evaluation, the size and locations of existing storage tanks will be analyzed to determine if the JSSD has sufficient storage to meet equalization, emergency and fire flow storage needs.

EXISTING SYSTEM CHARACTERISTICS

As stated in the previous chapter (see Table 4-1), JSSD has 10 water storage tanks with a collective capacity of 10.3 million gallons (mg).

STORAGE EVALUATION CRITERIA

Regulations established by the State require that water systems have storage facilities sufficient to provide:

- Equalization storage
- Emergency storage
- Fire suppression storage

Each of these storage components is discussed below.

Equalization Storage

Equalization storage is the volume of water needed to supply the system for periods when demands (usually peak hour demands) exceed the supply (peak day supply). Based on historic water use patterns, it is recommended that the equalization storage for JSSD be equal to 25 percent of peak day demand.

Emergency Storage

Emergency storage is the volume of water required to meet water demand during an emergency. JSSD's water supply is primarily dependent on water from the District's WTP. A severe water supply emergency relative to storage analysis would be an extended power outage that prevents the treatment plant from operating. While the most effective method of ensuring adequate water delivery during a power outage is to provide auxiliary power to selected water system facilities, it is also wise to include some additional emergency water at storage reservoirs. This also gives system operators the benefit of a little extra buffer for system operations. It is recommended that District facilities include sufficient emergency storage be able to supply the system during a six-hour power outage during peak day demands.

Fire Suppression Storage

Fire suppression storage is the volume of water needed to provide a required fire flow for a specified period. The State standard indicates that fire suppression shall meet the volume specified by the local fire authority. The Wasatch County Fire Marshall has required that fire suppression storage meet international fire flow standards, which are based on building square footage and building material type. The anticipated building square footage for the JSSD study area has been estimated based on the current zoning. Areas on the upper sections of the hillside are zoned as residential and could see larger residential development. The remainder of the JSSD study area is also residential zoning, but will probably see some associated institutional development (churches, elementary schools, etc.). For master planning purposes, the fire suppression storage volume for the upper hillside is 2,750 gpm for 2 hours (330,000 gallons), and the lower hillside is 3,500 gpm for 3 hours (630,000 gallons).

It is important to note that there are some tanks in the system that do not need fire flow storage because there are tanks upstream that can include the fire flow suppression. Conversely, equalization storage is used on a daily basis during the summer. Therefore, no portion of equalization storage should be satisfied from upstream tanks, but should be fully satisfied from available storage in each individual zone.

ESTIMATED EXISTING AND FUTURE STORAGE REQUIREMENTS

An evaluation of the JSSD water storage facilities for existing and future conditions was completed. Table 5-1 summarizes the development area that each tank serves and identifies if there are any upstream tanks that could help contribute to emergency and fire flow storage in the area. Tables 5-2 and 5-3 summarize the evaluation of the JSSD storage facilities based on projected demands. Included in Tables 5-2 and 5-3 are two columns summarizing the adequacy of storage in the zone. The first examines storage in the zone itself. The second considers the zone itself and any excess storage available from zones above it.

Table 5-1
Storage Tank Service Areas

Tank Name	Developer Service Areas			Upstream Tank(s)
Deer Crest	Deer Crest	Snowpark	Gimble	None
	Deep Springs	-	-	
East Park	Stillwater	Deer Valley Lake Side		Upper East Park Deer Crest
	Star Harbor	Westside (N)	Westside (S)	
Upper East Park	East Park	Jordanelle View	-	None
HWY 32 & Wasatch Commons	NVSSD	-	-	East Park 6800 (Future)
Red Ledges	Red Ledges	-	-	None
Lady Monument	Clyde Property	JLS Properties	Talisman	None
	Part of Sorenson	-	-	
6800 (Future)	Part of Sorenson	-	-	Lady Monument
Butte	Iroquois	-	-	None
Deer Canyon	Deer Canyon Preserve	Austin	-	None
Deer Mountain	Deer Mountain	-	-	Tuhaye Deer Canyon Butte
Tuhaye & Lower Tuhaye	Hideout Town	Tuhaye	Brodkin	None
	Hideout Canyon	Park Premier	AM Eagle	
	US Fish & Wildlife	Berg Ridge	Dunlap	
Victory Ranch	Victory Ranch	Cahoon	Christensen	None
Upper Area C (Future)	Mower	Jackson Fork	-	Lady Monument
Future Development	Mayflower North	Deer Point	Mayflower South	None
	Mustang	Noyes	Pioche	
	Promintory	Warburton	-	

Table 5-2
2015 Storage Facilities Evaluation

Tank Service Area	Peak Day Demand (gpm)	Peak Day Summer Equalization Storage (gallons)	Emergency Storage (gallons)	Fire Flow Storage (gallons)	Total Required Storage	Available Storage	Zone Storage Surplus or Deficit (gallons)	Total Storage Surplus or Deficit (gallons)
Deer Crest	254	91,269	91,269	630,000	812,538	1,575,000	762,462	762,462
EastPark	376	135,450	135,450	0	270,900	1,100,000	829,100	2,436,562
UpperEastPark	0	0	0	330,000	330,000	500,000	170,000	170,000
HWY 32	0	0	0	0	0	1,500,000	1,500,000	3,836,562
Lady Monument	0	0	0	630,000	630,000	1,500,000	870,000	870,000
6800' (Future)	0	0	0	0	0	0	0	870,000
Butte	93	33,345	33,345	330,000	396,690	850,000	453,310	453,310
Deer Canyon	33	11,731	11,731	330,000	353,463	500,000	146,537	146,537
Deer Mountain	375	135,000	135,000	0	270,000	850,000	580,000	1,179,847
Tuhaye	423	152,242	152,242	630,000	934,483	1,400,000	465,517	465,517
Victory Ranch	17	6,002	6,002	330,000	342,004	500,000	157,996	157,996
Upper Area C	0	0	0	0	0	0	0	0
Future Development	0	0	0	0	0	0	0	0
Total	**1,570**	**565,039**	**565,039**	**3,210,000**	**4,340,078**	**10,275,000**	**5,934,922**	**--**

Table 5-3
2055 Storage Facilities Evaluation

Tank Service Area	Peak Day Demand (gpm)	Peak Day Equalization Storage (gallons)	Emergency Storage (gallons)	Fire Flow Storage (gallons)	Total Required Storage	Available Storage	Zone Storage Surplus or Deficit (gallons)	Total Storage Surplus or Deficit (gallons)
Deer Crest	425	153,178	153,178	630,000	936,357	1,575,000	638,643	638,643
EastPark	1,375	494,898	494,898	0	989,795	1,100,000	110,205	755,151
UpperEastPark	227	81,849	81,849	330,000	493,698	500,000	6,302	6,302
HWY 32	0	0	0	0	0	1,500,000	1,500,000	2,830,151
Lady Monument	831	299,297	299,297	630,000	1,228,594	1,500,000	271,406	271,406
6800' (Future)	513	184,500	184,500	0	369,000	0	(369,000)	(97,594)
Butte	640	230,400	230,400	300	461,100	850,000	388,900	388,900
Deer Canyon	228	82,054	82,054	330,000	494,108	500,000	5,892	5,892
Deer Mountain	408	146,700	146,700	0	293,400	850,000	556,600	951,392
Tuhaye	1,608	579,036	579,036	630,000	1,788,073	1,400,000	(388,073)	(388,073)
Victory Ranch	801	288,196	288,196	330,000	906,393	500,000	(406,393)	(406,393)
Upper Area C	195	70,262	70,262	0	140,524	0	(140,524)	(140,524)
Future Development	2,360	849,551	849,551	630,000	2,329,102	0	(2,329,102)	(2,329,102)
Total	**9,611**	**3,459,922**	**3,459,922**	**3,510,300**	**10,430,143**	**10,275,000**	**-**	**--**

CONCLUSIONS

The following conclusions can be made regarding storage in the JSSD water storage system:

1. **Existing Storage** – As can be seen from Table 5-2, there is 10.3 million gallons of storage in 2015. Based on the criteria listed above, the system currently does not have any storage deficiencies on either a system wide basis or for individual zones.
2. **Future Storage** – Table 5-3 shows a there is no future storage surplus. There are five zones that will have a shortage of storage in the future. Of the five, there are three existing zones with projected shortages (Tuhaye, 6800 and Victory Ranch). There are also two future areas where new storage will be required. To meet the storage requirements in 2055, JSSD will need an additional 3.8 million gallons of storage. The storage needs are as follows: 400,000 gallons in 6800; 400,000 in Tuhaye; 450,000 gallons in Victory Ranch; 150,000 gallons in Upper Area C; and 2,300,000 gallons in future developments that cannot be served by existing tanks.

RECOMMENDATIONS

To meet future storage capacity requirements, the following improvements are recommended:

- **ST-1 - 6800 Tank** – It is recommended a tank be constructed within the next few years to facilitate development between Lady Monument and Hwy 32 Tanks. The approximate tank size is 200,000 gallons. Because this tank will be located in an area with significant topographic relief, the actual service area of the tank (and corresponding tank size) should be revisited as part of final design.
- **ST-2 - Victory Ranch Tank –** A tank will need to be constructed to service Victory Ranch in Area C that can provide an additional 450,000 gallons of storage. The existing tank in Victory Ranch has 500,000 gallons of storage and can service approximately 189 ERUs. Currently, Victory Ranch has 13 ERUs and is not anticipated to reach 189 ERUs within the next 10 years.
- **ST-3 - Upper Area C Tanks –** The Upper Area C can be partially served by the Lady Monument Tank, though infrastructure will need to be installed to connect the development to the Lady Monument tank. In addition to the Lady Monument Tank, one or more tanks with a combined capacity of at least 150,000 gallons will be needed. Currently there is no development in the area, nor are there active plans to develop the area. Prior to development of the Upper Area C, an analysis will need to be completed to identify exact sizing and site locations for the tank(s).
- **ST-4 - Future Development Tanks –** As development occurs in areas that cannot be serviced by the existing storage tanks (e.g. Mayflower), tanks will need to be constructed. Tank sizes will be determined by the final area to be served.
- **ST-5 - Tuhaye Tank –** A tank will need to be constructed to service Tuhaye that can provide an additional 400,000 gallons of storage. The timing for this tank will depend on development but is not expected in the next 10 years.

CHAPTER 6
DISTRIBUTION SYSTEM EVALUATION

INTRODUCTION

In order to evaluate the ability of the JSSD water distribution system to serve the needs of its existing and future customers, a hydraulic model was created using JSSD Geographic Information System (GIS) data, information provided by JSSD representatives, and the supply and demand analysis discussed in Chapters 2 and 3 of this report. The purpose of this model is to simulate existing and future demands on the distribution piping. Based on the results of the model simulations, improvements can then be evaluated to remedy any identified deficiencies. The purpose of this chapter is to document the results of the distribution system evaluation based on hydraulic modeling.

HYDRAULIC MODEL

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

Computer models are excellent tools that can be used to evaluate operating conditions in water systems. Models can identify deficiency locations in the system and can be used to evaluate alternatives to remedy identified problems. Computer models are valuable in examining future operating conditions. They also help to evaluate operating conditions during extreme events such as fires or power failures. There are several different computer programs used for modeling water distribution systems. The program Infowater 11.5 by Innovyze was used for this study.

Geometric Model Data

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

Pipes and Demand Nodes.

- Pipe sizes were taken from JSSD GIS data.
- Node elevations were taken from a 10-meter Digital Elevation Model (DEM) provided by the Utah Automated Geographic Reference Center (AGRC) website.
- Pipe roughness was conservatively set at a Hazen-Williams co-efficient of 110 for all sizes of pipe.

Source Connections.

- The Keetley WTP and Victory Ranch were modeled as fixed elevation reservoirs with a pump and a flow control valve to provide water to the system and can be easily adjusted based on the various source scenarios. Elevations of the source reservoirs were set at a head adequate to ensure there would be sufficient pressure to deliver water into the system.
- There are a few back-up wells in the system that were modeled as sources for one of the scenarios (see discussion below). The wells were modeled as reservoirs with a flow control valve. The elevations came from the 10-meter DEM.

Pumps.

- In this model, pumps have been modeled using the "design point" option, in which a design flow and head is entered for each pump. Flows vary depending on the evaluation scenario being considered. Heads were calculated based on the hydraulic grade line and tank elevation in each area.

Regulating Valves.

- The existing pressure regulating valves on the main trunk lines have been modeled in Infowater as PRVs. This means they are controlled by downstream pressures and open only as necessary to maintain a minimum pressure on the downstream side. Regulating valve sizes and settings are as outlined in Chapter 4.

Flow Data

Once all required geometric data is collected and a physical model of the system is created, the second type of data needed to model the system is flow data. For the purposes of this study, BC&A looked at flow for two scenarios existing (2015) and 2055. Two basic types of flow information are required for hydraulic modeling: flow out of the system (demand) and flow into the system (supply).

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

- **Total Production Requirement –** Demand projections for the JSSD service area have been presented in detail in Chapter 2.

- **Distribution of Demand –** Demand was distributed by development areas. The existing demand for each development area was approximated based on the number of existing connections within the zone, estimated from a recent digital aerial photo. The existing number of connections was also verified by representatives in JSSD. As defined in Chapter 2, future demand was estimated based on development area projections. The system growth curve was utilized to project to the demand (as defined in chapter 2 and 3) in each area for 2055. Table 6-1 shows the number of ERUs in each development area, and demand for each development areas in GPM.

Table 6-1
Projected Growth by Development Area

	Existing Demand (2015)			2025 Demand			2055 Demand		
Developer Area Name	ERUs	Average Day (GPM)	Peak Day (GPM)	ERUs	Average Day (GPM)	Peak Day (GPM)	ERUs	Average	Peak Day (GPM)
Austin	0	0	0	0	0	0	27	15	34
Berg Ridge	0	0	0	0	0	0	100	56	125
Brodkin	0	0	0	0	0	0	29	16	36
Cahoon	0	0	0	0	0	0	11	6	14
Christensen	0	0	0	0	0	0	219	123	274
Clyde	0	0	0	0	0	0	43	24	54
Deep Springs	0	0	0	0	0	0	7	4	8
Deer Canyon	26	15	33	80	45	100	104	59	130
Deer Crest	188	106	235	220	124	275	283	159	353
Deer	300	169	375	326	183	408	326	183	408
Deer Point	0	0	0	0	0	0	8	4	10
Deer Valley	0	0	0	0	0	0	474	267	592
East Park	0	0	0	0	0	0	142	80	178
Garff	0	0	0	0	0	0	36	20	45
Gimble	0	0	0	0	0	0	30	17	38
Hideout[1]	26	15	33	36	20	45	44	25	55
Hideout[1]	91	51	114	126	71	158	164	92	205
Iroquois	74	42	93	400	225	500	512	288	640
Jackson Fork	0	0	0	0	0	0	112	63	140
JLS Properties	0	0	0	0	0	0	0	0	0
Jordanelle	0	0	0	0	0	0	39	22	49
Mayflower	0	0	0	50	28	63	268	151	336
Mayflower	0	0	0	355	200	444	1223	688	1529
Mower	0	0	0	0	0	0	44	25	55
Mustang	0	0	0	0	0	0	219	123	273
Noyes	0	0	0	0	0	0	19	10	23
Park Premier	0	0	0	0	0	0	110	62	137
Pioche	0	0	0	0	0	0	100	56	125
Promintory	0	0	0	0	0	0	22	12	27
Reynolds	0	0	0	0	0	0	15	8	18
Snowpark	15	8	19	21	12	26	21	12	26
Sorenson	0	0	0	0	0	0	274	154	342
Star Harbor	141	79	176	141	79	176	141	79	176
Stillwater	160	90	200	190	107	238	200	113	250
Talisman	0	0	0	0	0	0	758	427	948
AM Eagle	0	0	0	0	0	0	137	77	171
Tuhaye	221	124	276	450	253	563	700	394	875

Developer Area Name	Existing Demand (2015)			2025 Demand			2055 Demand		
	ERUs	Average Day (GPM)	Peak Day (GPM)	ERUs	Average Day (GPM)	Peak Day (GPM)	ERUs	Average	Peak Day (GPM)
US Fish & Wildlife	0	0	0	0	0	0	0	0	0
Victory Ranch	13	8	17	25	14	32	410	231	513
Warburton	0	0	0	0	0	0	14	8	17
Westside (S)	0	0	0	0	0	0	252	142	315
Westside (N)	0	0	0	0	0	0	33	18	41
White	0	0	0	0	0	0	16	9	20
Dunlap	0	0	0	0	0	0	3	2	3
Subtotal	**1256**	**706**	**1570**	**2421**	**1362**	**3026**	**7689**	**4325**	**9611**
Wholesale Customers									
Red Ledges[2]	98	55	123	220	124	275	437	246	547
NVSSD	165	93	206	665	374	831	2370	1333	2963
Park City[3]	-	-	1000	-	-	1000	-	-	1000
Wholesale Subtotal	**263**	**148**	**1329**	**885**	**498**	**2106**	**2807**	**1579**	**4509**
Totals	**1519**	**854**	**2898**	**3306**	**1859**	**5132**	**10496**	**5904**	**14121**

[1] Hideout town has recently incorporated and is now a wholesale water customer
[2] Long-term Red Ledges water sales were based on contractual obligations.
[3] The Park City contract is based on a peak day flow rate.

- **Distribution of Demand Considering Sold Capacity –** As with other components of the system, it is necessary to consider the effect of sold capacity in the water system. Revised projections including all sold capacity are shown in Table 6-2

Table 6-2
Projected Growth by Development Area (with Sold Capacity)

Developer Area Name	Existing Demand (2015)			2025 Demand			2055 Demand		
	ERUs	Average Day (GPM)	Peak Day (GPM)	ERUs	Average Day (GPM)	Peak Day (GPM)	ERUs	Average	Peak Day (GPM)
Austin	0	0	0	0	0	0	27	17	34
Berg Ridge	0	0	0	0	0	0	100	62	125
Brodkin	0	0	0	0	0	0	29	18	36
Cahoon	0	0	0	0	0	0	11	7	14
Christensen	400	250	500	400	250	500	400	250	500
Clyde	0	0	0	0	0	0	43	27	54
Deep Springs	0	0	0	0	0	0	7	4	8
Deer Canyon	26	16	33	80	50	100	104	65	130
Deer Crest	188	118	235	140	88	175	283	177	353
Deer	325	203	406	326	204	408	326	204	408
Deer Point	0	0	0	0	0	0	8	5	10
Deer Valley	0	0	0	0	0	0	474	296	592
East Park	0	0	0	0	0	0	142	89	178
Garff	0	0	0	0	0	0	36	23	45
Gimble	0	0	0	0	0	0	30	19	38

Developer Area Name	Existing Demand (2015)			2025 Demand			2055 Demand		
	ERUs	Average Day (GPM)	Peak Day (GPM)	ERUs	Average Day (GPM)	Peak Day (GPM)	ERUs	Average	Peak Day (GPM)
Hideout[1]	81	51	101	81	51	101	81	51	101
Hideout[1]	300	188	375	300	188	375	300	188	375
Iroquois	512	320	640	512	320	640	512	320	640
Jackson Fork	205	128	256	205	128	256	205	128	256
JLS Properties	0	0	0	0	0	0	0	0	0
Jordanelle	0	0	0	0	0	0	39	25	49
Mayflower	0	0	0	0	0	0	268	168	336
Mayflower	0	0	0	0	0	0	1223	764	1529
Mower	80	50	100	80	50	100	80	50	100
Mustang	0	0	0	0	0	0	219	137	273
Noyes	34	21	43	34	21	43	34	21	43
Park Premier	0	0	0	0	0	0	110	68	137
Pioche	0	0	0	0	0	0	100	63	125
Promintory	0	0	0	0	0	0	22	14	27
Reynolds	0	0	0	0	0	0	15	9	18
Snowpark	15	9	19	21	13	26	21	13	26
Sorenson	500	313	625	500	313	625	500	313	625
Star Harbor	141	88	176	141	88	176	141	88	176
Stillwater	160	100	200	170	106	213	200	125	250
Talisman	1384	865	1730	1384	865	1730	1384	865	1730
AM Eagle	0	0	0	0	0	0	137	86	171
Tuhaye	625	391	781	625	391	781	700	438	875
US Fish & Wildlife	0	0	0	0	0	0	0	0	0
Victory Ranch	749	468	936	749	468	936	749	468	936
Warburton	0	0	0	0	0	0	14	9	17
Westside (S)	0	0	0	0	0	0	252	158	315
Westside (N)	0	0	0	0	0	0	33	21	41
White	0	0	0	0	0	0	16	10	20
Dunlap	0	0	0	0	0	0	3	2	3
Subtotal	**5725**	**3578**	**7156**	**5748**	**3593**	**7185**	**9377**	**5861**	**11,721**
Wholesale Customers									
Red Ledges[2]	98	55	123	220	124	275	437	246	547
NVSSD	165	93	206	665	374	831	2370	1333	2963
Park City[3]	-	-	1000	-	-	1000	-	-	1000
Wholesale Subtotal	**263**	**148**	**1329**	**885**	**498**	**2106**	**2807**	**1579**	**4509**
Totals	**1519**	**854**	**2898**	**3306**	**1859**	**5132**	**10,496**	**5904**	**14,121**

[1] Hideout town has recently incorporated and is now a wholesale water customer
[2] Long-term Red Ledges water sales were based on contractual obligations.
[3] The Park City contract is based on a peak day flow rate.

Supply

Each of the years modeled had the following supply scenarios:

1. **Existing** – The only sources available in the existing model are the existing Keetley WTP and the Victory Ranch Well.

2. **2055** – The sources available in 2055 will be the Keetley WTP with its additional treatment capacity, the Victory Ranch Well with its additional capacity, and the future Treatment Plant at a capacity as needed to satisfy 2055 demands.

Chapter 3 discusses each of the above-mentioned sources and the approximate timeline for their development.

Redundancy

In addition to the main scenarios, it is also useful to analyze various scenarios that consider redundancy in the system. The scenarios listed below were analyzed to provide recommendations that can create redundancy.

- **Victory Ranch Well Failure –** This scenario assumed that both the Victory Ranch Well and the back-up Victory Ranch Well fail, and that water in the Victory Ranch development needs to be delivered through the transmission pipe in Upper Area C, or from Tuhaye. The demand in this scenario is the 2055 peak day.
- **Keetley Treatment Plant Failure –** This scenario assumed that the Keetley Water Treatment Plant fails, and water needs to be delivered from all remaining wells in the JSSD system. Because the wells cannot provide enough water to meet peak day demand in 2055, an indoor demand was developed for JSSD. The indoor demand was estimated to be 325 GPD/ERU. Once additional detailed water meter data is available for the JSSD service area, the winter day demand estimate should be updated.
- **Major Pipe Failures –** There are two major transmission pipes that deliver water from the Keetley Treatment Plant to the rest of the system. One of the pipe feeds Areas B North and B South, while the other feeds Area A. This scenario analyses the system if either pipe fails. Constructing a fully redundant system for a peak summer demand scenario in 2055 would require upsizing many existing pump stations and transmission pipes, and would not be cost effective. Therefore, the goal of this scenario is to supply emergency water sufficient to meet indoor demand.

Recommended Future Model Improvements

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

- **Verification of PRV Elevations/Settings** – PRVs on the main trunklines have been included in the model. To understand the water system pressures better, it is recommended that all the PRVs be added to the model and verified. This will provide a more detailed analysis of pressures in the system, and more accurately reflect what is occurring in the field.
- **Increased Detail in Demand Distribution -** Because the demands are approximated by each development area, the model can only effectively simulate the transmission and

main distribution pipes. As additional GIS water meter data becomes available for the water system, we would recommend updating the model with the water meter data.

- **Peak Hour** – As system develops, further, peaking factors will become more defined. In the future, it is recommended that a scenario that includes the peak hour demand should be updated and incorporated into the model.
- **Periodic Model Updates** – The model should be updated periodically to reflect improvements made to the distribution network. A periodic review of demand distribution is also recommended. An updated analysis of demand distribution will allow model users to capture any shift in population density or development patterns that may occur.

EVALUATION CRITERIA

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

1. **Pressure -** A distribution system should provide adequate delivery pressure across the system. The State of Utah requires that distribution pressures be greater than 40 psi during peak day production requirements and 30 psi during peak hour production requirements. However, to improve the level of service and avoid customer complaints, we would recommend that pressure throughout the system should not generally drop lower than 60 psi during peak hour production conditions.
2. **Pipe Velocity –** Except in fire flow events, flow velocities in distribution pipes should be limited to less than 7.0 feet per second (ft/s). Transmission pipes can have velocities that are higher than distribution pipes, but typically should be less than 10 ft/s.

SYSTEM MODELING RESULTS

Based on the results of the computer model evaluation, several conclusions can be made regarding the JSSD water transmission and distribution system:

1. **Existing Facilities** – It appears that existing transmission and distribution piping have been adequately sized to meet existing and projected future demands. BC&A did not identify any existing deficiencies or pipes that need to upsized in order to meet future demand. This includes modeling both with and without sold capacity.
2. **Project Level Improvements** – Although the existing facilities appear to be adequately sized to meet projected demands, there are some areas of the system where no facilities exist. In these areas, new facilities will need to be constructed in order to provide water service. Since these new facilities will serve only single developments, they are considered project level improvements. As a result, the preliminary sizing and location of these facilities has been identified in this document for planning purposes, but funding of these improvements is expected to come from the developers they serve.

3. **Redundancy** – While no deficiencies were identified in existing facilities during normal operation for projected demands, there are some additional improvements need to improve system performance and redundancy as demands increase in the future.
4. **System Pressures** – The vast majority of system meets the recommended system criteria of 60 psi during peak hour production. A few locations have pressures slightly less than 60 psi, but they are still well above State standards.
5. **Flow Velocities** – The flow velocities in the transmission and distribution pipes are within a reasonable range.

RECOMMENDED DISTRIBUTION SYSTEM IMPROVEMENTS

Based on the conclusions above, several improvements have been identified. Once these improvements are completed, the JSSD transmission and distribution system should be able to meet all performance criteria outlined above through 2055. The location of each improvement is shown in the following chapter (Figure 7-1). It should be noted that the pipeline routings shown here are preliminary based on a global look at system needs only. It is expected that a detailed routing study will be conducted for each project as part of preliminary design. For discussion purposes, the improvements can be grouped into projects to be completed by developers (primarily on the Sorensen Property and Upper Area C) and projects to be completed by the District.

Sorensen Property

Several improvements will be needed in order to serve the Sorensen Property in Area C. The District is currently discussing development in this area with the property owner and expects these improvements to be completed shortly. Since these improvements will primarily serve a single developer, it is expected that they will be financed and constructed by the developer.

- **PS-1 – 6800 Pump Station –** A 400 horsepower pump station will need to be constructed that can deliver 1,200 gpm to the Lady Monument Tank. This pipeline will be needed prior to development occurring on any of the upper elevation portions of the Sorensen Property. Its recommended size is based on projected future development in the area as well as redundancy requirements as described earlier.
- **T-1 - 6800 Transmission Pipeline** – A 16-inch transmission line will need to be constructed from the existing 16-inch pipe in Hwy 32 to the Lady Monument Tank. The timeline and purpose for construction is the same as the 6800 Pump Station. The sizing of transmission pipe is also the same as the 6800 Pump station: it would be sized to provide redundancy for each of the scenarios described earlier.

Upper Area C

Several improvements will need to be made in the Upper Area C. The Upper Area C is currently undeveloped, and there are no plans to develop the area. Once plans are made to develop the area, the following improvements will need to be made. The time line for the following recommended improvements will depend on when the area develops. Although the timing of the development is currently unknown, it is assumed that it will not happen within the next 10 years.

The recommended improvement associated with Upper Area C would be sized to provide redundancy for each of the scenarios described earlier. As with the Sorensen Property improvements, it is expected these improvements will be financed and constructed by the developer.

- **T-4 and T-5 –** A 16-inch and a 12-inch transmission pipe will need to be constructed that connects the Lady Monument Tank to the Victory Ranch distribution infrastructure. These transmission pipelines will serve as the backbone for future development in Upper Area C.
- **PS-5 and PS-6 –** While normal water deliveries to Upper Area C will generally come from the Lady Monument Tank, it is recommended that facilities in the area be capable to moving water from east to west in an emergency. To accomplish this, two pump stations will be needed in Upper Area C. Based on projected demands in the Upper Area C and redundancy needs elsewhere, recommended capacities of the pump stations are 940 gpm for the lower pump station (PS-5) and 850 gpm for the upper (PS-6).

The improvements listed above may change when plans are in place to develop the Upper Area C. Once the development is laid out, a master plan will need to be written that indicates the size and location of the improvement, based on the layout of the roads, and the exact location of the future developments. After a master plan for that area is completed, the recommendations in this master plan will need to be updated.

Other Project Level Improvements

While not specifically identified here, there are a number of areas where additional project level improvements will be required (e.g. Mayflower, Pioche, Mustang, etc.). It is expected that facilities in these areas will be designed and constructed to meet District standards for projected demands.

District Improvements

Beyond the developer driven projects identified above, it is recommended that the District complete the following projects:

- **PS-2 – Deer Canyon Preserve Pump Station –** A pump station will need to be constructed that can deliver 130 gpm to the Deer Canyon Tank. The pump station will provide a redundant connection for a peak summer demand at full build-out to the Deer Canyon Preserve area. Because the area is currently being developed and the area will reach its build-out in the next 10-20 years, it is recommended that the pump station be constructed in the near future to provide the redundant capacity.
- **PS-3 and T-2 – Connection between Tuhaye and Victory Ranch –** A redundant connection between Tuhaye and Victory Ranch will need to be constructed. The connection will include a 25-horsepower pump station and a 12-inch transmission pipe that can deliver 680 gpm from the Victory Ranch area to Tuhaye. As part of the pump station, a flow control valve should also be included that will allow water to be delivered by gravity from Tuhaye to Victory Ranch. With the completion of the Upper Area C and Sorensen improvements identified above, this connection will create a full loop in the

system. The pipe, pump station, and flow control valve would be sized to provide redundancy for each of the scenarios described earlier.

- **PS–4 –** Once a complete loop has been constructed around the District, only one remaining improvement is needed to allow water to move either way around the loop. PS-4 is a proposed pump station at the boundary between Victory Ranch and Upper Area C. It is recommended that this pump station have a capacity of 800 gpm to pump water from the lowest pressure zone in Upper Area C into Victory Ranch. It should also be equipped with a flow control valve to deliver flow by gravity from Victory Ranch to Upper Area C.
- **T-3 – Connection to Future Treatment Plant –** A connection will need to be constructed to the future treatment plant (see Chapter 3). The treatment plant will not be constructed for approximately 25 to 30 years, and will be governed by future development patterns. The size and capacity of the treatment plant and the pipe will need to be included as part of a future study. For this purpose of this master plan, the pipe has been shown as a 16-inch transmission line.

CHAPTER 7
CAPITAL FACILITIES PLAN – WATER

INTRODUCTION

Recommended capital improvements pertaining to water supply, distribution system facilities, and storage facilities were identified in Chapters 3, 5, and 6, respectively. The purpose of this chapter is to summarize those recommended improvements and present a cost estimate for those recommended improvements.

CAPITAL IMPROVEMENT PLAN SUMMARY

The recommended capital improvements for JSSD have been summarized in Tables 7-1, 7-2, and 7-3. Included in those tables is a summary of each project, along with an itemized estimate of project costs. A 15 percent allowance for engineering, legal, and administrative costs has been included for each project. Each project has also been prioritized based on its level of importance relative to the JSSD goal of providing efficient and reliable water service to its customers. The location of each project is shown on Figure 7-1. We would also recommend that an update to this master plan and its associated analyses be completed every five to seven years. A cost has been included in the 10-year capital improvements budgeting schedule to update this master plan and its associated analyses.

Table 7-1
Supply Improvements

Project	Description	Quantity	Unit	Unit Cost	Construction Cost	Engineering (15%)	Total Project Cost
SUPPLY IMPROVEMENT PROJECTS							
SP-1	**Water IFFP Update**	1	LS	$40,000	-	-	$40,000
SP-2a	**Mine Tunnel Improvements - Shaft 6 Pumps**	1	LS	$600,000	$600,000	$90,000	$690,000
SP-2b	**Mine Tunnel Improvements - Silver Fissure**	1	LS	$1,200,000	$1,200,000	$180,000	$1,380,000
SP-3 or SP-4	**Mine Tunnel Redundant Bore Hole or Keetley Treatment Plant – Alternative Source Improvements**	1	LS	$6,400,000	$6,400,000	$960,000	$7,360,000
SP-5	**Expand the Keetley Treatment Plant to 16 mgd**	1	LS	$9,907,773	$9,908,000	$1,486,000	$11,394,000
SP-6	**Expand the Victory Ranch Well**	50	HP	$5,319	$266,000	$40,000	$306,000
SP-7	**Additional Treatment Plant**	1	LS	$16,800,000	$16,800,000	$2,520,000	$19,320,000
SUPPLY IMPROVEMENT PROJECTS							**$40,490,000**

L E G E N D

Existing Water Facilities

- Pump Station
- Tank
- Water Treatment Plant
- Well
- Pipe

Water Facility Improvements

- Pump Station
- Tank
- Water Treatment Plant

Pipe Improvements

Size (in)

- 12
- 16

SP–2 & SP-3 & SP-4 - Mine Tunnel Improvements
SP–5 - Water Treatment Plant
Expansion 8 MGD to 16 MGD

PS-3 and T-2 - 12" Waterline and
a 680 gpm at 25 HP Pump to
Provide a Backup Connection

Connect Waterline upstream of PRV

SP–6 - Expand the
Victory Ranch Well

PS-5 - Pump to Provide a backup
connection to Upper Cumming
940 gpm @ 80 HP

PS–4 - Pump to Provide a
backup Connection
800 gpm @ 25 HP

PS-6 - Pump to Provide a backup
connection to Upper Cumming
850 gpm @ 110 HP

PS-1 – 6800 Pump Station
to Lady Monument 400 HP

ST-1 - 6800 Tank
800,000 Gallons

ST-3 - Upper Area C Tanks
Area C Tanks 1 and 2
75,000 Gallons Per Tank

SP–7 - Future Water Treatment Plant

T-3 – Connection to Future Treatment Plant

T-1 - 6800 16" Transmission Pipeline

ST-2 - Victory Ranch Tank
Expand from 500,000
Gallons to 950,000 Gallons

Hideout

Jordanelle Reservoir

Midway

Heber City

Midway Ln

Center St

NORTH:

SCALE:

0 5,000 Feet

JSSD WATER SYSTEM IMPROVEMENTS

JSSD

JSSD WATER AND SEWER MASTER PLAN

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

FIGURE NO.

7-1

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Table 7-2
Storage Improvements

Project	Description	Quantity	Unit	Unit Cost	Construction Cost	Engineering (15%)	Total Project Cost
STORAGE IMPROVEMENT PROJECTS							
ST-1	**6800 Tank**	200,000	Gal	$1.16	$232,000	$35,000	$267,000
ST-2	**Additional Victory Ranch Tank**	450,000	Gal	$1.16	$523,000	$78,000	$601,000
ST-3	**Area C Tanks**	150,000	Gal	$1.16	$174,000	$26,000	$200,000
ST-4	**Future Development Tanks**	2,300,000	Gal	$1.16	$2,671,000	$401,000	$3,072,000
ST-5	**Additional Tuhaye Tank**	400,000	Gal	$1.16	$465,000	$70,000	$535,000
TOTAL STORAGE IMPROVEMENTS							**$4,675,000**

Table 7-3
Conveyance and Distribution Improvements

Project	Description	Quantity	Unit	Unit Cost	Construction Cost	Engineering (15%)	Total Project Cost
CONVEYANCE AND DISTRIBUTION IMPROVEMENTS							
PS-1	**6800 Pump Station**	700	HP	$4,856	$3,399,000	$510,000	$3,909,000
T-1	**6800 Transmission Pipeline**	8,450	LF	$193	$1,633,000	$245,000	$1,878,000
PS-2	**Deer Canyon Preserve Pump Station**	20	HP	$5,319	$106,000	$16,000	$122,000
PS-3	**Victory Ranch to Tuhaye Pump Station**	50	HP	$5,319	$266,000	$40,000	$306,000
T-2	**Victory Ranch to Tuhaye 12 Inch Pipe**	13,000	LF	$158	$2,059,000	$309,000	$2,368,000
T-3	**Connection to Future Treatment Plant**	3,000	LF	$240	$720,000	$108,000	$828,000
PS–4	**Upper Area C Pump Station 4**	25	HP	$5,319	$133,000	$20,000	$153,000
PS-5	**Upper Area C Pump Station 5**	80	HP	$5,319	$426,000	$64,000	$490,000
PS-6	**Upper Area C Pump Station 6**	110	HP	$4,856	$534,000	$80,000	$614,000
T-4	**Upper Area C Transmission 12 Inch Pipe**	18,000	LF	$158	$2,851,000	$428,000	$3,279,000
T-5	**Upper Area C Transmission 16 Inch Pipe**	12,000	LF	$193	$2,318,000	$348,000	$2,666,000
CONVEYANCE AND DISTRIBUTION IMPROVEMENTS							**$16,613,000**

IMPLEMENTATION PLAN

Project prioritization, implementation, and a 10-yr budget plan for water system improvements are discussed in Chapter 15.

CHAPTER 8
WATER SYSTEM RENEWAL

INTRODUCTION

In addition to the capacity related improvements described in previous chapters, it is recommended that JSSD consider and prepare for expected future expenditures associated with the general maintenance and renewal of the existing distribution system. The purpose of this chapter is to present recommendations regarding system maintenance and renewal.

RECOMMENDED CAPITAL IMPROVEMENT BUDGET

As with most things, each component of a water system has a finite service life. As such, it is necessary to continually budget money for the rehabilitation or replacement of these system components. If adequate funds are not set aside for regular system renewal, the water system will fall into disrepair and be incapable of providing the level of service that customers in JSSD expect. To maintain the water system in good operating condition, it is recommended that the JSSD annual budget for system renewal be approximately equal to the replacement value of the system divided by its estimated service life.

- **Replacement Value –** The replacement value of the JSSD water system is estimated to be $110 million. This estimate has been prepared using the JSSD GIS database and includes the value of JSSD pipelines, PRVs, the WTP, and the storage tanks.
- **Service Life –**The service life for water facilities can vary greatly depending on the type of facility and the conditions in which it serves. Most pipelines will have design lives of 60 to 80 years. Conversely, mechanical equipment like pumps and control valves are designed with 20 to 30 year lives. For the purposes of this analysis, it has been assumed that the average life of water facilities in the JSSD system is between 50 and 100 years.

Based on these estimates, the annual capital improvements budget for JSSD could be set at somewhere between $1,100,000 and $2,200,000. However, because the system is relatively new, and because the existing distribution piping has capacity to meet demands through the year 2055, increasing the annual budget to $1,100,000 or above may be higher than necessary, and would increase the rates in JSSD to an undesirable level. Based on the needed capital improvements within the next ten years, we would recommend that JSSD fund system investment (including both new facilities and rehabilitation and replacement) at a minimum of $345,000 in 2015. This should increase gradually overtime to reflect aging of the system and growth in its value as facilities are added.

CHAPTER 9
EXISTING SEWER FACILITIES

INTRODUCTION

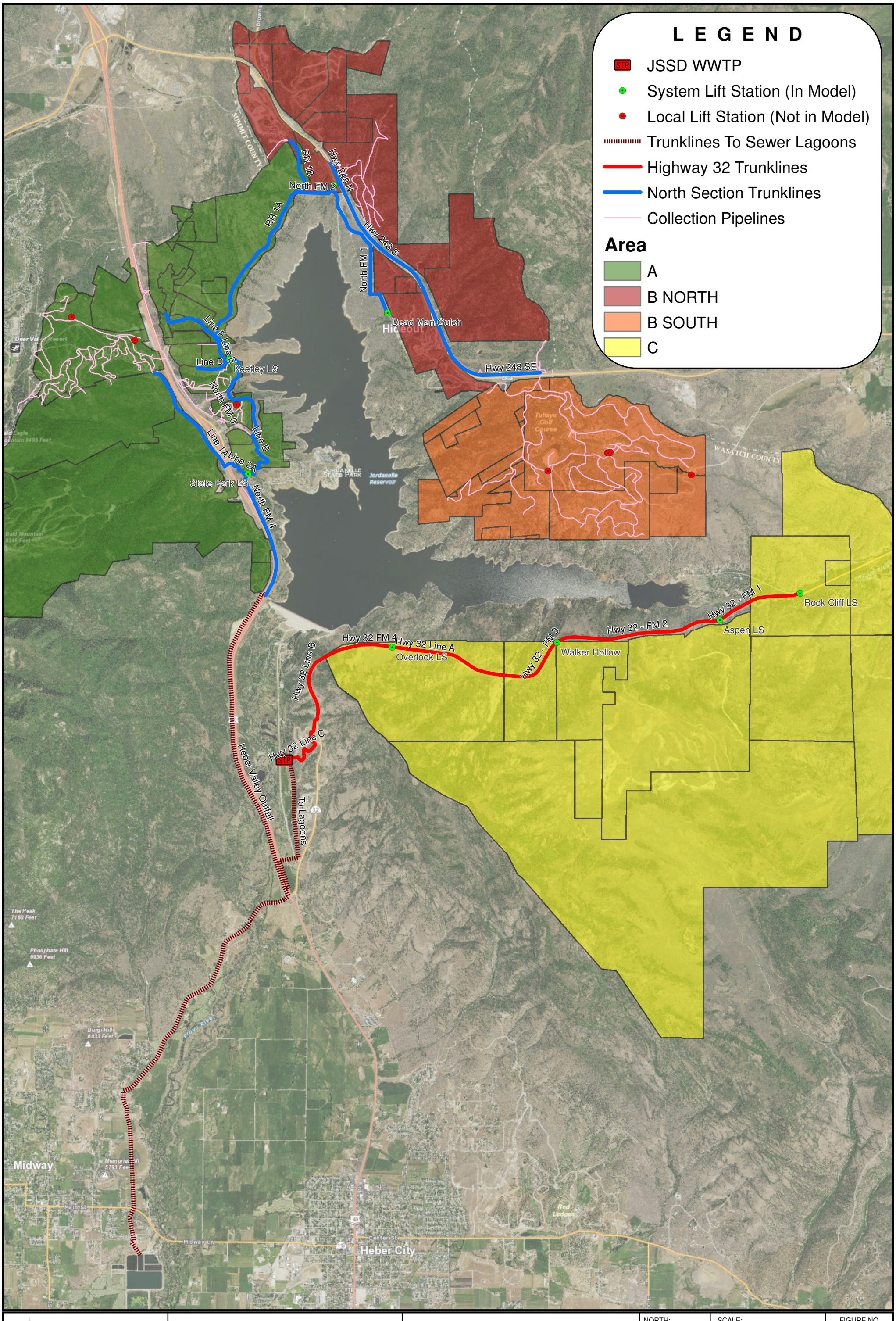
The purpose of this chapter is to summarize the characteristics of the existing facilities of the JSSD sewer collection system. It is intended as a quick reference for JSSD personnel regarding information on the trunk lines of the system. Included is information about collection pipelines, major lift stations, and treatment facilities.

COLLECTION SYSTEM

JSSD's sewer collection system is divided into two major sections as shown in Figure 9-1. The North section consists of flows from development areas A, B North, and B South, while the Highway 32 section receives flows from Area C only. These two sections currently combine near the intersection of Highway 32 and Highway 40 and continue to the Heber Valley Reclamation Facility, west of Heber City, Utah.

Discharging into these two main trunk lines is a network of smaller wastewater pipes and laterals. Where known, the locations of these smaller sewer branches are shown in the figure. Unfortunately, not all of the smaller lines have been located for mapping. For future use, it is recommended that a full inventory of this network be collected and added to the model.

Table 9-1 summarizes the trunk line data for all pipelines in the JSSD sewer collection system that were modeled in this master plan. This is separated in to gravity pipes and force mains. In addition, there are approximately 180,000 linear feet of collection lines that were not modeled.



Bowen Collins & Associates, Inc. CONSULTING ENGINEERS	JSSD WATER AND SEWER MASTSER PLAN	EXISTING SEWER COLLECTION FACILITIES	NORTH: NORTH	SCALE: 0 4,500 Feet	FIGURE NO. 9-1

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Table 9-1
Summary of Modeled Sewer Pipelines[1]

Gravity Lines			
Pipe Diameter	**Length (ft)**	**Length (mi)**	**% of Total**
8"	8,096	1.5	12.8%
10"	20,757	3.9	32.7%
12"	5,393	1.0	8.5%
14"	130	0.0	0.2%
15"	26,770	5.1	42.2%
18"	2,234	0.4	3.5%
Total	63,380	12.0	
Force Mains			
Pipe Diameter	**Length (ft)**	**Length (mi)**	**% of Total**
6"	13,512	2.6	23.2%
8"	7,002	1.3	12.0%
10"	10,081	1.9	17.3%
12"	9,276	1.8	16.0%
16"	18,269	3.5	31.4%
Total	58,140	11.0	

[1] Does not include approximately 180,000 feet of collection pipelines outside the District's main trunk lines.

LIFT STATIONS

JSSD currently has 15 sewer lift stations, but only eight are along the main trunk lines of the collection system. Figure 9-1 shows all lift stations, while Table 9-2 summarizes the capacity of the eight lift stations along the trunk lines.

Table 9-2
Summary of Major District Lift Stations[1]

Lift Stations	Capacity (gpm)
Dead man Gulch Lift Station[2]	170
Ross Creek Lift Station	1,530
Keetley Lift Station	1,235
State Park Lift Station	1,500
Rock Cliff Lift Station	375
Aspen Lift Station	1,870
Walker Hollow Lift Station	2,125
Overlook Lift Station	2,380

[1] Does not include 7 additional lift stations outside the District's main trunk lines.
[2] Part of the Hideout Town system

TREATMENT PLANT

Currently, wastewater is being treated at Heber Valley's Reclamation Facility. This can continue as long as Heber Valley has available capacity. JSSD has built a bio-reactor Wastewater Treatment Plant (WWTP) to service Area C of the District. This plant was designed for an average day flow capacity of 1.0 mgd. This equates to a State capacity rating for peak month average day flows of 1.2 mgd.

The District's WWTP is not currently in operation because there is not enough flow from Area C for proper operation of the plant. The plant can be put into operation when flows reach a minimum of 144,000 gpd. Currently, JSSD has approximately 425,000 gpd of wastewater flows, but most of this flow is in Areas A and B. These areas do not own capacity in the treatment plant and are not currently connected to the plant. To utilize the new WWTP, an agreement for use of capacity would need to be reached and a pipe would need to be constructed that connects the trunk lines to the WWTP. Some minor improvements within the plant and training JSSD personnel to run the WWTP would also be needed.

CHAPTER 10
COLLECTION SYSTEM EVALUATION

INTRODUCTION

In order to evaluate the ability of the JSSD sewer collection system to serve the needs of its existing and future customers, a hydraulic model was created using data from a previous Microsoft Excel model (provided by Jackson Engineering), as-built drawings, and field data collection. The purpose of this model was to simulate existing and future demands on the collection system. Based on the results of the model simulations, improvements can then be evaluated to remedy any identified deficiencies. The purpose of this chapter is to document the results of the collection system evaluation based on hydraulic modeling.

HYDRAULIC MODEL

The hydraulic model was developed in Microsoft Excel using hydraulic equations in order to estimate wastewater flows and pipe capacities. Full pipe flow capacities were calculated using Manning's equation. Wastewater flows were estimated based on 340 gpd per ERU (including infiltration) as discussed in Chapter 2. A peaking factor of 2.5 was applied to account for peak hour flows. Lift station capacities were provided by JSSD.

The advantage of a spreadsheet model is that it simplifies the analysis and makes identifying problem areas such as bottleneck areas easy. Though a spreadsheet model does not provide a detailed surface water profile that includes backwater calculations, hydraulic routing, attenuation, etc., it does provide direct calculation of the capacity of each pipe that can be used to develop recommended improvements on a master plan level. It is recommended that prior to final design of any improvements, a more robust hydraulic model (such as InfoSewer, Autodesk Sanitary Sewer Analysis or similar) be developed which includes backwater, hydraulic routing, attenuation, etc.

GEOMETRIC MODEL DEVELOPMENT

There are two major types of data required to create a hydraulic model of a sewer system: geometric data and flow data. Geometric data consists of all information in the model needed to represent the physical characteristics of the system. Flow data is the estimated wastewater entering the collection system.

Modeled Pipelines

It was not economically feasible to model all of the sewer pipes in the JSSD sewer system. As smaller pipes are added to the model, the more refined the analysis becomes, but this requires additional time, effort, and expense. Hence, it is important to consider the required accuracy and available budget when selecting the sewer lines to model. This analysis has correspondingly been limited to the major trunk lines in the District servicing multiple developments. Project level improvements serving single developments have not been included at this time.

Information on the physical characteristics of the pipes came from spreadsheet data provided by Jackson Engineering, as-build drawings, and field data collection. The data included pipe diameter, length, location, rim elevations, and measure down depths/invert elevations.

Modeled Lift Stations

Eight existing lift stations were included in the model of the JSSD system. The eight lift stations (Dead Man Gulch, Ross Creek, Keetley, State Park, Rock Cliff, Aspen, Walker Hollow, and Overlook) were modeled using available pump capacity information. Details for existing lift station characteristics were summarized in Chapter 9.

FLOW MODEL DEVELOPMENT

The second type of data required by the hydraulic model is sewer flow into the modeled pipes. Required information includes magnitude of flow and point of entry into the system.

To estimate flow magnitudes and distribution, the service area was divided into 44 sub basins that correspond to the development areas shown on Figure 10-1. It should also be noted that flows from North Village are being transported in JSSD system. Figure 10-1 shows where North Village flows enter the JSSD system. Tables 10-1 through 10-4 show the projected development and flows for each trunk line in the system (see Figure 9-1 for location of pipes). The first two tables include this information for projected demands only based on growth as outlined in Chapter 2. The second two tables provide the same information including sold capacity. For the evaluation of conveyance capacity, all sold shares were modeled as existing flows. This was done to preserve capacity in the pipe for those who have already purchased capacity. If an agreement can be developed to loan a portion of the sold capacity to new users, some projects could be deferred until the sold capacity comes on line.

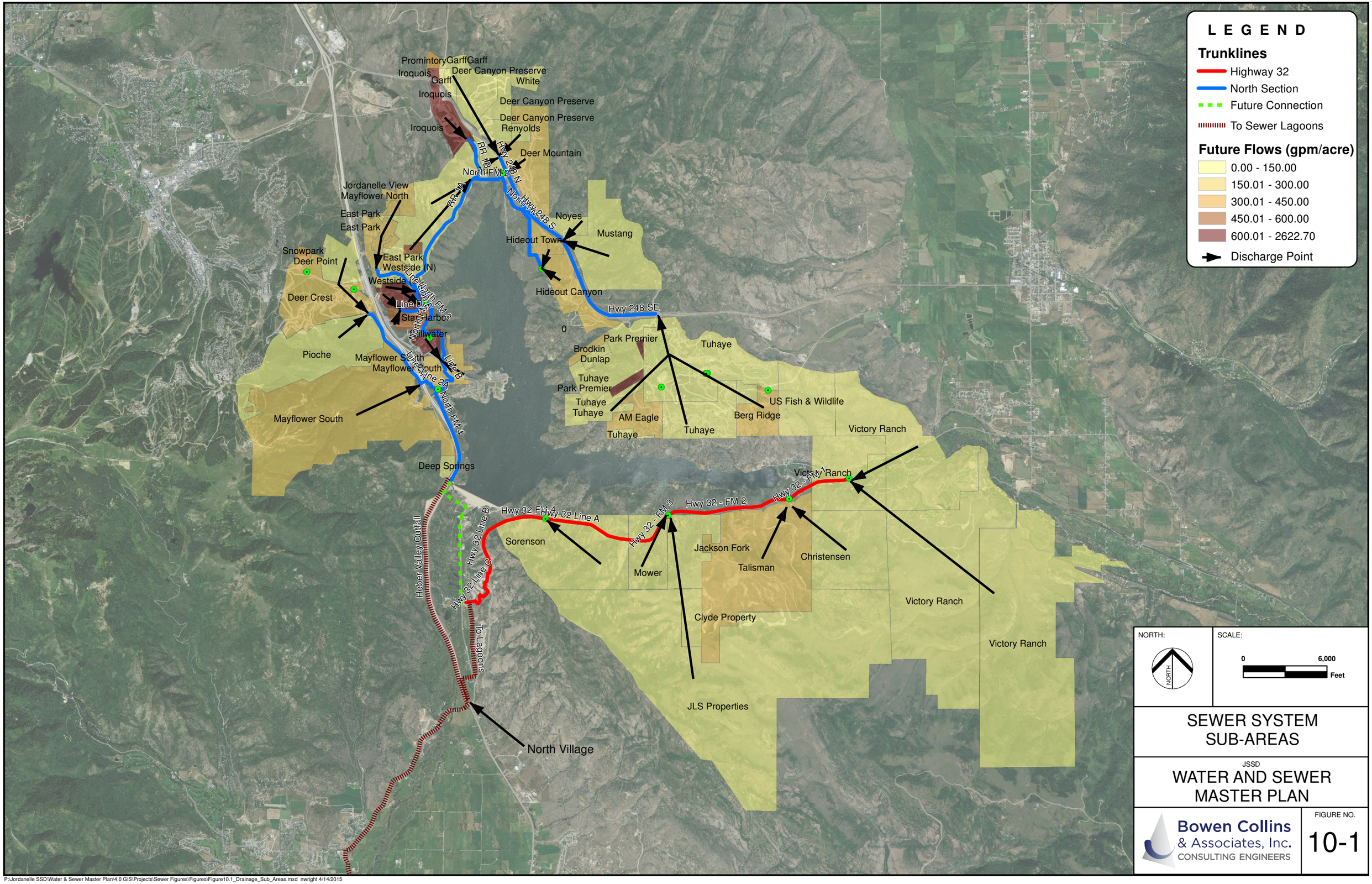

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Table 10-1
Projected Upstream Development by Pipe – Actual Connections (ERUs)

Label	2015 ERU's	2025 ERU's	2055 ERU's
Hwy 248 SE	221	450	1092
Hwy 248 S	521	776	1655
Hwy 248 N	26	80	220
North FM 1	117	162	209
North FM 2	664	1018	2084
RR 1B	74	400	512
RR 1A	738	1468	2894
Line F	0	0	215
Line E	0	0	941
Line D	141	141	141
North FM 3	879	1609	3976
Line B	1039	1835	4543
Line A-1	203	241	412
Line A-2	203	490	1268
North FM 4	1242	2395	5810
Heber Valley Outfall	1407	3060	8187
WWTP Connection	1242	2395	5817
Hwy 32 FM 1	13	25	421
Hwy 32 FM 2	13	25	1399
Hwy 32 FM 3	13	25	1598
Hwy 32 Line A	13	25	1872
Hwy 32 FM 4	13	25	1872
Hwy 32 Line B	13	25	1872
Hwy 32 Line C	13	25	1872
Total JSSD Connections	1256	2421	7689

Table 10-2
Projected Flow by Pipe – Actual Connections (gpm)

Label	2015 Peak Hour Flows	2025 Peak Hour Flows	2055 Peak Hour Flows
Hwy 248 SE	130	266	644
Hwy 248 S	308	458	977
Hwy 248 N	15	47	130
North FM 1	69	96	123
North FM 2	392	601	1230
RR 1B	44	236	302
RR 1A	436	867	1708
Line F	0	0	127
Line E	0	0	555
Line D	83	83	83
North FM 3	519	950	2347
Line B	614	1146	2753
Line A-1	120	142	243
Line A-2	120	268	676
North FM 4	733	1414	3430
Heber Valley Outfall	888	1956	5547
WWTP Connection	733	1414	3434
Hwy 32 FM 1	8	15	249
Hwy 32 FM 2	8	15	826
Hwy 32 FM 3	8	15	943
Hwy 32 Line A	8	15	1105
Hwy 32 FM 4	8	15	1105
Hwy 32 Line B	8	15	1105
Hwy 32 Line C	8	15	1105
Total JSSD Connections	741	1429	4539

Table 10-3
Projected Development by Pipe – With Sold Capacity (ERUs)

Label	2015 ERU's	2025 ERU's	2055 ERU's
Hwy 248 SE	625	625	1092
Hwy 248 S	984	985	1670
Hwy 248 N	26	80	220
North FM 1	381	381	381
North FM 2	1391	1446	2271
RR 1B	512	512	512
RR 1A	1228	1908	3116
Line F	320	320	359
Line E	653	653	1166
Line D	141	141	141
North FM 3	2022	2702	4423
Line B	3075	3785	5516
Line A-1	486	492	600
Line A-2	1825	1831	1939
North FM 4	4900	5616	7455
Heber Valley Outfall	5077	6293	9837
WWTP Connection	4912	5628	7467
Hwy 32 FM 1	749	749	760
Hwy 32 FM 2	2533	2,533	2544
Hwy 32 FM 3	2818	2818	2872
Hwy 32 Line A	3318	3318	3372
Hwy 32 FM 4	3318	3318	3372
Hwy 32 Line B	3318	3318	3372
Hwy 32 Line C	3318	3318	3372
Total JSSD Connections	9395	9486	11027

Table 10-4
Projected Flow by Pipe – With Sold Capacity (gpm)

Label	2015 Peak Hour Flows	2025 Peak Hour Flows	2055 Peak Hour Flows
Hwy 248 SE	369	369	644
Hwy 248 S	581	581	986
Hwy 248 N	15	47	130
North FM 1	225	225	225
North FM 2	821	854	1341
RR 1B	302	302	302
RR 1A	725	1127	1839
Line F	189	189	212
Line E	385	385	688
Line D	83	83	83
North FM 3	1194	1595	2611
Line B	1815	2234	3256
Line A-1	287	290	356
Line A-2	1077	1081	1145
North FM 4	2893	3315	4401
Heber Valley Outfall	2997	3715	5807
WWTP Connection	2900	3322	4408
Hwy 32 FM 1	442	442	449
Hwy 32 FM 2	1495	1495	1502
Hwy 32 FM 3	1663	1663	1695
Hwy 32 Line A	1959	1959	1991
Hwy 32 FM 4	1959	1959	1991
Hwy 32 Line B	1959	1959	1991
Hwy 32 Line C	1959	1959	1991
Total JSSD Connections	5546	5599	6509

EVALUATION CRITERIA

In defining what constitutes a deficiency, it is important to consider the assumptions made in estimating sewer flows in the model. As described above and in Chapter 2, the sewer flow included in the model is composed of two parts: domestic sewer flow and infiltration. Only limited meter data was available for estimated domestic sewer flow and infiltration was estimated from wastewater collection systems having similar characteristics. Because these estimates are based on average values and a limited data set, actual flows will fluctuate and may be greater than the model estimates. For example, infiltration during extremely wet years could

be more than estimated in the model. The criteria established for identifying deficiencies should be sufficient to account for occasional flows higher than those estimated in the model. Evaluation criteria used in this master plan are as follows:

- **Gravity Pipelines:** For master planning purposes, a pipe was considered deficient where the peak hour flow is greater than 75 percent of the pipe's full flow capacity. The remaining 25 percent of the pipe's capacity was reserved for inflow and/or unaccounted fluctuations in domestic flow and infiltration.
- **Pressure Force Mains:** Velocities in force mains over 7 fps were considered deficient.
- **Lift Stations:** The lift station was considered deficient if peak flows exceeded 85 percent of the reliable pump capacity. Allowing for a modest amount of extra capacity accounts for variations in flow as discussed previously, and for some mechanical wear and decreased efficiency for pumps at each lift station.

EXISTING SYSTEM ANALYSIS

The existing sewer collection system has generally been sized for future demands, but much of this capacity has already been sold. As stated in the flow model development portion of this chapter, all facilities were modeled assuming that sold capacity is already taken in order to meet future capacity obligations. With sold capacity included, a few deficiencies were found with the existing system.

Deficiencies

- **Line B -** Line B is deficient in two locations. At the upstream end, a few sections of pipe are 12" diameter and are slightly undersized. Near the downstream end, the existing 15" diameter pipe has little slope resulting in slightly less than the sold capacity.
- **Heber Valley Outfall –** Based on the sold flows for the system the Heber Valley Outfall line is deficient throughout the length of the pipe.
- **Lift Stations -** The Dead Man Gulch Lift Station, State Park Lift Station, Keetley Lift Station, and Rock Cliff Lift Station all have less capacity than the amount sold. This is by design since oversizing of lift stations can lead to problems. It has long been the intent of the District to add capacity at the lift stations based on actual developed flows in the system.

It should be noted that Railroad 1B initially appeared to have a deficient section at its very downstream end. However, this is a relatively short section that appears to be deficient only because of a very flat slope. Further evaluation has determined that backwater associated with this short section of pipe does not actually exceed depth design criteria. Therefore, this is not a system deficiency.

FUTURE SYSTEM ANALYSIS

Much of the demand associated with future growth is already represented in the existing system analysis as sold capacity. However, there is also a portion of future growth expected through 2055 that does not have purchased capacity and will further add to demands. Based on an analysis through 2055, one additional deficiency was discovered beyond those identified above. North Force Main 3 will become deficient with the added flows associated with future development. Future growth (without purchased capacity) does add to the required capacity of the future improvements required to resolve each deficiency and will need to participate in their costs.

Figure 12-1 shows all deficiencies in the collection system that were found through 2055. It will be noted, that all pipelines and lift stations along Highway 32 appear to have sufficient capacity to meet demands through 2055.

Along with the need for capacity expansion improvements, it is proposed that a connection to the WWTP from the North section of the system be made in order to give the plant sufficient flows to properly operate the plant and eliminate the need to use Heber Valley's Reclamation Facility. This will be discussed in more detail in Chapter 11.

Conclusions and Recommendations

As stated earlier, much of the existing JSSD system is sized to meet future demands. Below are the recommended sewer improvements needed to facilitate growth through 2055. The timing of all projects are dependent on future development. A map of recommended improvements is included in chapter 12.

- **P-1 - WWTP North Connection** – The plant is currently not operating because there is not enough flow from Area C of the sewer collection system to operate the plant properly. In order to put the plant in service initially, a connection pipe from the North section to JSSD's new WWTP will need to be constructed. It is recommended that an 18" to 24" line connect the existing North section to JSSD's WWTP. Currently a 6" line exists along a portion of this reach, but this pipe would be insufficient to convey existing flows from the North Section. See Chapter 11 for further information regarding the plant and this connection.
- **P-2 - Line B -** It is recommended that a new 18" line be placed parallel to Line B.
- **FM-1 - North Force Main 3 –** Downstream of the Keetley Lift Station the force main lacks capacity. It is recommended that a new 8" line be installed parallel to the existing 10" and 6" lines. Alternatively, one of the existing force mains could be upsized.
- **FM-2 - North Force Main 4 –** Downstream of the State Park Lift Station the force main lacks capacity. It is recommended that a new 10" line be installed parallel to the existing 12" and 8" lines. Alternatively, one of the existing force mains could be upsized.
- **LS-1 - State Park Lift Station -** Currently the State Park Lift Station has a capacity of 1,500 gpm. By 2055, it will need to accommodate a flow of 4,400 gpm. Based on the District's design standard of not exceeding 85 percent pump capacity, the State Park Lift

Station will eventually need to be expanded to a capacity of no less than 5,180 gpm. The needed future horsepower is approximately 730 HP. It should also be noted that this lift station is in a poor location for both current maintenance and future expansion potential. Once the existing station reaches capacity, it is recommended that new locations for the lift station be considered to improve future operation.

- **LS-2 - Keetley Lift Station** - Currently the Keetley Lift Station has a capacity of 1,235 gpm. By 2055, it will need to accommodate a flow of 2,610 gpm. Based on the District's design standard of not exceeding 85 percent pump capacity, the Keetley Lift Station will eventually need to be expanded to a capacity of no less than 3,070 gpm. The needed future horsepower is approximately 300 HP.

It should also be noted that Line 2a which takes a significant portion of the Mayflower South development will be very near capacity in 2055. This pipeline should be reevaluated if more development occurs in the Mayflower South area than is predicted in this report.

It should be noted that all of the sizes and capacities shown are based on projected demand patterns and approximate pipeline alignments. Final sizes and capacities will need to be reviewed carefully as part of detailed design.

CHAPTER 11
TREATMENT SYSTEM EVALUATION

INTRODUCTION

The purpose of this chapter is to summarize the capacity of JSSD's new wastewater treatment plant (WWTP) to meet projected demands. Although this study does not look into the specifics of treatment processes at the WWTP, a general evaluation of capacity relative to the Peak Month, Average Day Capacity will be considered in order to compare future flows to the capacity of the WWTP.

HEBER VALLEY RECLAMATION FACILITY

JSSD currently sends all its wastewater to Heber Valley's Reclamation Facility for treatment. JSSD does not have an agreement with Heber Valley Special Service District guaranteeing a certain capacity. However, since Heber Valley currently has excess capacity, they allow JSSD's flows to be treated for a fee. While Heber Valley has been a satisfactory provider for wastewater treatment in the past, the absence of committed future capacity has required the District to pursue longer-term alternatives for treatment. The existing pipeline that conveys flows from JSSD to the Heber Valley Reclamation Facility has capacity to service demands for the next 8-9 years based on current projections. Based on capacity sold, the pipeline is already deficient. Before this pipeline reaches capacity, the District will need accommodations in place to treat flows elsewhere.

JSSD WASTEWATER TREATMENT PLANT

Recently, JSSD constructed a new WWTP to serve demands from Area C of the District. This plant requires a minimum flow of approximately 144,000 gpd for proper operation. JSSD currently has 425,000 gpd of wastewater, but the majority of the flow comes from the North Section of the District (Areas A and B) which is not connected to the WWTP and does not own capacity in the plant. In Chapter 10, it was recommended that a new connection be made between the North Section of the District and the WWTP. This would allow the plant to be operated until development in Area C growths into its capacity.

WWTP CAPACITY

JSSD's new WWTP has an average annual capacity of 1.0 mgd. For the purposes of design for most treatment processes, capacity is also defined for the peak month, average day flow. The peak month, average daily capacity corresponds to the maximum allowable average daily flow under summer infiltration. The current rating of the plant for peak month, average day flow is 1.2 mgd. It should be noted that this is based on the treatment plant's current rated capacity based on existing regulations. As discharge regulations become stricter, the effective treatment capacity may be reduced because of higher treatment standards.

Figure 11-1 shows projected sewer flows for the peak month, average day compared to the plant capacity. For discussion purposes, projected flow have been divided between Area C and the rest of the District. Also shown in the figure are projected flows from the Red Ledges development and NVSSD, both of which plan to eventually send wastewater to JSSD for treatment. Figure 11-2 shows similar information, but replaces projected flows from Area C and Red Ledges with actual sold capacity. As noted above, the plant was originally built to serve capacity purchased by Area C. Since that time, Red Ledges has also purchased treatment capacity for up to 1,210 ERUs in a future facility. From these figures, the following conclusion can be made:

- **WWTP Capacity – Projected Flows:** If North Village and Areas A and B are connected to the plant, flows at the plant based on current sewer flow projections presented in Chapter 2 are not expected to exceed plant capacity until sometime after 2025.
- **WWTP Capacity – Area C Sold Capacity**: With the inclusion of sold capacity for Area C, essentially all of the existing capacity in the plant has been consumed. As result, servicing flow from Red Ledges, NVSSD, or Areas A and B will require the construction of additional capacity.

RECOMMENDATION

JSSD has recently built a new WWTP to serve Area C. Unfortunately, projected flows from Area C will not be sufficient to operate the plant for some time. To solve this challenge and provide treatment for North Village and Areas A and B, it is recommended that an agreement be developed to loan capacity on an interim basis to allow North Village and Areas A and B into the plant. As Area C grows and requires its purchased capacity, the flows from Areas A and B can be displaced from the plant and moved into new treatment facilities to be constructed by the District.

Specific tasks required to follow this recommendation include:

- **WWTP Startup** – When the District decides to put the WWTP into operation, the following is recommended:
    - Construct a pipeline to connect to Areas A and B from the north (see Chapter 10).
    - Install new SCADA system equipment where needed and program the existing SCADA equipment.
    - Inspect equipment, which has been sitting dormant, to ensure proper operation.
    - Train personnel regarding proper operation of the equipment.
- **Expand WWTP –** As future flows increase, the capacity of the existing WWTP will eventually need to be expanded. Based on growth projections, at least 2.5 MGD of additional capacity will need to be treated by the end of the planning window (2055). This will likely be accomplished in phases with each phase being similar in size to the existing facilities (1.2 MGD).

Figure 11-1
Projected Flow and Wastewater Treatment Plant - Projected Flows

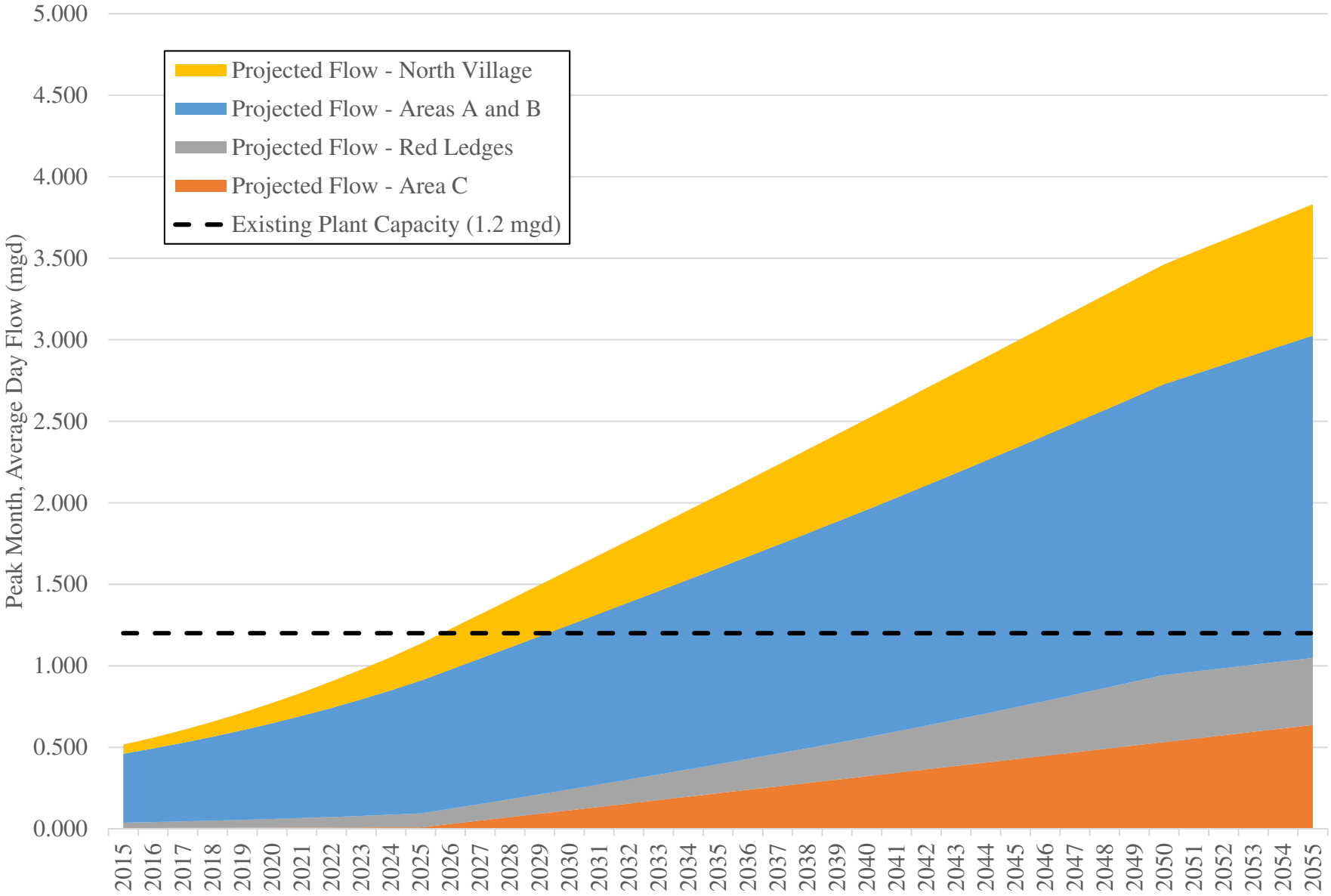
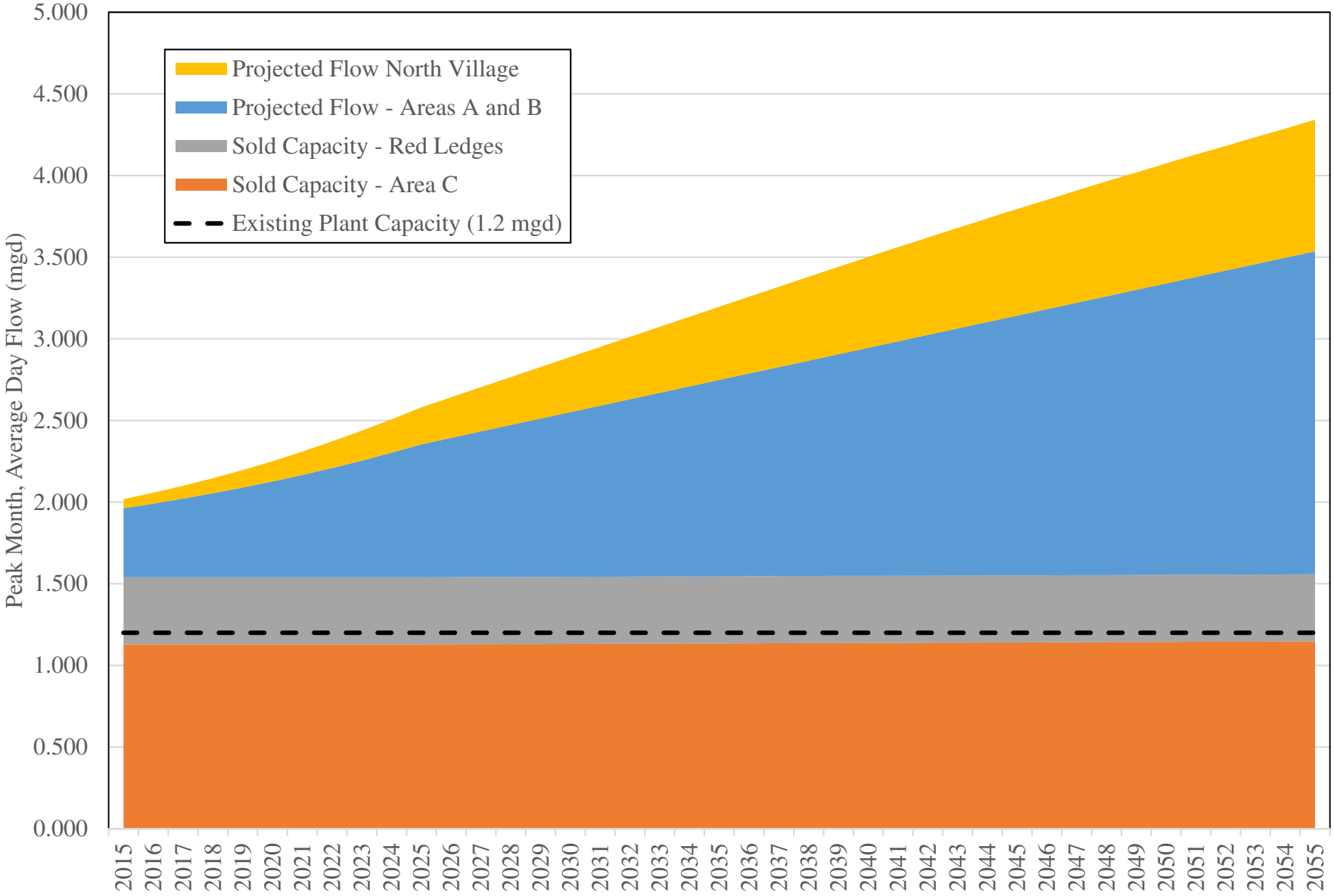


Figure 11-2
Projected Flow and Wastewater Treatment Plant - Area C Sold Flows



CHAPTER 12
CAPITAL FACILITIES PLAN – SEWER

INTRODUCTION

Recommended capital improvements pertaining to sewer collection piping, lift stations and treatment facilities were identified in Chapters 10 and 11 respectively. The purpose of this chapter is to summarize those recommended improvements and present a cost estimate for all recommended improvements discussed in this report.

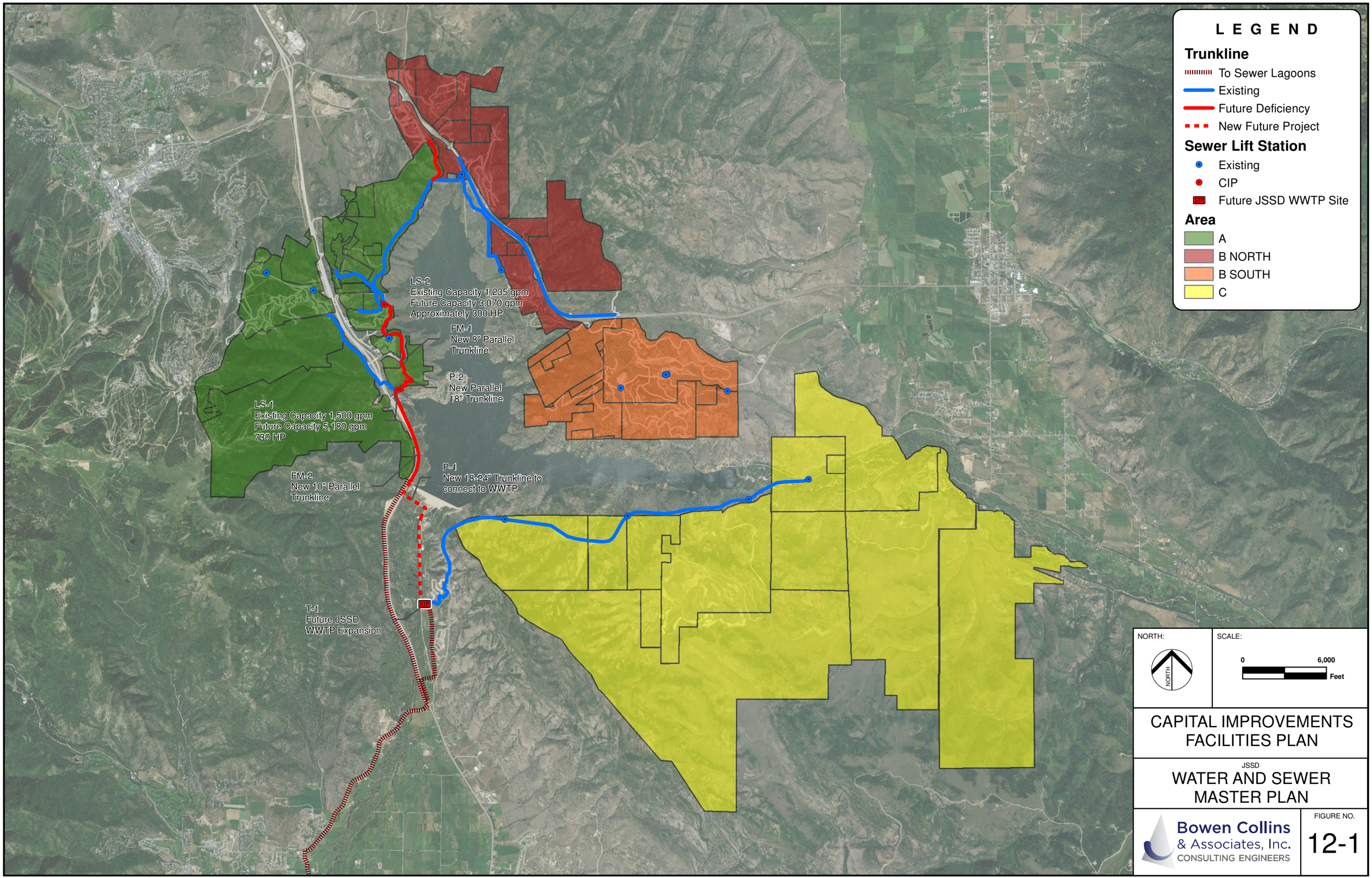
CAPITAL IMPROVEMENT PLAN SUMMARY

The recommended capital improvements for JSSD have been summarized in Tables 12-1, 12-2, and 12-3. Included in these tables is a summary of each project, along with an estimate of project costs. An appropriate construction contingency has been included for each project along with 15 percent for engineering, legal, and administrative costs. Costs estimates are based on 2015 construction costs and will need to be adjusted according to the actual construction date.

Each project has also been prioritized based on its level of importance relative to the JSSD goal of providing efficient and reliable wastewater service to its customers. The location of each project is shown on Figure 12-1. It is also recommend that an update to this master plan and its associated analyses be completed every five to seven years.

Table 12-1
Conveyance Improvements

Project	Description	Construction Costs (2015 Dollars)	Engineering Costs	Total Project Cost
P-1	Install new 18" to 24" line from Force Main 4 to the new WWTP	$3,043,211	$456,482	$3,499,693
P-2	Install 18" parallel line next to Line B	$904,119	$135,618	$1,039,737
FM-1	Install 8" parallel line next to North FM3	$700,000	$105,000	$805,000
FM-2	Install 10" parallel line next to North FM4	$645,840	$96,876	$742,716



CAPITAL IMPROVEMENTS FACILITIES PLAN

JSSD

WATER AND SEWER MASTER PLAN

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

FIGURE NO.
12-1

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Table 12-2
Lift Station Improvements

Project	Description	Construction Costs (2015 Dollars)	Engineering (15%)	Total Project Cost
LS-1	Install New Lift Station with capacity of 5,180 gpm	$1,884,176	$282,626	$2,166,803
LS-2	Install New Lift Station with capacity of 1,620 gpm	$781,191	$117,179	$898,369

Table 12-3
WWTP Capacity Updates

Project	Description	Construction Costs (2015 Dollars)	Engineering (15%)	Total Project Cost
T-1	WWTP Start-up Costs	$240,000	$36,000	$276,000
T-2	Expand Treatment Plant (Phase 1)	$14,400,000	$2, 160,000	$16,560,000
T-3	Expand Treatment Plant (Phase 2)	$14,400,000	$2, 160,000	$16,560,000

It will be noted that no exact construction timing has been included in the tables. This is for two reasons. First, growth in the District has been unpredictable. The timing of projects could change dramatically depending on future growth patterns. Second, the need for projects may also depend on whether or not agreements can be reached regarding temporary use of sold capacity in various project components. Regardless of the exact timing, the ultimate implementation of the improvements identified in the tables should allow JSSD to be able to continue to provide reliable wastewater services to their customers for the foreseeable future.

CHAPTER 13
SEWER SYSTEM RENEWAL

INTRODUCTION

In addition to the capacity related improvements described in previous chapters, it is recommended that JSSD consider and prepare for expected future expenditures associated with the general maintenance and renewal of the existing collection system. The purpose of this chapter is to present recommendations regarding system maintenance and renewal. This is not a comprehensive evaluation of existing maintenance procedures or system conditions, nor is it a complete asset management plan. Instead, it is a collection of general observations assembled during the master planning process relative to system maintenance and renewal.

SYSTEM RENEWAL

Along with system capacity improvements, effective infrastructure planning must also include asset rehabilitation and replacement, commonly termed renewal. To effectively identify which system facilities need replacement and plan for future asset renewal projects, JSSD needs to continue to accurately assess and document the condition of system assets. Towards this goal, BC&A would recommend improvements in what data is collected and stored regarding system facilities and how the condition of existing facilities is assessed.

Condition Assessment

JSSD has a relatively new collection system and it is understood that minimal inspection on the system is in place. BC&A would recommend condition assessment program be instituted to help keep the system in good working conditions for the life of the system. The following are recommended as part of the program.

- **Condition Assessment Coding Using PACP –** The Pipeline Assessment and Certification Program (PACP) is a nationally recognized format for documenting sewer system deficiencies. It is recommended that JSSD consider adopting PACP to maintain more consistent defect coding during inspection and to make the inspection data more useful for asset management purposes.
- **Inspection Schedule –** It is recommended that the entire system be inspected on average once every 10 years to provide sufficient inspection frequency to identify most pipe deterioration issues before they become problems. Priority pipes should be checked more frequently. In some cases, groundwater, root intrusion, and/or sediment concerns may also merit more frequent inspection. If PACP inspection is adopted, JSSD will be able to establish an inspection history for each pipeline in the system to determine which mains may need more frequent inspection.

SYSTEM RENEWAL BUDGET

As with most things, each component of a sewer system has a finite service life. As such, it is necessary to continually budget money for the rehabilitation or replacement of these system components. If adequate funds are not set aside for regular system renewal, the sewer system will fall into disrepair and be incapable of providing the necessary level of service. The purpose of this section of the report is to evaluate how much money JSSD should be budgeting for the purpose of system renewal.

System Pipes

The total cost to replace all of the pipes in JSSD's Collection system would be approximately $62.5 million based on 2015 construction costs. For the purposes of this evaluation, BC&A recommends that JSSD assume a 100-year system service life. This is probably not unreasonable given the observed performance of historic sewer collection systems and the expected design lives of new materials. To replace 1% of the collection system every year (or 100% every 100-years), it would cost approximately $625,000/year.

In reality, it will not be necessary to completely replace system components every 100 years because of new rehabilitation technologies (e.g. slip lining, cast-in-place pipe, etc.). Rehabilitation costs are much lower than replacement costs (20% to 60% depending on pipe diameter). If the District were able to rehabilitate all of its system components once every 100 years (instead of replace components), it could reduce its annual renewal budget to $315,000/year. Unfortunately, it is generally not possible to rehabilitate all system components due to either condition or capacity concerns. Some components are so far deteriorated that rehabilitation techniques are inadequate and the components must be replaced. Others require upsizing which also necessitates replacement.

To account for the limitations on rehabilitation, BC&A would propose a renewal budget for JSSD based on a combination of rehabilitation and replacement as shown in Table 13-1. This table shows a comparison of the required annual renewal budgets based on both replacement and rehabilitation. It also includes the required budget for a combination of replacement/rehabilitation assuming half of the District's system components can be rehabilitated and the other half need to be replaced.

Table 13-1
Required System Renewal Budgets for Various Rehabilitation/Replacement Scenarios

System Renewal	Annual Budget (2013 Dollars)[1]
Replacement of 100 percent of system components	$625,000
Rehabilitation of 100 percent of components	$315,000
50 percent replacement 50 percent rehabilitation	$470,000

[1] ENR=8566

Based on the table, BC&A would recommend that JSSD budget an average of $470,000 annually (based on 2013 dollars) for system renewal. However, since most of JSSD's system is still relatively new, it may not be necessary to spend this much immediately.

Nevertheless, the District should avoid the temptation to postpone improvements until failure begins to occur because the opportunity for rehabilitation may be lost. In recent years, the District has invested in expansion of the collection system. To keep the system in good operating condition, it is recommended that the District gradually shift dollars from expansion to rehabilitation until it reaches the desired budget of $470,000 (adjusted for inflation).

As PACP coding results of JSSD's collection system accumulate, it may be possible to re-evaluate the estimated service life of system pipes based on observed deterioration rates. If the data indicates that the service life of system pipes will be longer than 100 years, the annual renewal budget could be reduced. Conversely, if the calculated service life of system pipes is less than 100-years, a larger renewal budget may be required.

Lift Stations

Lift Stations also represent a significant cost in JSSD's collection system. Unlike gravity collection mains, lift stations require frequent maintenance and have a much shorter service life than service mains. The replacement value of JSSD's lift station is estimated at approximately 6.1 million. The expected service life of a lift station is approximately 40 years, after which, significant rehabilitation is likely required. Lift station pumps have an even shorter service life of approximately 10 to 20 years. Based on these estimates, JSSD should be spending approximately $150,000/year on lift station rehabilitation. This may include wet well rehabilitation, pump replacement, or control repairs.

Wastewater Treatment Plant

JSSD's Wastewater Treatment Plant is another expensive part of the wastewater system. The replacement value of JSSD's Wastewater Treatment Plant is estimated at approximately $16 million. While some components in the Districts' reclamation plant may last less than 20 years, some components may last for more than 100 years. Based on historic observations, the estimated average service life of all system components at JSSD's treatment plant is approximately 50 years. Based on these estimates, the District should set aside approximately $320,000/year for treatment plant rehabilitation. Once the plant is up and operational, it is recommended that JSSD conduct a treatment plant master plan study to evaluate the treatment plant and determine how to prioritize the funding of future rehabilitation projects.

Based on these estimates for system pipes, lift stations, and wastewater treatment plant, the annual capital improvements budget for JSSD could be set somewhere around $940,000. However, because the system is relatively new, and because the existing system generally has capacity through the year 2055, increasing the annual budget to $940,000 may be higher than necessary, and would raise rates to an undesirable level. Based on number of users and the fact that the system is fairly new we would recommend JSSD have a system renewal goal of at least $235,000. As the

system grows it is recommended that this goal be gradually increased until estimated goal is reached.

SYSTEM RENEWAL PRIORITIES

Because of limited funding, it may be necessary to prioritize initial system rehabilitation activities based on the potential consequence of failure for various pipes. The following criteria may aid JSSD personnel in identifying pipes that are most critical based on their relative importance in JSSD's collection system:

- **Sewer Flow Rate –** Flow rate in a sewer pipe is the single most important indicator of the importance of a pipe. In most situations, the higher the flow rate, the larger the area that pipe serves. Bypass pumping cost, the risk of property damage, environmental and regulatory consequences, the cost of pipe replacement, and problems from sewage backing up in the system are all greater for larger flow rates. In a worst case scenario, if a pipe collapses or becomes blocked (due to corrosion or a natural disaster) and surcharging in the pipeline results in wastewater flows in basements and the street, there is a greater health hazard to the public with a larger wastewater flow rate.
- **Road Type** – There is a direct connection between the density of traffic and the cost and time associated with maintenance and repairs on sewer pipes. Thus, pipelines in high traffic areas must be considered more critical than similarly sized pipelines in lower traffic areas. For example, the cost of failure for pipes under Highway 40 would be much higher than equivalent sized pipes in residential streets or open space areas.
- **Pipe Depth** – The depth of the pipe can have a significant impact on the cost of repairs and rehabilitation of sewer pipe. Extensions on backhoes, very wide trenches, possible dewatering, etc. make repairs and maintenance much more expensive and time consuming on deeper pipes. As a result, deep pipelines should be considered higher priority than their similarly sized shallow counterparts.

CHAPTER 14
SYSTEM OPERATIONS AND MAINTENANCE COSTS

INTRODUCTION

As part of this master plan, a projected annual operations and maintenance (O&M) cost for the JSSD water and sewer system was developed. The past annual budgets were reviewed, costs were analyzed and categorized, and O&M costs were projected for the next 10 years. The purpose of this chapter is to summarize the analysis and projection of the JSSD water and sewer system O&M costs for the next 10 years.

OPERATIONS AND MAINTENANCE COSTS

Operations and maintenance (O&M) costs are the annual costs of running the system. They include items such as salary and benefit costs for District staff, equipment and supplies, power costs, and all other costs associated with doing business throughout the year. In larger, more established systems, O&M costs are relatively constant from year to year and tend to follow the rate of inflation. However, O&M costs for the District are expected to show more volatility because of the significant growth expected in the next several years and potential changes in how wastewater is treated. District O&M costs are also unique in that no separate account is kept for most expenditures to distinguish between water and sewer.

The historic budgets between 2008 and 2013 were reviewed. For projecting future budgets, expenditures from those budgets were separated into the following categories: Administration/Overhead, Salaries and Benefits, Water Leasing Costs, Collection/Distribution System O&M, Pump Station Power, WTP O&M and the WWTP O&M. Table 14-1 shows the historic budget with each expenditure assigned into the appropriate category.

Table 14-1
JSSD Categorized O&M Costs

GL Number	Expenses		2008	2009	2010	2011	2012	2013
41000	Wages	Salary	$ 1,426,370.00	$ 1,257,506.35	$ 1,089,294.37	$ 1,055,146.18	$ 1,069,118.18	$ 1,227,267.68
41200	Payroll Taxes	Salary	$ 113,792.00	$ 95,261.29	$ 81,716.53	$ 77,065.66	$ 78,697.18	$ 93,885.98
41300	Worker's Comp	Salary	$ 49,156.00	$ 35,182.44	$ 31,274.69	$ 34,823.84	$ 37,620.47	$ 40,000.00
41400	Workforce Services	Salary		$ 32,549.08	$ 29,745.20	$ -	$ -	$ -
41500	Employee Benefits	Salary	$ 232,788.00	$ 224,019.49	$ 190,821.47	$ 162,242.43	$ 194,756.53	$ 217,428.38
55000	State Retirement	Salary	$ 220,955.00	$ 204,841.27	$ 175,523.71	$ 189,216.82	$ 207,093.99	$ 233,180.86
43000	Travel	Salary	$ 9,309.00	$ 10,584.82	$ 4,271.84	$ 17,783.50	$ 16,109.22	$ 17,000.00
44000	Training/Conferences	Salary	$ 11,187.00	$ 10,752.66	$ 1,273.00	$ 5,666.00	$ 4,915.00	$ 5,000.00
46000	Utilities	System Power	$ 374,801.00	$ 371,796.71	$ 367,273.26	$ 366,924.77	$ 343,387.16	$ 357,122.65
46500	Utilites- Water Plant	Treatment Power	$ 165,752.00	$ 303,289.13	$ 249,592.73	$ 246,374.00	$ 242,891.45	$ 252,607.11
46600	Utilites- Mine	Treatment Power	$ 98,695.00	$ 59,479.39	$ 92,882.70	$ 126,243.45	$ 110,847.58	$ 115,281.48
46700	Utilites- Wastewater Facility	Treatment Power	$ -	$ 5,484.61	$ 15,587.56	$ 33,631.75	$ 35,049.40	$ 36,451.38
47000	Phones	Admin	$ 35,510.00	$ 39,480.07	$ 28,837.48	$ 30,300.98	$ 38,228.10	$ 37,600.00
49000	Overhead/Management	Admin		$ -	$ -	$ -	$ -	$ -
50000	Legal Fees	Admin	$ 35,311.00	$ -	$ 190,370.88	$ 308,235.78	$ 350,152.18	$ 300,000.00
50500	JSSD Water	Water Purchase	$ 2,740,258.00	$ 2,813,310.37	$ 2,811,677.79	$ 2,159,944.07	$ 1,390,569.22	$ 1,390,569.22
50750	Postage	Admin	$ 12,123.00	$ 11,441.97	$ 8,340.76	$ 6,688.42	$ 8,908.39	$ 8,908.39
51000	Equipment	System O & M	$ 121,347.00	$ 37,504.58	$ 1,538.00	$ 6,113.23	$ 3,478.95	$ 3,478.95
51001	Equipment - Repairs & Maint	System O & M		$ 11,472.13	$ 52,051.11	$ 73,016.89	$ 37,034.36	$ 37,034.36
52000	Supplies	System O & M	$ 442,296.00	$ 321,569.53	$ 63,857.08	$ 90,167.19	$ 71,606.94	$ 111,606.94
52001	Supplies-Mine	Plant O & M	$ 127,822.00	$ 74,083.99	$ 9,525.64	$ 15,940.45	$ 12,614.96	$ 12,614.96
52002	Supplies-Water Plant	Plant O & M	$ -	$ 62,444.34	$ 369,200.89	$ 460,452.85	$ 484,965.00	$ 484,965.00
53000	Services	Admin	$ 1,081,886.00	$ 797,230.47	$ 358,120.98	$ 373,156.07	$ 415,011.90	$ 480,000.00
54000	Insurance- Liability	Admin	$ 128,183.00	$ 128,576.92	$ 153,183.44	$ 153,299.80	$ 196,977.06	$ 196,977.06
57000	Office/Overhead-Rent	Admin	$ 6,628.00	$ 42,405.10	$ -	$ -	$ -	$ -
58000	Vehicle Expense	System O & M	$ 95,220.00	$ 40,918.49	$ 53,525.73	$ 71,734.45	$ 72,753.22	$ 72,753.22
90000	Miscellaneous Expense	Admin	$ (2,517.00)	$ 1,122.23	$ 2,896.25	$ 30,193.40	$ 3,347.21	$ 3,347.21
95000	Bad Debt	Admin	$ 111,034.00	$ -	$ -	$ 3,388,885.38	$ 139,233.93	$ -

Below is a brief description of each category and the method for projecting future expenditures for the category.

Administration/Overhead – Administration and overhead includes postage, phones, legal fees, insurance, and other expenses required to keep the office in operation. Though expenditures will increase proportionally with growth in the system (postage, insurance, etc.), other expenditures in the category will not increase so quickly (office rent, phones, etc.). As a result, it is expected that future costs will grow because of system growth, but not in direct proportion to system growth.

In is difficult to project the exact proportion of growth that will results in cost increases in each category. Based on observed cost increase in other systems, the expected increase in cost is generally between 50 and 80 percent of growth depending on the category. To be conservative, this master plan uses an estimate of 80 percent for the proportion of growth of administration and overhead expenditures of projected growth in ERUs (e.g. a 10 percent growth in ERUs will result in an 8 percent growth in admin expenditures).

Salaries/Benefits – Salaries and benefits includes wages, services, retirement, training, travel, etc. that is required to staff JSSD. As the number of connections in the JSSD system increases, the staff will also need to grow. However, as the system grows, the JSSD system can be managed more efficiently due to economy of scale. Similar to the administration and overhead, the projected growth of salaries and benefits expenditures has been estimated at 80 percent of the projected growth in ERUs.

Water Leasing Costs – Some of the water used in the JSSD water delivery system is leased from various outside organizations. The annual cost of leasing water has been as high as $2.8 million in recent years, but has decreased to $1.4 million as the District has eliminated some of its more expensive leases. For the purposes of this master plan, it has been assumed that water lease costs will remain at $1.4 million (plus inflation) for the immediate future. Longer term lease costs will depend on District supply plans and agreements and should be re-evaluated from time to time.

Collection/Distribution System O&M - The sewer collection system and water distribution system O&M represents expenditures for vehicles, equipment and supplies that are used to maintain and operate the pump stations (not including electricity costs), pipes and other system components. As noted above, as the JSSD collection/distribution system grows, it can be managed more efficiently due to some economy of scale. The projected growth of collection/distribution system O&M expenditures have been estimated at 80 percent of the projected growth in ERUs.

Pump Station Power – For the purpose of this study, the terms power and electricity will be used interchangeably. The consumption of electricity for a pump station is a function of flow and head. If future growth in the system were distributed exactly proportional to existing development, future power costs could be estimated based simply on system growth. However, growth is not expected to be quite so uniform. Some areas of the system are expected to see far greater amounts of growth than others will. Since the location of development will affect the

amount of pumping that is required to convey water and wastewater to and from the development, BC&A looked more closely at the pumping costs associated with projected growth.

An analysis was completed that examined projected flows and the needed head for each sewer and water pump station. This included consideration of existing flows as calculated for 2013 and projected flows in 10 years. Since power consumption is a function of flow and head, expected growth in power consumption can be estimated based on the product of these two variables. The results of the analysis are summarized in Tables 14-2 and 14-3.

Table 14-2
Projected Power Growth for Sewer Lift Stations

Lift Station Name	Head	2013 Flows (gpm)	2023 Flows (gpm)	(2013 Flow) X (Head)	(2023 Flow) X (Head)
Dead man Gulch Lift Station	10	39	74	394	744
Ross Creek Lift Station	174	223	580	38,815	100,871
Keetley Lift Station	90	526	1,523	47,087	136,318
State Park Lift Station	153	701	1,854	107,251	283,698
Rock Cliff Lift Station	123	13	25	1,641	3,102
Aspen Lift Station	124	13	25	1,654	3,128
Walker Hollow Lift Station	101	13	25	1,354	2,559
Overlook Lift Station	10	13	25	132	249
Total	-			198,326	530,670
Percent Growth	**-**			**-**	**167.6%**

Table 14-3
Projected Power Growth for Water Pump Stations

Lift Station Name	Head	2013 Flows (gpm)	2023 Flows (gpm)	(2013 Flow) X (Head)	(2023 Flow) X (Head)
Hwy 248	440	176	324	77,281	142,652
Butte	373	42	225	15,547	83,925
All of the Deer Crest Pumps	1,117	1,112	1,201	1,242,104	1,341,517
East Park	460	0	0	0	0
HWY 32	570	0	200	0	114,000
Red Ledges	400	60	188	24,000	75,200
Victory Ranch #1	571	8	14	4,284	8,101
Victory Ranch #2	735	8	14	5,514	10,428
Total	-			1,368,730	1,775,823
Percent Growth	**-**			**-**	**29.7%**

Included in the tables is the percent growth in the product of flow and head. Since the product of flow and head is directly proportional to power consumption, this value also represents the expected percent growth in power consumption. As discussed in Chapter 2, ERU's in the JSSD system are expected to increase from 714 to 1,878 over the next ten years, an increase of 163 percent. At 167.6 percent, sewer power consumption costs are expected to be slightly greater than this. Power consumption associated with water, however, is expected to grow at a significantly slower rate (46 percent).

The reason that water power consumption is expected to grow at a slower rate than the system as a whole is the District's contract to deliver water to Park City. Much of the District's current power costs are associated with pumping water up to Park City through its Deer Crest pump system. Since this contract is not expected to change, power costs associated with this water are also not expected to change significantly. As a result, even with expected growth in other areas, the total cost increase expected over the next 10 years is lower than overall system growth rates.

As shown in Table 14-1, the District includes all power costs (both sewer and water) in a single category. Based on pump efficiency and historic costs, the projected increase for the combined water and sewer power consumption budget is expected to be 63 percent for the 10-year planning window.

WTP O&M– Water treatment plant costs include power for the WTP, costs to bring water from the mine tunnels, and other costs to operate and maintain the WTP. Since no major changes to the water treatment process are anticipated in the next 10 years, it has been assumed that growth in O&M costs for the WTP will be proportional to growth in ERUs.

WWTP O&M – As discussed previously, JSSD has recently constructed a new WWTP that is not yet in service. Thus, projected O&M costs will depend on how wastewater is being treated:

- **Midway City Sanitary District Wastewater Lagoons.** Currently, all wastewater flows for the District are conveyed to Midway City Sanitary District (MCSD) for treatment. The District is charged a fee by MCSD based on the volume of wastewater treated. Additionally, even though the JSSD WWTP is currently not in operation, it does incur some minimal standby costs. These costs will continue to be incurred and must be added to the cost of treatment if wastewater continues to be diverted to Midway City for treatment. Total existing costs for treatment associated with the Midway City wastewater lagoons and standby costs at the plant are $223,000.

- **New Wastewater Treatment Plant.** Once the WWTP is put into service, the District will begin to incur a number of new costs associated with operation of the plant. Some of those costs will include Personnel, Chemicals, Power, Solids Treatment, and General O&M. The following costs were derived from average operation and maintenance costs for other WWTPs of similar type and size.

    - **Personnel –** Personnel will need to be trained on the operation of the WWTP, and the WWTP is expected to require one full time operator. For the purposes of this report, it has been assumed that the District would need to hire a new operator for this

purpose, rather than absorb this work into its existing staff. Additional staff will be required as the system grows and flow increases at the plant. Similar to the Salaries/Benefits listed above, it has been estimated that personnel costs at the plant will increase at a rate that is 80 percent of the growth in flow to the WWTP.

- **Chemicals –** The treatment plant will need chemicals such as alum, sodium hydroxide, etc. for day-to-day operations. Based on the budget for other plants of similar size, the expected budget for chemicals at the plant at existing system flows is $19,200, with the majority of this cost associated with alum. Since chemical application is proportional to flow, it is expected that the cost in chemicals will grow in direct proportion to increases in flow to the WWTP.
- **Power –** The estimated amount of electricity that will be consumed by the WWTP will be 100-150 KW (i.e. 2,400-3,600 KWH per day). The expected cost of this power based on average electricity rates is $84,000/year. While there are some base electrical loads that are independent of flow rate, the largest loads are associated with the treatment process. As a result, it has been conservatively estimated that the amount of electricity consumed by the plant will grow in direct proportion to increases in flow to the WWTP.
- **Solids Treatments –** The WWTP includes a solids dewatering facility. After the solids are dewatered, they will be disposed in a local landfill. While the exact arrangements for solids disposal is unknown, costs for disposal have been estimated based on projected solids production, and disposal costs for similar facilities. Costs associated with solids treatment and disposal will increase in direct proportion to increases in flow to the WWTP.
- **General O&M –** The WWTP will also have some miscellaneous costs in regards to O&M. This includes routine maintenance and repair of equipment, costs of other miscellaneous consumables, etc. Costs associated with general O&M have conservatively been assumed to increase in direct proportion to increases in flow to the WWTP.

Table 14-4 summarizes the anticipated costs for the annual O&M costs for the WWTP.

Table 14-4
Anticipated Annual O&M cost For the WWTP

JSSD WWTP O&M	Annual Cost
Personnel	$ 72,000
Chemicals	$ 19,200
Power	$ 84,000
Solids Treatments	$ 26,400
General O&M	$ 20,400
Total	**$ 222,000**

As can be seen from Table 14-4, the annual cost O&M for the WWTP is $222,000. The cost listed in Table 14-4 represents the O&M costs based on a 2014 wastewater flow. If the treatment plant is connected after 2014, the cost will increase, as shown in Table 14-5. The cost for treatment at the WWTP is approximately 0.25¢ or $0.0025 per gallon.

In addition to increases for system growth as documented above, each of the O&M costs described above were also adjusted by 3% per year for inflation. Table 14-5 summarizes the projected O&M costs for each category. As can be seen in the table, the costs of moving treatment from the existing location at Midway City to the new plant are approximately the same.

Table 14-5
Summary of Projected O&M Costs

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Admin/Overhead	$1,026,833	$1,193,457	$1,315,066	$1,460,203	$1,625,243	$1,800,760	$1,989,617	$2,194,832	$2,424,992	$2,681,920	$2,762,378
Salaries/Benefits	$1,833,763	$2,131,328	$2,348,502	$2,607,695	$2,902,431	$3,215,876	$3,553,146	$3,919,627	$4,330,657	$4,789,491	$4,933,175
Water Lease Costs	$1,390,569	$1,432,286	$1,475,255	$1,519,513	$1,565,098	$1,612,051	$1,660,412	$1,710,225	$1,761,531	$1,814,377	$1,868,809
Collection/Distribution System O & M	$224,873	$261,364	$287,996	$319,780	$355,924	$394,361	$435,721	$480,662	$531,066	$587,333	$604,953
Pump Station Power	$357,123	$386,446	$418,176	$452,512	$489,667	$529,874	$573,381	$620,460	$671,406	$726,534	$786,189
WTP O&M	$865,469	$1,018,074	$1,129,715	$1,264,291	$1,418,743	$1,584,266	$1,763,740	$1,960,279	$2,182,625	$2,433,005	$2,505,995
WWTP Standby and MCSD Treatment	$223,151	$266,741	$298,716	$337,685	$382,861	$431,673	$485,026	$543,922	$611,140	$687,494	$708,119
Current Total	$5,921,781	$6,689,696	$7,273,425	$7,961,678	$8,739,967	$9,568,861	$10,461,042	$11,430,007	$12,513,418	$13,720,155	$14,169,618
New WWTP O&M	$222,000	$265,365	$297,174	$335,943	$380,886	$429,446	$482,523	$541,115	$607,987	$683,947	$704,466
Total With JSSD WWTP in Operation	$5,920,629	$6,688,320	$7,271,884	$7,959,936	$8,737,991	$9,566,634	$10,458,540	$11,427,200	$12,510,265	$13,716,607	$14,165,965

CHAPTER 15
10-YEAR BUDGET PLAN

INTRODUCTION

Recommended capital improvements pertaining to the water system and the sewer collection system were identified previously. Operations and Maintenance costs were also identified and projected in this master plan. The purpose of this chapter is to present a detailed 10-year budget that includes the financial components that have been identified previously in this master plan.

10 YEAR BUDGET PLAN

Table 15-1 represents an implementation plan of the proposed improvements for the next ten years. The recommended payment method for the majority of the capital improvements is on a pay-as-you-go basis. This includes most of the smaller projects.

Table 15-1
Detailed 10-Year Budget Plan for JSSD's Water System

Project #	Project Description	Estimated 2015 Total Cost[1]	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
PS-2	Deer Canyon Preserve Pump Station	$ 122,000	$ -	$ -	$ 129,430	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Master Plan	Water Master Plan	$ 40,000	$ -	$ -	$ -	$ -	$ -	$ 46,371	$ -	$ -	$ -	$ -	$ -
PS-3	Victory Ranch to Tuhaye Pump Station	$ 306,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 387,632	$ -	$ -
T-2	Victory Ranch to tuhaye 12" Pipe	$ 2,368,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,182,394
ST-1	6800 Tank	$ 267,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 348,374	$ -
	Total Improvements	**$ 3,103,000**	**$ -**	**$ -**	**$ 129,430**	**$ -**	**$ -**	**$ 46,371**	**$ -**	**$ -**	**$ 387,632**	**$ 348,374**	**$ 3,182,394**

Table 15-2
Detailed 10-Year Budget Plan for JSSD's Sewer System

	Project Description	Estimated 2015 Total Cost*	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
P-1	Install new 18" to 24" line from Force Main 4 to the new WWTP	$ 3,499,693	**$ -**	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,433,307	$ -	$ -
P-2	Install 18" parallel line next to Line B	$ 1,039,737	**$ -**	$ -	$ -	$ -	$ -	$ -	$ -	$0	$0	$0	$ 1,070,929
LS-1	Install New Lift Station to supply 5200 gpm	$ 2,166,803	**$ -**	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,231,807
LS-2	Install New Lift Station to supply 1650 gpm	$ 898,369	**$ -**	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 925,321
Master Plan Update		$ 40,000	**$ -**	$ -	$ -	$ -	$ -	$ 46,371	$ -	$ -	$ -	$ -	
	Total Improvements	**$ 7,644,602**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 46,371**	**$ -**	**$ -**	**$ 4,433,307**	**$ -**	**$ 4,228,056**

WATER IMPACT FEE FACILITIES PLAN

June 2015

Project No. 056-12-02

Prepared for:

Jordanelle Special Service District

Prepared by:

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

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EXECUTIVE SUMMARY

INTRODUCTION

Jordanelle Special Service District (JSSD or District) has retained Bowen Collins & Associates (BC&A) to prepare an impact fee facilities plan (IFFP) for the water delivery system. The purpose of the IFFP is to identify water demands placed upon the District by future development and evaluate how these demands will be met. The IFFP is also intended to outline the water system improvements which may be funded through impact fees.

WHY IS AN IFFP NEEDED?

The IFFP provides a technical basis for assessing updated impact fees throughout the District. This document will address the future infrastructure needed to serve the District with regard to current land use planning. The existing and future capital projects documented in this IFFP will ensure that level of service standards are maintained for all existing and future residents who reside within the service area. Local governments must pay strict attention to the required elements of the IFFP which are enumerated in the Impact Fees Act.

PROJECTED FUTURE GROWTH

To evaluate future infrastructure needs, it is first necessary to project how water demands will increase in the future. Demands on the existing system were used in conjunction with projected population growth to estimate future demands. System demands were projected in terms of Equivalent Residential Unit (ERU) and are discussed in detail in Chapter 2 of the Water Master Plan for JSSD. Table ES-1 provides a summary of the demands under existing and 10 year growth conditions.

Table ES-1
JSSD Service Area Flows

Item	Existing	10-Year Projected	Existing Including Sold Capacity	10-Year Projected Including Sold Capacity
Equivalent Residential Units (ERUs)	1,256	2,421	7,111	7,577
Average Day Flow (gpm)	706	1,361	3,997	4,262
Peak Day Flow (gpm)	1,570	3,026	8,889	9,471
Peak Hour Flow (gpm)	2,355	4,539	13,333	14,207
Flows per ERU				
Average Day Flow (gpd/ERU)	810	810	810	810
Peak Day Flow (gpd/ERU)	1,800	1,800	1,800	1,800
Peak Hour Flow (gpd/ERU)	2,700	2,700	2,700	2,700

CAPACITY TO SERVE FUTURE GROWTH

Projected future growth will be met through a combination of available excess capacity in existing facilities and construction of additional capacity in new facilities. Additional improvements required to serve new growth were identified using a hydraulic computer model. The required improvement projects to serve 10-year growth are summarized in Table ES-2.

Table ES-2
Project Costs Allocated to Projected Development, 10-year Planning Window

Project	Description	Estimate 2015 Construction Cost	Percent Existing	Percent 10-year Bonded Growth	Percent 10-year Unbonded Growth	Percent Bonded Growth Beyond 10 Years	Percent Unbonded Growth Beyond 10 Years	Cost to Existing Users	Cost To 10 Year Bonded Growth	Cost To 10 Year Unbonded Growth	Cost Bonded Growth Beyond 10-years	Cost Unbonded Growth Beyond 10-years
PS-2	Deer Canyon Preserve Pump Station	$ 122,000	7%	10%	24%	23%	36%	$ 9,080	$ 11,866	$ 29,136	$ 27,965	$ 43,953
PS-3	Victory Ranch to Tuhaye Pump Station	$ 306,000	7%	10%	24%	23%	36%	$ 22,765	$ 29,750	$ 73,048	$ 70,111	$ 110,195
T-2	Victory Ranch to Tuhaye 12 Inch Pipe	$ 2,368,000	7%	10%	24%	23%	36%	$ 176,244	$ 230,323	$ 565,528	$ 542,790	$ 853,115
	Total Capital Costs	**$ 2,796,000**	-	-	-	-	-	**$ 208,089**	**$ 271,940**	**$ 667,712**	**$ 640,866**	**$ 1,007,262**

SECTION 1
INTRODUCTION

JSSD has retained BC&A to prepare an IFFP for water distribution services provided by the District. The purpose of an IFFP is to identify demands placed upon District facilities by future development and evaluate how these demands will be met by the District. The IFFP is also intended to outline the improvements which may be funded through impact fees.

Much of the analysis forming the basis of this IFFP has been taken from chapters found in the JSSD Water Master Plan. The reader should refer to the master plan for additional discussion of planning and evaluation methodology beyond what is contained in this report.

Requirements for the preparation of an IFFP are outlined in Title 11, Chapter 36 of the Utah code (the Impact Fees Act). Under these requirements, an IFFP shall accomplish the following for each facility:

1. Identify the existing level of service
2. Establish a proposed level of service
3. Identify excess capacity to accommodate future growth
4. Identify demands of new development
5. Identify the means by which demands from new development will be met
6. Consider the following additional issues
    a. revenue sources to finance required system improvements
    b. necessity of improvements to maintain the proposed level of service
    c. need for facilities relative to planned locations of schools

The major sections of this report have been organized to address each of these requirements.

SOLD CAPACITY

JSSD is somewhat different than many other service districts in regards to the way it has been constructed. The District is a relatively new district with most of its initial infrastructure constructed through a series of bonds that were paid for by developers in exchange for future commitments to capacity. Although a large portion of the capacity in the system is not currently being used, bonded users are guaranteed the capacity they purchased at the time of development. Thus, there is only limited available excess capacity for serving future growth outside of the developments that have purchased capacity. For the analysis contained in this IFFP and a subsequent Impact Fee Analysis (IFA), it will be important to keep track of both existing demands and committed future demands from those who participated in the infrastructure bonds. The infrastructure bonds divided into areas within the District. Figure 1-1 shows the boundaries for each of the areas (i.e. Area A, B North, B South and Area C). For a further discussion on the areas, see chapter 2 of the Master Plan.

LEGEND

- Study Area Boundary

Developer Area Boundary

- A
- B NORTH
- B SOUTH
- C

Study Area Boundary

Promontory
The Ranch Club
Peoa
OAKLEY
Marion
KAMAS
FRANCIS
MID WAY
HEBER CITY
Jordanelle Reservoir
JORDANELLE STATE PARK
SUMMIT COUNTY
WASATCH COUNTY
Deer Valley Ski Area
Red Ledges

Garff
Iroquois
White
Deer Canyon Preserve
Renyolds
Deer Mountain
Austin
East Park
Jordanelle View
Mayflower North
Gimble
Westside (N)
Westside (S)
Deer Valley Lake Side
Star Harbor
Snowpark
Deer Point
Deer Crest
Pioche
Stillwater
Mayflower South
Deep Springs
Noyes
Hideout Town
Hideout Canyon
Mustang
Brodkin
Dunlap
Park Premier
Tuhaye
Tuhaye Golf Course
AM Eagle
Berg Ridge
US Fish & Wildlife
Victory Ranch
Cahoon
Sorenson
Mower
Jackson Fork
Talisman
Christensen
Clyde Property
JLS Properties

Bowen Collins & Associates, Inc. CONSULTING ENGINEERS	JORDANELLE SPECIAL SERVICE DISTRICT WATER AND SEWER MASTER PLAN	STUDY AREA	NORTH: NORTH	SCALE: 0 3,000 Feet	FIGURE NO. 1-1

P:\Jordanelle SSD\Water & Sewer Master Plan\4.0 GIS\Figures\Figure 1-1 IFFP - Study Area.mxd kballentine 5/12/2015

To further complicate the issue, JSSD issued multiple bonds for water infrastructure. Two of the bonds included the treatment facilities. Multiple bonds included storage facilities, and the remainder of the bonds were for distribution and conveyance facilities. As a result, each of the components of the water system (i.e. treatment facilities, storage facilities, and conveyance facilities) will be treated differently for this evaluation as described below:

- Water Production and Treatment Facilities – The two major facilities for producing water in JSSD include the Victory Ranch Well and the Keetley Water Treatment Plant (WTP). Though a large portion of the capacity in both facilities is not currently being used, there is no excess capacity for developments that have not already purchased capacity. Therefore, any developments that have not purchased capacity in either source will need to contribute impact fees to a new future source.
- Storage Facilities – Most of the existing water storage facilities in JSSD were constructed to serve one development, and are considered project level improvements. Therefore, most existing tanks will not be considered for reimbursement through impact fees and most of the future tanks will be considered project level improvements and will not be paid for using impact fees. The only exception is Area C. The HWY 32 tank in Area C is in an ideal location to serve multiple developments and is considered a system level improvement. Furthermore, there are future tank projects in Area C that will be able to serve multiple developments are also considered system level improvements. As a result, Area C will be its own service area in regards to water storage.
- Conveyance Facilities – Some of the major conveyance facilities in JSSD have excess capacity to serve demands beyond the sold capacity. Therefore, some potential development beyond those that have already purchased capacity can be served through existing facilities. Because some major conveyance facilities have excess capacity, they will need to be considered in the impact fee.

These issues will be manifest in this report in three different ways:

1. Future growth projections will include discussion of both actual development and sold capacity. Because sold capacity is already committed to future users, evaluation of available capacity in existing infrastructure will be based on only unsold capacity, regardless of whether it is currently being used.
2. Where appropriate, growth and needed capacity will be distinguished between bonded and unbonded users so that needed infrastructure costs can be accurately allocated between both types of users.
3. Similar to item 2, growth and needed capacity will be distinguished between users in different service areas so that needed infrastructure costs can be accurately allocated between service areas.

SECTION 2
EXISTING LEVEL OF SERVICE (11-36A-302.1.A.I)

Level of service is defined in the Impact Fees Act as "the defined performance standard or unit of demand for each capital component of a public facility within a service area". This section discusses the level of service being currently provided to existing users.

UNIT OF DEMAND

The projected flow used to design and evaluate system components will vary depending on the nature of each component. For example, transmission pipelines must be designed based on peak hour flow. For the purposes of this analysis, it is useful to define these various demands in terms of Equivalent Residential Units (ERUs). An ERU represents the demands associated with an average single family residential unit. The flow rates and ERUs are summarized in Table 2-1.

Table 2-1
JSSD Service Area

Item	Existing	Existing Plus Remaining Sold Capacity
Equivalent Residential Units (ERUs)	1,256	7,111
Average Day Flow (gpm)	706	3,997
Peak Day Flow (gpm)	1,570	8,889
Peak Hour Flow (gpm)	2,355	13,333
Flows per ERU		
Average Day Flow (gpd/ERU)	810	810
Peak Day Flow (gpd/ERU)	1,800	1,800
Peak Hour Flow (gpd/ERU)	2,700	2,700

PERFORMANCE STANDARD

To improve the accuracy of the analysis, this impact fee facility plan has divided the system into three different components (production capacity, storage, and transmission). Each of these components has its own set of performance standards:

Production Capacity

Water treatment and production facilities must be adequate to satisfy demands on a peak day basis.

Storage

Three major criteria are generally considered when sizing storage facilities for a water distribution system: operational or equalization storage, fire flow storage, and emergency or standby storage.

1. **Operational/Equalization Storage:** Operational/equalization storage is the storage required to satisfy the difference between the maximum rate of supply and the rate of demand during peak conditions. Sources, major transmission pipelines, and pump stations are usually sized to convey peak day demands to optimize the capital costs of infrastructure. During peak hour demands, storage is needed to meet the difference in source/conveyance capacity and the increased peak instantaneous demands. Because demands can vary from day to day, operational storage must be adequate to meet the average observed storage fluctuation with a safety factor of 2.0. Based on the methodology described in chapter 5 of the JSSD water plan and historic water use patterns, operational storage is 25 percent of peak day demand.

2. **Fire Flow Storage*:*** Fire suppression storage is the volume of water needed to provide a required fire flow for a specified period. The State standard indicates that fire suppression shall meet the volume specified by the local fire authority. The Wasatch County Fire Marshall has required that fire suppression storage meet international fire flow standards, which are based on building square footage and building material type. The anticipated building square footage for the JSSD study area has been estimated based on the current zoning. Areas on the upper sections of the hillside are zoned as residential and could see larger residential development. The remainder of the JSSD study area is also residential zoning, but will probably see some associated institutional development (churches, elementary schools, etc.). For master planning purposes, the fire suppression storage volume for the upper hillside is 2,750 gpm for 2 hours (330,000 gallons), and the lower hillside is 3,500 gpm for 3 hours (630,000 gallons).

3. **Emergency Storage:** Emergency or standby storage is the storage needed to meet demands in the event of an unexpected emergency situation such as a line break, treatment plant failure, or other unexpected event. For the District, the critical scenario appears to be providing water during a power outage during the peak day. The level of service established for existing customers is to provide 6 hours of peak day demand of emergency storage (25 percent of peak day demand).

Storage requirements are calculated for the system as a whole and for each individual zone.

Transmission and Distribution

Based on input from District staff, the following criteria were used as the performance standards for major conveyance facilities:

1. **Pressure -** A distribution system should provide adequate delivery pressure across the system. The State of Utah requires that distribution pressures be greater than 40 psi during peak day production requirements and 30 psi during peak hour production

requirements. However, the level of service for the pressure in the JSSD water system throughout the system does not generally drop lower than 60 psi during peak day production conditions.

2. **Pipe Velocity –** Except in fire flow events, flow velocities in distribution pipes should be limited to less than 7.0 feet per second (ft/s). Transmission pipes can have velocities that are higher than distribution pipes, but typically should be less than 10 ft/s.

Summary of Existing Level of Service

Table 2-1 summarizes the existing level of for the JSSD system for each component.

Table 2-1
Summary of Level of Service

Criteria	Value
Average Day Demand	810 GPD/ERU
Peak Day Demand	1800 GPD/ERU
Peak Hour Demand	2700 GPD/ERU
Source Capacity	Peak Day Demand
Storage Capacity	50% of Peak Day Demand and Fireflow
Min Pressure – Peak Hour Demands (Distribution)	60 psi
Working Water System Velocity	Less Than 7 ft/s (distribution) or 10 ft/s (transmission)

SECTION 3
PROPOSED LEVEL OF SERVICE (11-36A-302.1.A.II)

The proposed level of service is the performance standard used to evaluate system needs in the future. The Impact Fee Act indicates that the proposed level of service may:

1. diminish or equal the existing level of service; or
2. exceed the existing level of service if, independent of the use of impact fees, the District implements and maintains the means to increase the level of service for existing demand within six years of the date on which new growth is charged for the proposed level of service.

In the case of this IFFP, no changes are proposed to the existing level of service for design standards. Future growth will be evaluated based on the same design standards level of service as identified for existing users. Table 3-1 presents the proposed level of service for flows projected at the end of the 10 year planning window. As was done in the previous chapter, the projections include one column with projected actual flows and a second column with projected flows plus flows associated with remaining sold capacity that is yet to be developed.

Table 3-1
JSSD Service Area Projected 10-year

Item	10-Year Projected	10-Year Projected Plus Remaining Sold Capacity
Equivalent Residential Units (ERUs)	2,421	7,577
Average Day Flow (gpm)	1,362	4,262
Peak Day Flow (gpm)	3,026	9,471
Peak Hour Flow (gpm)	4,539	14,207
Flows per ERU		
Average Day Flow (gpd/ERU)	810	810
Peak Day Flow (gpd/ERU)	1,800	1,800
Peak Hour Flow (gpd/ERU)	2,700	2,700

SECTION 4
EXCESS CAPACITY TO ACCOMMODATE FUTURE GROWTH (11-36A-302.1.A.III)

Projected future growth will be met through a combination of available excess capacity in existing facilities and construction of additional capacity in new facilities. For the purposes of this analysis, we have divided the system into three different components (transmission, production/treatment, and storage). The purpose of this breakdown is to consider the available capacity for each component individually. Excess capacity in each component of the system is as follows:

TRANSMISSION

To calculate the percentage of existing capacity to be used by future growth in existing facilities, existing and future flows were examined in system model for each transmission pipeline. For the purpose of this IFFP, excess capacity was estimated against all sold capacity (including both existing flows and future commitments). The method used to calculate excess capacity available for use by future flows is as follows:

- **Calculate Flows –** The peak flow in each facility was calculated in the model for both existing and future flows (including all sold capacity in both cases).

- **Identify Available Capacity –** Where a facility has capacity in excess of projected flows at buildout, the available capacity in the facility was defined as the difference between existing flows and buildout flows. Where the facility has capacity less than projected flows at buildout, the available capacity in the facility was defined as the difference between existing flows and the facility's maximum capacity.

- **Eliminate Facilities without Excess Capacity –** For the planning window period (in this case, 10 years), the committed capacity at the end of the planning window was compared against the facility's available capacity. If committed capacity at the end of the 10 year window exceeds the capacity of the facility, the available excess capacity is zero. By definition, this corresponds to those facilities with deficiencies that are identified in the facilities plan. By assigning a capacity of zero, this eliminated double counting those facilities against new users.

- **Calculate Percent of Excess Capacity Used in Remaining Facilities –** Where the future flow was less than the capacity of the facility, the percent of excess capacity being used in each facility was calculated by dividing the growth in flow in the facility (future flow less existing flow) by the total capacity (existing flow plus available capacity).

As discussed in Section 1, the majority of existing trunk lines have been constructed using funds from bonds paid for by developers and not by the District. As a result, it would not be appropriate for the District to collect impact fees associated with this capacity. However, this excess capacity does represent a valuable asset that is being used by future users. For this

reason, the portion of capacity being used by future users in existing facilities (as described above) has been calculated based on actual historic bond costs. This will be credited to those who participated in the bonds against their portion of costs associated with other impact fee facilities. This is discussed in greater detail in Section 6.

PRODUCTION/TREATMENT

The District has a treatment capacity of 5,555 gpm (8 mgd) at the Keetley WTP and 300 gpm at Victory Ranch Well. Both sources have excess capacity based on current demand in the JSSD system. However, all capacity associated with either source has been sold to bonded developers. As a result, there is no excess production/treatment capacity within the District for use by future users outside of historic bonds.

STORAGE

As discussed in Section 1, most of the storage tanks in the JSSD system only serve one development and are considered project level improvements and will not be considered for reimbursement through impact fees. In Areas A and B, future development will be responsible for its own storage, either through its participation in past storage projects or construction of new storage.

Because of the backbone of the system has not yet been completed in some portions of Area C, storage in this area will be different. Existing and future storage along the major transmission facilities are considered system level improvements. This includes the HWY 32 storage tank. The HWY 32 storage tank was paid for with bonds by developers in Area C. That tank is in an ideal location to service the North Village Special Service District (NVSSD). Furthermore, it has 1,500,000 gallons of excess capacity to serve NVSSD. Therefore, JSSD will credit the Area C bonded developers for the available storage capacity similar to the bonded users for the transmission system. As a result, Area C will be its own service area in regards to storage with excess capacity in the HWY 32 tank.

SECTION 5
DEMANDS PLACED ON FACILITIES BY NEW DEVELOPMENT (11-36A-302.1.A.IV)

Growth within the District's service area and projections of demands resulting from said growth is discussed in detail in Chapter 2 of the Master Plan. Growth in terms of equivalent residential units is summarized in Table 5-1. Projected flows for the 10-year planning window have been summarized previously in Table 3-1.

Table 5-1
JSSD Service Area ERU Projections

	Projected ERUs	Average Annual Growth	Projected ERUs Plus Remaining Sold Capacity	Average Annual Growth
2015	1,256		7,111	
2016	1,341	6.8%	7,156	0.6%
2017	1,432	6.8%	7,202	0.6%
2018	1,529	6.8%	7,248	0.6%
2019	1,633	6.8%	7,294	0.6%
2020	1,744	6.8%	7,340	0.6%
2021	1,862	6.8%	7,387	0.6%
2022	1,988	6.8%	7,434	0.6%
2023	2,123	6.8%	7,481	0.6%
2024	2,267	6.8%	7,529	0.6%
2025	2,421	6.8%	7,577	0.6%
2035	4,177	5.6%	8,340	1.0%
2045	5,933	3.6%	9,102	0.9%
2055	7,689	2.6%	9,865	0.8%

As was discussed in Chapter 1 a significant amount of capacity within the existing system has already been bonded for by developers. Table 5-2 compares bonded to unbonded users for each of the different service areas. However, it is important to remember that only Area C is in its own service area in regards to storage, while Areas A and B are in the same service area in regards to storage. All four areas are in the same service area in regards to treatment/production and transmission.

Table 5-2
JSSD Service Area ERU Projections

	Existing Demand (ERUs)	Projected 10-Year Growth-Bonded Users (ERUs)	Projected 10-Year Growth-Unbonded Users (ERUs)	Projected >10-Year Growth-Bonded Users (ERUs)	Projected >10-Year Growth-Unbonded Users (ERUs)
Area A	504	62	411	1,324	1,408
Area B North	517	396	55	365	372
Area B South	221	219	10	175	453
Area C	13	11	1	3,293	54

It is important to note that though Table 5-2 lists the ERUs by area, only Area C is its own service area for storage. Furthermore, there is only one service area in regards to transmission and treatment/production.

SECTION 6
INFRASTRUCTURE REQUIRED TO MEET DEMANDS OF NEW DEVELOPMENT (11-36A-302.1.A.V)

To satisfy the requirements of state law, demand placed upon existing system facilities by future development was projected using the process outlined below. Each of the steps were completed as part of this plan's development. More description of the methodology used in the process outlined below can be found in the JSSD Water Master Plan.

- **Existing Demand** – The demand existing development places on the JSSD system was estimated based on existing ERUs plus any sold capacity.
- **Existing Capacity** – The capacities of existing water system facilities were estimated using size data provided by JSSD and a hydraulic computer model.
- **Existing Deficiencies** – Existing deficiencies in the system were looked for by comparing defined levels of service against calculated capacities.
- **Future Demand** - The demand future development will place on the system was estimated based on development projections described in Chapter 2 of the master plan report.
- **Future Deficiencies** - Future deficiencies in the delivery system were identified using the defined level of service and results from the hydraulic computer model
- **Recommended Improvements** – Needed system improvements were identified to meet demands associated with future development.

The steps listed above describe the "demands placed upon existing public facilities by new development activity at the proposed level of service; and… the means by which the political subdivision or private entity will meet those growth demands" (Section 11-36a-302-1.a of the Utah Code). Defining the water system capacity in terms of a single value can be inaccurate. To improve the accuracy of this analysis, we have divided the system into three components (transmission, production/treatment, and storage).

TRANSMISSION

This section summarizes the breakdown of costs for the transmission system.

10-Year Improvement Plan

In Chapter 7 of the Master Plan, capital facility projects needed to provide service to various parts of the District were identified based on projected demand plus sold capacity through 2055. Most of these projects will need to be constructed in phases as development occurs. Only infrastructure to be constructed within a ten year horizon will be considered in the calculation of impact fees to avoid uncertainty surrounding improvements further into the future. Table 6-1 summarizes the components of projects identified in the capital facilities plan that will need to be constructed within the next ten years. The timing of these projects is based on projected flows plus sold capacity. If the District can reach an agreement with bonded users to temporarily use

sold capacity in some facilities, the actual construction date of these projects may be delayed. See Figure 6-1 for the location of the capital improvement projects.

Project Cost Attributable to Future Growth

To satisfy the requirements of state law, Table 6-1 provides a breakdown of the capital facility projects and the percentage of the project costs attributed to existing and future users. As defined in Section 11-36-304, the impact fee facilities plan should only include "the proportionate share of the costs of public facilities [that] are reasonably related to the new development activity."

Project Cost Attributable to 10-Year Growth

Included in Table 6-1 is a breakdown of capacity associated with growth both at full build-out and through the next 10 years. This is necessary because some of the projects identified in the table will be built with capacity to accommodate flows beyond the 10-year growth window. As summarized in the table, the total cost of future projects in the impact fee facility plan is approximately $2.8 million. Of these costs, about $208,000 is attributed to existing flows, while $939,000 is attributable to growth in the next ten years (including both bonded and unbonded users).

Project Cost Attributable to Bonded and Unbonded Users by Service Area

The final breakdown contained in Table 6-1 is a division of cost associated with bonded and unbonded capacity for each major component of the water system. In general, cost division at this level has been based on projected flows as described previously. However, also included in this division is consideration of the use of excess capacity in existing facilities as described in Section 4. Where capacity associated with one group of users is being used in facilities paid for by a different group, the portion of historic cost associated with this infrastructure is credited between the two groups.

For example, unbonded users in the conveyance system will be using capacity in facilities constructed by bonded users in the same area. To properly credit conveyance bond payers, costs equal to the portion of capacity used have been transferred from the bonded users to the unbonded users for other projects where both these groups have a responsibility for conveyance costs.

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Table 6-1
Project Costs Allocated to Projected Development, 10-year Planning Window

Project	Description	Estimate 2015 Construction Cost	Percent Existing	Percent 10-year Bonded Growth	Percent 10-year Unbonded Growth	Percent Bonded Growth Beyond 10 Years	Percent Unbonded Growth Beyond 10 Years	Cost to Existing Users	Cost To 10 Year Bonded Growth	Cost To 10 Year Unbonded Growth	Cost Bonded Growth Beyond 10-years	Cost Unbonded Growth Beyond 10-years
PS-2	Deer Canyon Preserve Pump Station	$ 122,000	7%	10%	24%	23%	36%	$ 9,080	$ 11,866	$ 29,136	$ 27,965	$ 43,953
PS-3	Victory Ranch to Tuhaye Pump Station	$ 306,000	7%	10%	24%	23%	36%	$ 22,765	$ 29,750	$ 73,048	$ 70,111	$ 110,195
T-2	Victory Ranch to Tuhaye 12 Inch Pipe	$ 2,368,000	7%	10%	24%	23%	36%	$ 176,244	$ 230,323	$ 565,528	$ 542,790	$ 853,115
	Total Capital Costs	**$ 2,796,000**	-	-	-	-	-	**$ 208,089**	**$ 271,940**	**$ 667,712**	**$ 640,866**	**$ 1,007,262**

TREATMENT/PRODUCTION

The treatment/production project with the cost breakdown is summarized below:

- **SP-6: Keetley WTP Expansion –** The capacity in the existing Keetley WTP is committed to bonded developers. Future developments that have not participated in the Keetley WTP bond will need to contribute to the expansion of the Keetley WTP. The total cost for the Keetley WTP expansion will be $6,740,314 and is all attributable to future developments that have not participated in the Keetley WTP bond. The increase of the capacity of the Keetley WTP will be 8 mgd (5,555 gpm), which will be able to serve an additional 4,444 ERUs. Projected growth of users without purchased capacity in the Keetley WTP is estimated to be 477 ERUs in the next 10 years. Therefore, the cost attributable to growth in unbonded users over the next 10 years is $723,571.

STORAGE

The storage project for Area C with the cost breakdown is summarized below:

- **ST-1: 6800 Tank –** There will be system level storage constructed in Area C. Within the next 10 years, it is anticipated that the 6800 Tank will be constructed with a total cost of $267,000. The 6800 Tank is not needed to serve existing users, nor will it be used by existing users. Therefore, the total cost of the 6800 Tank is attributable to future users. The capacity of the 6800 Tank will be 200,000 gallons, and will be able to serve 222 ERUs.

Basis of Construction Cost Estimates

Construction costs for transmission, production/treatment and storage have been taken directly from the Water Master Plan. These costs have been estimated based on past experience with projects of a similar nature. Water system project costs are based on average costs for facilities of the same size. Additional details regarding cost estimates are contained in Chapter 6 of the Water Master Plan document.

IFFP UPDATE

This IFFP will need to be updated periodically as growth occurs. Development patterns can change significantly from time to time and the recommendations in this report may need to be revised. The status of development should be reviewed at least every five years. This report and the associated recommendations should also be updated at least every five years. The estimated cost to update the IFFP is $40,000 with all the cost attributable to growth within the next 10 years. Fifty Nine percent (approximately $23,600) is attributable to bonded growth and 41 percent (approximately $16,400) to unbonded growth.

SECTION 7
ADDITIONAL CONSIDERATIONS

MANNER OF FINANCING (11-36A-302.2)

The District may fund the infrastructure identified in this IFFP through a combination of different revenue sources.

Federal and State Grants and Donations. Impact fees cannot reimburse costs funded or expected to be funded through federal grants and other funds that the District has received for capital improvements without an obligation to repay. Grants and donations are not currently contemplated in this analysis. If grants become available for constructing facilities, impact fees will need to be recalculated and an appropriate credit given. Any existing infrastructure funded through past grants will be removed from the system value during the impact fee analysis.

Bonds. The cost of bonding required to finance impact fee eligible improvements identified in the IFPP may be added to the calculation of the impact fee. It is expected that at least a portion of the IFFP projects will be funded through bonds. Bond costs including interest will need to be considered in the Impact Fee Analysis.

Interfund Loans. Because infrastructure must generally be built ahead of growth, there often arises situations in which projects must be funded ahead of expected impact fee revenues. In some cases, the solution to this issue will be bonding. In others, funds from existing user rate revenue will be loaned to the impact fee fund to complete initial construction of the project and will be reimbursed later as impact fees are received. Consideration of potential interfund loans will be included in the impact fee analysis and should also be considered in subsequent accounting of impact fee expenditures.

Impact Fees. It is recommended that impact fees be used to fund growth-related capital projects as they help to maintain the proposed level of service and prevent existing users from subsidizing the capital needs for new growth. Based on this IFFP, an impact fee analysis will be able to calculate a fair and legal fee that new growth should pay to fund the portion of the existing and new facilities that will benefit new development.

Developer Dedications and Exactions. Developer exactions are not the same as grants. Developer exactions may be considered in the inventory of current and future public safety infrastructure. If a developer constructs a facility or dedicates land within the development, the value of the dedication is credited against that particular developer's impact fee liability.

If the value of the dedication/exaction is less than the development's impact fee liability, the developer will owe the balance of the liability to the District. If the value of the improvements dedicated is worth more than the development's impact fee liability, the District must reimburse the difference to the developer from impact fee revenues collected from other developments.

It should be emphasized that the concept of impact fee credits pertains to system level improvements only. For project level improvements (i.e. projects not identified in the impact fee

facility plan), developers will be responsible for the construction of the improvements without credit against the impact fee.

NECESSITY OF IMPROVEMENTS TO MAINTAIN LEVEL OF SERVICE (11-36A-302.3)

According to State statute, impact fees cannot be used to correct deficiencies in the system and must be necessary to maintain the proposed level of service established for all users. Only those projects or portions of projects that are required to maintain the proposed level of service for future growth have been included in this IFFP. This will result in an equitable fee as future users will not be expected to fund any portion of the projects that will benefit existing residents.

NOTICING AND ADOPTION REQUIREMENTS (11-36A-502)

The Impact Fees Act requires that entities must publish a notice of intent to prepare or modify any IFFP. If an entity prepares an independent IFFP rather than include a capital facilities element in the general plan, the actual IFFP must be adopted by enactment. Before the IFFP can be adopted, a reasonable notice of the public hearing must be published in a local newspaper at least 14 days before the actual hearing. A copy of the proposed IFFP must be made available in each public library within the District during the 14 day noticing period for public review and inspection. Utah Code requires that the District must post a copy of the ordinance in at least three places. These places may include the District offices and the public libraries within the District's service area. Following the 14-day noticing period, a public hearing will be held, after which the District may adopt, amend and adopt, or reject the proposed IFFP.

SECTION 8
IMPACT FEE CERTIFICATION (11-36A-306.1)

This report has been prepared in accordance with Utah Code Title 11 Chapter 36a (the "Impact Fees Act"), which prescribes the laws pertaining to Utah municipal capital facilities plans and impact fee analyses. The accuracy of this report relies upon the planning, engineering, and other source data which was provided by the District and their designees.

In accordance with Utah Code Annotated, 11-36a-306(1), Bowen Collins & Associates, certifies that this impact fee facilities plan:

1. Includes only the cost of 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 the day on which each impact fee is paid;
2. Does not include:
   a. costs of operation and maintenance of public facilities;
   b. cost of 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 the methodological standards set forth by the federal Office of Management and Budget for federal grant reimbursement; and
3. Complies in each and every relevant respect with the Impact Fees Act.

SEWER IMPACT FEE FACILITIES PLAN

June 2015

Project No. 056-12-02

Prepared for:

Jordanelle Special Service District

Prepared by:

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

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EXECUTIVE SUMMARY

INTRODUCTION

Jordanelle Special Service District (JSSD or District) has retained Bowen Collins & Associates (BC&A) to prepare an impact fee facility plan (IFFP) for the sanitary sewer system. The purpose of the IFFP is to identify sewer demands placed upon the District by future development and evaluate how these demands will be met. The IFFP is also intended to outline the sewer system improvements which may be funded through impact fees.

WHY IS AN IFFP NEEDED?

The IFFP provides a technical basis for assessing updated impact fees throughout the District. This document will address the future infrastructure needed to serve the District with regard to current land use planning. The existing and future capital projects documented in this IFFP will ensure that level of service standards are maintained for all existing and future residents who reside within the service area. Local governments must pay strict attention to the required elements of the Impact Fee Facilities Plan which are enumerated in the Impact Fees Act.

PROJECTED FUTURE GROWTH

To evaluate future infrastructure needs, it is first necessary to project how sewer demands will increase in the future. Demands were projected based on estimated population growth and include all capacity sold or committed to future development through past bonding activities. System demands were projected in terms of Equivalent Residential Units (ERUs) and are discussed in detail in Chapter 2 of the Water and Sewer Master Plan for JSSD. Table ES-1 provides a summary of the demands under existing and 10 year growth conditions.

Table ES-1
JSSD Service Area Historic Flows

Item	Existing Flow	10-Year Projected Flow	Existing Flow Including Sold Capacity	10-Year Projected Flow Including Sold Capacity
Equivalent Residential Units (ERUs)	1,256	2421	9,395	9,486
Domestic Wastewater Production (gpd)	370,520	714,195	2,771,525	2,798,370
Infiltration, Maximum Month (gpd)	56,520	108,945	422,775	426,870
Average Day, Maximum Month Flow (mgd)	427,040	823,140	3,194,300	3,225,240
Peak Hour Production (gpd)	1,067,600	2,057,850	7,985,750	8,063,100
Flows per ERU				
Domestic Wastewater Production (gpd/ERU)	295	295	295	295
Average Day, Maximum Month Flow (gpd/ERU)	340	340	340	340
Peak Hour Production (gpd/ERU)	850	850	850	850
Average Indoor Water Use (gpd/ERU)	325	325	325	325

CAPACITY TO SERVE FUTURE GROWTH

Projected future growth will be met through a combination of available excess capacity in existing facilities and construction of additional capacity in new facilities. Additional improvements required to serve new growth were identified using a hydraulic computer model. The required conveyance improvement projects to serve 10-year growth are summarized in Table ES-2. There will also need to be additional treatment capacity, as all existing capacity has been sold to bonded developers. The additional capacity needed will require construction of an additional 1.2 MGD WWTP at an estimated cost of $16.6 million.

Not shown in Table 6-1 are required costs for additional treatment plant capacity. Required treatment improvements are as follows:

- **T-1: Wastewater Treatment Plant Expansion** - The District has a total treatment capacity of 1.2 mgd at the JSSD Treatment Plant. The existing plant was designed to meet the demands of Area C who bonded for the construction of the WWTP. Future development outside of Area C (including North Village) will be responsible to construct additional capacity. The estimated cost of a new 1.2 MGD WWTP to treat the needs of users outside of Area C is $16.6 million. Construction of an additional plant of this size would serve 3,530 ERUs.

Table ES-2
Project Collection Costs Allocated to Projected Development, 10-year Planning Window

Project	Description	Estimated 2015 Construction Cost	Service Area	Percent to Existing Users	Percent to 10-Year Growth-Bonded Users	Percent to 10-Year Growth-Unbonded Users	Percent to >10-Year Growth-Bonded Users	Percent to >10-Year Growth-Unbonded Users	Cost to Existing Users	Cost to 10-Year Growth-Bonded Users	Cost to 10-Year Growth-Unbonded Users	Cost to >10-Year Growth-Bonded Users	Cost to >10-Year Growth-Unbonded Users
P-1	Install new 18" to 24" line from Force Main 4 to the new WWTP	$ 3,499,693	Area A	5.60%	4.87%	0.53%	35.95%	9.95%	$ 196,063	$ 170,519	$ 18,425	$ 1,258,130	$ 348,182
			Area B North	8.39%	5.43%	0.87%	4.99%	6.03%	$ 293,527	$ 190,207	$ 30,600	$ 174,648	$ 211,045
			Area B South	3.24%	3.42%	0.02%	2.62%	8.09%	$ 113,389	$ 119,586	$ 625	$ 91,788	$ 282,960
			Area C	0.00%	0.00%	0.00%	0.00%	0.00%	$ -	$ -	$ -	$ -	$ -
P-2	Install 18" parallel line next to Line B	$ 1,039,737	Area A	0.00%	0.00%	1.92%	0.00%	16.20%	$ -	$ -	$ 19,958	$ -	$ 168,416
			Area B North	0.00%	6.89%	4.68%	2.83%	14.42%	$ -	$ 71,689	$ 48,680	$ 29,395	$ 149,928
			Area B South	9.78%	12.15%	0.13%	4.17%	26.82%	$ 101,698	$ 126,379	$ 1,379	$ 43,317	$ 278,899
			Area C	0.00%	0.00%	0.00%	0.00%	0.00%	$ -	$ -	$ -	$ -	$ -
LS-1	Install New Lift Station to supply 5200 gpm	$ 2,166,803	Area A	5.60%	4.87%	0.53%	35.95%	9.95%	$ 121,390	$ 105,575	$ 11,408	$ 778,960	$ 215,574
			Area B North	8.39%	5.43%	0.87%	4.99%	6.03%	$ 181,734	$ 117,765	$ 18,946	$ 108,132	$ 130,666
			Area B South	3.24%	3.42%	0.02%	2.62%	8.09%	$ 70,204	$ 74,041	$ 387	$ 56,830	$ 175,192
			Area C	0.00%	0.00%	0.00%	0.00%	0.00%	$ -	$ -	$ -	$ -	$ -
LS-2	Install New Lift Station to supply 1650 gpm	$ 898,369	Area A	0.00%	0.00%	1.92%	0.00%	16.20%	$ -	$ -	$ 17,244	$ -	$ 145,518
			Area B North	0.00%	6.89%	4.68%	2.83%	14.42%	$ -	$ 61,942	$ 42,061	$ 25,398	$ 129,543
			Area B South	9.78%	12.15%	0.13%	4.17%	26.82%	$ 87,871	$ 109,196	$ 1,191	$ 37,427	$ 240,978
			Area C	0.00%	0.00%	0.00%	0.00%	0.00%	$ -	$ -	$ -	$ -	$ -
-	Impact Fee Facility Plan and Impact Fee Analysis Update	$ 40,000	$ -	0.00%	92.19%	7.81%	0.00%	0.00%	$ -	$ 36,876	$ 3,124	$ -	$ -
	Total Capital Costs	**$ 7,644,602**	**$ -**						**$ 1,165,875**	**$ 1,183,774**	**$ 214,027**	**$ 2,604,024**	**$ 2,476,901**

* Project Year to be constructed is based on sold capacity. If the District can develop an agreement to loan capacity on an interim basis, Projects may be delayed until actual flows near system capacity.

SECTION 1
INTRODUCTION

Jordanelle Special Service District (JSSD or the District) has retained Bowen Collins & Associates (BC&A) to prepare an impact fee facility plan (IFFP) for sewer collection services provided by the District. The purpose of an IFFP is to identify demands placed upon District facilities by future development and evaluate how these demands will be met by the District. The IFFP is also intended to outline the improvements which may be funded through impact fees.

Much of the analysis forming the basis of this IFFP has been taken from chapters found in the JSSD Sewer Master Plan. The reader should refer to the master plan for additional discussion of planning and evaluation methodology beyond what is contained in this report.

JSSD does not currently treat its own wastewater. All wastewater collected by JSSD is treated at the Heber Valley Reclamation Facility. However, the District has recently constructed a treatment plant to meet the needs of a portion of its users.

Requirements for the preparation of an IFFP are outlined in Title 11, Chapter 36 of the Utah code (the Impact Fees Act). Under these requirements, an IFFP shall accomplish the following for each facility:

1. Identify the existing level of service
2. Establish a proposed level of service
3. Identify excess capacity to accommodate future growth
4. Identify demands of new development
5. Identify the means by which demands from new development will be met
6. Consider the following additional issues
    a. revenue sources to finance required system improvements
    b. necessity of improvements to maintain the proposed level of service
    c. need for facilities relative to planned locations of schools

The major sections of this report have been organized to address each of these requirements.

SOLD CAPACITY

JSSD is somewhat different than many other service districts in regards to the way it has been constructed. The District is a relatively new district with most of its initial infrastructure constructed through a series of bonds that were paid for by developers in exchange for future commitments to capacity. This means that, although a large portion of the capacity in the system is not currently being used, bonded users are guaranteed the capacity they purchased at the time of development. Thus, there is only limited available excess capacity for serving future growth outside of the developments that have purchased capacity. For the analysis contained in this IFFP and a subsequent Impact Fee Analysis (IFA), it will be important to keep track of both

LEGEND

- JSSD WWTP
- System Lift Station (In Model)
- Local Lift Station (Not in Model)
- Trunklines To Sewer Lagoons
- Highway 32 Trunklines
- North Section Trunklines

Area

- A
- B NORTH
- B SOUTH
- C

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

JSSD
IMPACT FEE FACILITY PLAN

SEWER COLLECTION SERVICE AREAS

NORTH:

SCALE: 0 6,000 Feet

FIGURE NO. 1-1

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existing demands and committed future demands from those who participated in the infrastructure bonds.

To further complicate the issue, JSSD issued four different bonds for sewer infrastructure. Three of the bonds included conveyance related infrastructure only, while the last bond included both conveyance and treatment facilities. As a result, there will be four different service areas that will need to be considered in this evaluation as shown in Figure 1-1:

- Area A – This was the initial infrastructure constructed by the District. It includes most of the facilities west of Jordanelle Reservoir and collects upstream flows from Area B.
- Area B North – Infrastructure in the area collectively known as "Area B" was constructed in two phases. The first phase will be referred to as Area B North. The Ross Creek sewer bond constructed infrastructure for service to this area. Flow from this area is conveyed to Area A and uses capacity in Area A facilities. However, developments in this area did not participate in any of the Area A bond costs.
- Area B South – The second phase of infrastructure completed in Area B was funded by the Tuhaye sewer bond and will be referred to as Area B South. This area uses capacity in downstream infrastructure in both Area A and Area B North. Developments in this area did not participate in any of the Area A or Area B North bond costs.
- Area C – The final service area in the District is located to the south of Jordanelle Reservoir. Area C is a little unique for several reasons:
    - Because of its location, infrastructure serving Area C is largely independent of the rest of the JSSD system. Thus, it does not rely on capacity from the other service areas.
    - The Area C bond included construction of treatment capacity. Thus, bonded users in Area C will have access to treatment capacity at no additional cost, while bonded users in other service areas will not.
    - Area C is also unique in that all conveyance infrastructure required to serve projected growth for bonded properties has been completed. This means that no impact fee will be required of any future growth for bonded properties. This also means that there is no opportunity for unbonded properties to buy into the system. Thus, no development of unbonded properties will be permitted unless the unbonded properties develop their own independent conveyance facilities.

Service area issues will be manifest in this report in three different ways:

1. Future growth projections will include discussion of both actual development and sold capacity. Because sold capacity is already committed to future users, evaluation of available capacity in existing infrastructure will be based on only unsold capacity, regardless of whether it is currently being used.
2. Where appropriate, growth and needed capacity will be distinguished between bonded and unbonded users so that needed infrastructure costs can be accurately allocated between both types of users.
3. Similar to item 2, growth and needed capacity will be distinguished between users in different service areas so that needed infrastructure costs can be accurately allocated between service areas.

SECTION 2
EXISTING LEVEL OF SERVICE (11-36A-302.1.A.I)

Level of service is defined in the Impact Fees Act as "the defined performance standard or unit of demand for each capital component of a public facility within a service area". This section discusses the level of service being currently provided to existing users. The level of service has been defined previously in Chapter 10 of the Master Plan and is same for all service areas within the district.

- **Pipeline Capacity:** The recommended level of service provided by the JSSD sewer system is such that the peak hour flow is less than 75 percent of the full flow capacity of the pipe. This allows for extra capacity to be reserved in the pipeline to account for potential inflow into the system and other unknowns. This design standard was used as the level of service for existing and future system evaluation.
- **Pressure Force Mains:** Velocities in force mains over 7 fps were considered deficient.
- **Lift Stations:** The lift station was considered deficient if peak flows exceeded 85 percent of the reliable pump capacity. Allowing for a modest amount of extra capacity accounts for variations in flow as discussed previously, and for some mechanical wear and decreased efficiency for pumps at each lift station.
- **Design Flows:** Chapter 2 of the Master Plan identifies historic and projected flows in the JSSD service area. The level of service for existing flow rates as calculated previously is summarized in Table 2-1. Included in the table are two columns. The first column indicates actual existing flows. The second includes all existing flows along with flows associated with capacity that has been sold (through system bonding) but have not been developed.

Table 2-1
JSSD Service Area Historic Flows

Item	Existing Flows	Existing Flows Plus Remaining Sold Capacity
Equivalent Residential Units (ERUs)	1,256	9,395
Domestic Wastewater Production (gpd)	370,520	2,771,525
Infiltration, Maximum Month (gpd)	56,520	422,775
Average Day, Maximum Month Flow (mgd)	427,040	3,194,300
Peak Hour Production (gpd)	1,067,600	7,985,750
Flows per ERU		
Domestic Wastewater Production (gpd/ERU)	295	295
Average Day, Maximum Month Flow (gpd/ERU)	340	340
Peak Hour Production (gpd/ERU)	850	850
Average Indoor Water Use (gpd/ERU)	325	325

It should be noted that the flow rate used to design and evaluate system components will vary depending on the nature of each component. For example, most treatment plant processes are designed based on average day, maximum month flow. Conversely, conveyance pipelines must be designed based on peak hour flow (function of daily flow and diurnal flow variation).

SECTION 3
PROPOSED LEVEL OF SERVICE (11-36A-302.1.A.II)

The proposed level of service is the performance standard used to evaluate system needs in the future. The Impact Fee Act indicates that the proposed level of service may:

1. diminish or equal the existing level of service; or
2. exceed the existing level of service if, independent of the use of impact fees, the District implements and maintains the means to increase the level of service for existing demand within six years of the date on which new growth is charged for the proposed level of service.

In the case of this IFFP, no changes are proposed to the existing level of service for design standards. Future growth will be evaluated based on the same design standards level of service as identified for existing users. Table 3-1 presents the proposed level of service for flows projected at the end of the 10 year planning window. As was done in the previous chapter, the projections include one column with projected actual flows and a second column with projected flows plus flows associated with remaining sold capacity that is yet to be developed.

Table 3-1
JSSD Service Area Projected 10-year Flows

Item	10-Year Projected Flows	10-Year Projected Flow Plus Remaining Sold Capacity
Equivalent Residential Units (ERUs)	2,421	9,486
Domestic Wastewater Production (gpd)	714,195	2,798,370
Infiltration, Maximum Month (gpd)	108,945	426,870
Average Day, Maximum Month Flow (mgd)	823,140	3,225,240
Peak Hour Production (gpd)	2,057,850	8,063,100
Flows per ERU		
Domestic Wastewater Production (gpd/ERU)	295	295
Average Day, Maximum Month Flow (gpd/ERU)	340	340
Peak Hour Production (gpd/ERU)	850	850
Average Indoor Water Use (gpd/ERU)	325	325

SECTION 4
EXCESS CAPACITY TO ACCOMMODATE FUTURE GROWTH (11-36A-302.1.A.III)

Projected future growth will be met through a combination of available excess capacity in existing facilities and construction of additional capacity in new facilities. To improve the accuracy of the analysis, we have divided the system into two different components (collection and treatment). The purpose of this breakdown is to consider the available capacity for each component individually. Excess capacity in each component of the system is as follows:

COLLECTION SYSTEM CAPACITY

To calculate the percentage of existing capacity to be used by future growth in existing facilities, existing and future flows were examined in a hydraulic model for each major collection pipeline. For the purpose of this IFFP, excess capacity was estimated against all sold capacity (including both existing flows and future commitments).

The method used to calculate excess capacity available for use by future flows is as follows:

- **Calculate Flows –** The peak flow in each facility was calculated in the model for both existing and future flows (including all sold capacity in both cases).
- **Identify Available Capacity –** Where a facility has capacity in excess of projected flows at build-out, the available capacity in the facility was defined as the difference between existing flows and build-out flows. Where the facility has capacity less than projected flows at build-out, the available capacity in the facility was defined as the difference between existing flows and the facility's maximum capacity.
- **Eliminate Facilities without Excess Capacity –** For the planning window period (in this case, 10 years), the committed capacity at the end of the planning window was compared against the facility's available capacity. If committed capacity at the end of the 10 year window exceeds the capacity of the facility, the available excess capacity is zero. By definition, this corresponds to facilities with deficiencies that are identified in the facilities plan as will be addressed in Section 6.
- **Calculate Percent of Excess Capacity Used in Remaining Facilities –** Where the future flow was less than the capacity of the facility, the percent of excess capacity being used in each facility was calculated by dividing the growth in flow in the facility (future flow less existing flow) by the total capacity (existing flow plus available capacity).

As discussed in Section 1, the majority of existing trunk lines have been constructed using funds from bonds paid for by developers and not by the District. As a result, it would not be appropriate for the District to collect impact fees associated with this capacity. However, this excess capacity does represent a valuable asset that is being used by future users. For this reason, the portion of capacity being used by future users in existing facilities (as described above) has been calculated based on actual historic bond costs. This will be credited to those who participated in the bonds against their portion of costs associated with other impact fee facilities. This is discussed in Section 6.

Treatment System Capacity

The District has a total treatment capacity of 1.2 mgd at the JSSD Treatment Plant. As stated in the Master Plan report, the WWTP has excess capacity based on current potential flow to the plant. However, all capacity within the plant has been sold to bonded developers. The actual cost of the existing plant based on time of construction was $16 million.

SECTION 5
DEMANDS PLACED ON FACILITIES BY NEW DEVELOPMENT (11-36A-302.1.A.IV)

Growth within the District's service area and projections of sewer flows resulting from said growth is discussed in detail in Chapter 2 of the Master Plan. Growth in terms of equivalent residential units is summarized in Table 5-1. Projected flows for the 10-year planning window have been summarized previously in Table 3-1.

Table 5-1
JSSD Service Area ERU Projections

	Projected ERUs	Average Annual Growth	Projected ERUs Plus Remaining Sold Capacity	Average Annual Growth
2015	1,256		9,395	
2016	1,341	6.8%	9,404	0.1%
2017	1,432	6.8%	9,413	0.1%
2018	1,529	6.8%	9,422	0.1%
2019	1,633	6.8%	9,431	0.1%
2020	1,744	6.8%	9,441	0.1%
2021	1,862	6.8%	9,450	0.1%
2022	1,988	6.8%	9,459	0.1%
2023	2,123	6.8%	9,468	0.1%
2024	2,267	6.8%	9,477	0.1%
2025	2,421	6.8%	9,486	0.1%
2035	4,177	5.6%	10,000	0.8%
2045	5,933	3.6%	10,513	0.4%
2055	7,689	2.6%	11,027	0.3%

As was discussed in Chapter 1 a significant amount of capacity within the existing system has already been bonded for by developers. Table 5-2 compares bonded to unbonded users for each of the different service areas.

Table 5-2
JSSD Service Area ERU Projections

	Existing Demand (ERUs)	Projected 10-Year Growth-Bonded Users (ERUs)	Projected 10-Year Growth-Unbonded Users (ERUs)	Projected >10-Year Growth-Bonded Users (ERUs)	Projected >10-Year Growth-Unbonded Users (ERUs)
Area A	504	438	35	3233	661
Area B North	517	397	54	365	372
Area B South	221	228	1	175	453
Area C*	13	11	1**	3293	54**
Total	**1256**	**1074**	**91**	**7065**	**1541**

* Area C is the only area within JSSD to have purchased treatment capacity in the new WWTP. All other bonded facilities are specific to the conveyance system.
**Although projections include the potential for growth in unbonded Area C properties, development in these areas will only be allowed if they construct their own conveyance facilities as discussed previously.

SECTION 6
INFRASTRUCTURE REQUIRED TO MEET DEMANDS OF NEW DEVELOPMENT (11-36A-302.1.A.V)

To satisfy the requirements of state law, demand placed upon existing system facilities by future development was projected using the process outlined below. Each of the steps were completed as part of this plan's development. More description of the methodology used in the process outlined below can be found in the JSSD Master Plan.

- **Existing Demand** – The demand existing development places on the JSSD system was estimated based on existing ERUs plus any sold capacity.
- **Existing Capacity** – The capacities of existing system collection facilities were estimated using size data provided by JSSD and a hydraulic computer model.
- **Existing Deficiencies** – Existing deficiencies in the system were looked for by comparing defined levels of service against calculated capacities.
- **Future Demand** - The demand future development will place on the system was estimated based on sold capacities and development projections described in Chapter 2 of the master plan report.
- **Future Deficiencies** - Future deficiencies in the collection system were identified using the defined level of service and results from the hydraulic computer model.
- **Recommended Improvements** – Needed system improvements were identified to meet demands associated with future development.

The steps listed above describe the "demands placed upon existing public facilities by new development activity at the proposed level of service; and… the means by which the political subdivision or private entity will meet those growth demands" (Section 11-36a-302-1.a of the Utah Code).

Defining system capacity in terms of a single number is difficult. To improve the accuracy of the analysis, we have divided the system into two different components (collection and treatment).

COLLECTION

10-Year Improvement Plan

In Chapter 10 of the Master Plan, capital facility projects needed to provide service to various parts of the District were identified based on projected flows plus sold capacity through 2055. Most of these projects will need to be constructed in phases as development occurs. Only infrastructure to be constructed within a ten year horizon will be considered in the calculation of impact fees to avoid uncertainty surrounding improvements further into the future. Table 6-1 summarizes the components of projects identified in the capital facilities plan that will need to be constructed within the next ten years. The timing of these projects is based on projected flows plus sold capacity. If the District can reach an agreement with bonded users to temporarily use sold capacity in some facilities, the actual construction date of these projects may be delayed.

See Figure 6-1 for the location of these projects. Included in the table is also a line item to prepare this impact fee facility plan and impact fee analysis.

LS-2
Existing Capacity 1,235 gpm
Future Capacity 3,070 gpm
300 HP

P-2
New Parallel
18" Trunkline

LS-1
Existing Capacity 1,500 gpm
Future Capacity 5,180 gpm
730 HP

P-1
New 18-24" Trunkline to
connect to WWTP

T-1
Future JSSD
WWTP Expansion

STP

L E G E N D

Trunkline
- To Sewer Lagoons
- Existing
- Future Deficiency
- New Future Project

Sewer Lift Station
- Existing
- CIP
- STP Future JSSD WWTP Site

Area
- A
- B NORTH
- B SOUTH
- C

NORTH:

SCALE: 0 6,000 Feet

CAPITAL IMPROVEMENTS FACILITIES PLAN

JSSD
WATER AND SEWER MASTER PLAN

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

FIGURE NO.
6-1

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Table 6-1
Project Collection Costs Allocated to Projected Development, 10-year Planning Window

Project	Description	Estimated 2015 Construction Cost	Service Area	Percent to Existing Users	Percent to 10-Year Growth-Bonded Users	Percent to 10-Year Growth-Unbonded Users	Percent to >10-Year Growth-Bonded Users	Percent to >10-Year Growth-Unbonded Users	Cost to Existing Users	Cost to 10-Year Growth-Bonded Users	Cost to 10-Year Growth-Unbonded Users	Cost to >10-Year Growth-Bonded Users	Cost to >10-Year Growth-Unbonded Users
P-1	Install new 18" to 24" line from Force Main 4 to the new WWTP	$ 3,499,693	Area A	5.60%	4.87%	0.53%	35.95%	9.95%	$ 196,063	$ 170,519	$ 18,425	$ 1,258,130	$ 348,182
			Area B North	8.39%	5.43%	0.87%	4.99%	6.03%	$ 293,527	$ 190,207	$ 30,600	$ 174,648	$ 211,045
			Area B South	3.24%	3.42%	0.02%	2.62%	8.09%	$ 113,389	$ 119,586	$ 625	$ 91,788	$ 282,960
			Area C	0.00%	0.00%	0.00%	0.00%	0.00%	$ -	$ -	$ -	$ -	$ -
P-2	Install 18" parallel line next to Line B	$ 1,039,737	Area A	0.00%	0.00%	1.92%	0.00%	16.20%	$ -	$ -	$ 19,958	$ -	$ 168,416
			Area B North	0.00%	6.89%	4.68%	2.83%	14.42%	$ -	$ 71,689	$ 48,680	$ 29,395	$ 149,928
			Area B South	9.78%	12.15%	0.13%	4.17%	26.82%	$ 101,698	$ 126,379	$ 1,379	$ 43,317	$ 278,899
			Area C	0.00%	0.00%	0.00%	0.00%	0.00%	$ -	$ -	$ -	$ -	$ -
LS-1	Install New Lift Station to supply 5200 gpm	$ 2,166,803	Area A	5.60%	4.87%	0.53%	35.95%	9.95%	$ 121,390	$ 105,575	$ 11,408	$ 778,960	$ 215,574
			Area B North	8.39%	5.43%	0.87%	4.99%	6.03%	$ 181,734	$ 117,765	$ 18,946	$ 108,132	$ 130,666
			Area B South	3.24%	3.42%	0.02%	2.62%	8.09%	$ 70,204	$ 74,041	$ 387	$ 56,830	$ 175,192
			Area C	0.00%	0.00%	0.00%	0.00%	0.00%	$ -	$ -	$ -	$ -	$ -
LS-2	Install New Lift Station to supply 1650 gpm	$ 898,369	Area A	0.00%	0.00%	1.92%	0.00%	16.20%	$ -	$ -	$ 17,244	$ -	$ 145,518
			Area B North	0.00%	6.89%	4.68%	2.83%	14.42%	$ -	$ 61,942	$ 42,061	$ 25,398	$ 129,543
			Area B South	9.78%	12.15%	0.13%	4.17%	26.82%	$ 87,871	$ 109,196	$ 1,191	$ 37,427	$ 240,978
			Area C	0.00%	0.00%	0.00%	0.00%	0.00%	$ -	$ -	$ -	$ -	$ -
-	Impact Fee Facility Plan and Impact Fee Analysis Update	$ 40,000	$ -	0.00%	92.19%	7.81%	0.00%	0.00%	$ -	$ 36,876	$ 3,124	$ -	$ -
	Total Capital Costs	**$ 7,644,602**	**$ -**						**$ 1,165,875**	**$ 1,183,774**	**$ 214,027**	**$ 2,604,024**	**$ 2,476,901**

* Project Year to be constructed is based on sold capacity. If the District can develop an agreement to loan capacity on an interim basis, Projects may be delayed until actual flows near system capacity.

Project Cost Attributable to Future Growth

To satisfy the requirements of state law, Table 6-1 provides a breakdown of the capital facility projects and the percentage of the project costs attributed to existing and future users. As defined in Section 11-36-304, the impact fee facilities plan should only include "the proportionate share of the costs of public facilities [that] are reasonably related to the new development activity." Projects that benefit existing users include those projects addressing existing capacity needs and maintenance related projects.

For many projects, the division of costs between existing and future users is easy because 100 percent of the project costs can be attributed to one category or the other (e.g. infrastructure needed solely to serve new development can be 100 percent attributed to new growth, while projects related to existing condition or capacity deficiencies can be 100 percent attributed to existing user needs). For projects needed to address both existing deficiencies and new growth or where a higher level of service is being proposed, costs have been divided proportionally between existing and future users based on their needs in the facility. For example, consider a pipeline with a capacity of 3 mgd. If 1.64 mgd (55 percent) is needed for flows from existing customers, while the remaining 1.36 mgd (45 percent) will be used by future users, the project costs will be divided accordingly.

Project Cost Attributable to 10-Year Growth

Included in Table 6-1 is a breakdown of capacity associated with growth both at full build-out and through the next 10 years. This is necessary because some of the projects identified in the table will be built with capacity to accommodate flows beyond the 10-year growth window. As summarized in the table, the total cost of future projects in the impact fee facility plan is approximately $7.6 million. Of these costs, about $1.2 million is attributed to existing flows, while $1.4 million is attributable to growth in the next ten years (including both bonded and unbonded users).

Project Cost Attributable to Bonded and Unbonded Users by Service Area

The final breakdown contained in Table 6-1 is a division of cost associated with bonded and unbonded capacity in each of the service areas. In general, cost division at this level has been based on projected flows as described previously. However, also included in this division is consideration of the use of excess capacity in existing facilities as described in Section 4. Where capacity associated with one group of users is being used in facilities paid for by a different group, the portion of historic cost associated with this infrastructure is credited between the two groups.

For example, unbonded users in Area B South will be using capacity in facilities constructed by bonded users in the same area. To properly credit Area B South bond payers, costs equal to the portion of capacity used have been transferred from the bonded users to the unbonded users for other downstream projects where both these groups have a responsibility for conveyance costs.

TREATMENT

Not shown in Table 6-1 are required costs for additional treatment plant capacity. Required treatment improvements are as follows:

- **T-1: Wastewater Treatment Expansion -** The District has a total treatment capacity of 1.2 mgd at the JSSD Treatment Plant. The existing plant was designed to meet the demands of Area C who bonded for the construction of the WWTP. Future development outside of Area C (including North Village) will be responsible to construct additional capacity. The estimated cost of a new 1.2 MGD WWTP to treat the needs of users outside of Area C is $16.6 million. Construction of an additional plant of this size would serve 3,530 ERUs.

BASIS OF CONSTRUCTION COST ESTIMATES

Construction costs have been taken directly from the Sewer Master Plan. These costs have been estimated based on past experience with projects of a similar nature. Collection system project costs are based on average per foot costs for pipes of the same size. Additional details regarding cost estimates are contained in Chapter 12 of the Water and Sewer Master Plan document.

SECTION 7
ADDITIONAL CONSIDERATIONS

MANNER OF FINANCING (11-36A-302.2)

The District may fund the infrastructure identified in this IFFP through a combination of different revenue sources.

Federal and State Grants and Donations. Impact fees cannot reimburse costs funded or expected to be funded through federal grants and other funds that the District has received for capital improvements without an obligation to repay. Grants and donations are not currently contemplated in this analysis. If grants become available for constructing facilities, impact fees will need to be recalculated and an appropriate credit given. Any existing infrastructure funded through past grants will be removed from the system value during the impact fee analysis.

Bonds. The cost of bonding required to finance impact fee eligible improvements identified in the IFPP may be added to the calculation of the impact fee. It is expected that at least a portion of the IFFP projects will be funded through bonds. Bond costs including interest will need to be considered in the Impact Fee Analysis.

Interfund Loans. Because infrastructure must generally be built ahead of growth, there often arises situations in which projects must be funded ahead of expected impact fee revenues. In some cases, the solution to this issue will be bonding. In others, funds from existing user rate revenue will be loaned to the impact fee fund to complete initial construction of the project and will be reimbursed later as impact fees are received. Consideration of potential interfund loans will be included in the impact fee analysis and should also be considered in subsequent accounting of impact fee expenditures.

Impact Fees. It is recommended that impact fees be used to fund growth-related capital projects as they help to maintain the proposed level of service and prevent existing users from subsidizing the capital needs for new growth. Based on this IFFP, an impact fee analysis will be able to calculate a fair and legal fee that new growth should pay to fund the portion of the existing and new facilities that will benefit new development.

Developer Dedications and Exactions. Developer exactions are not the same as grants. Developer exactions may be considered in the inventory of current and future public safety infrastructure. If a developer constructs a facility or dedicates land within the development, the value of the dedication is credited against that particular developer's impact fee liability.

If the value of the dedication/exaction is less than the development's impact fee liability, the developer will owe the balance of the liability to the District. If the value of the improvements dedicated is worth more than the development's impact fee liability, the District must reimburse the difference to the developer from impact fee revenues collected from other developments.

It should be emphasized that the concept of impact fee credits pertains to system level improvements only. For project level improvements (i.e. projects not identified in the impact fee

facility plan), developers will be responsible for the construction of the improvements without credit against the impact fee.

NECESSITY OF IMPROVEMENTS TO MAINTAIN LEVEL OF SERVICE (11-36A-302.3)

According to State statute, impact fees cannot be used to correct deficiencies in the system and must be necessary to maintain the proposed level of service established for all users. Only those projects or portions of projects that are required to maintain the proposed level of service for future growth have been included in this IFFP. This will result in an equitable fee as future users will not be expected to fund any portion of the projects that will benefit existing residents.

NOTICING AND ADOPTION REQUIREMENTS (11-36A-502)

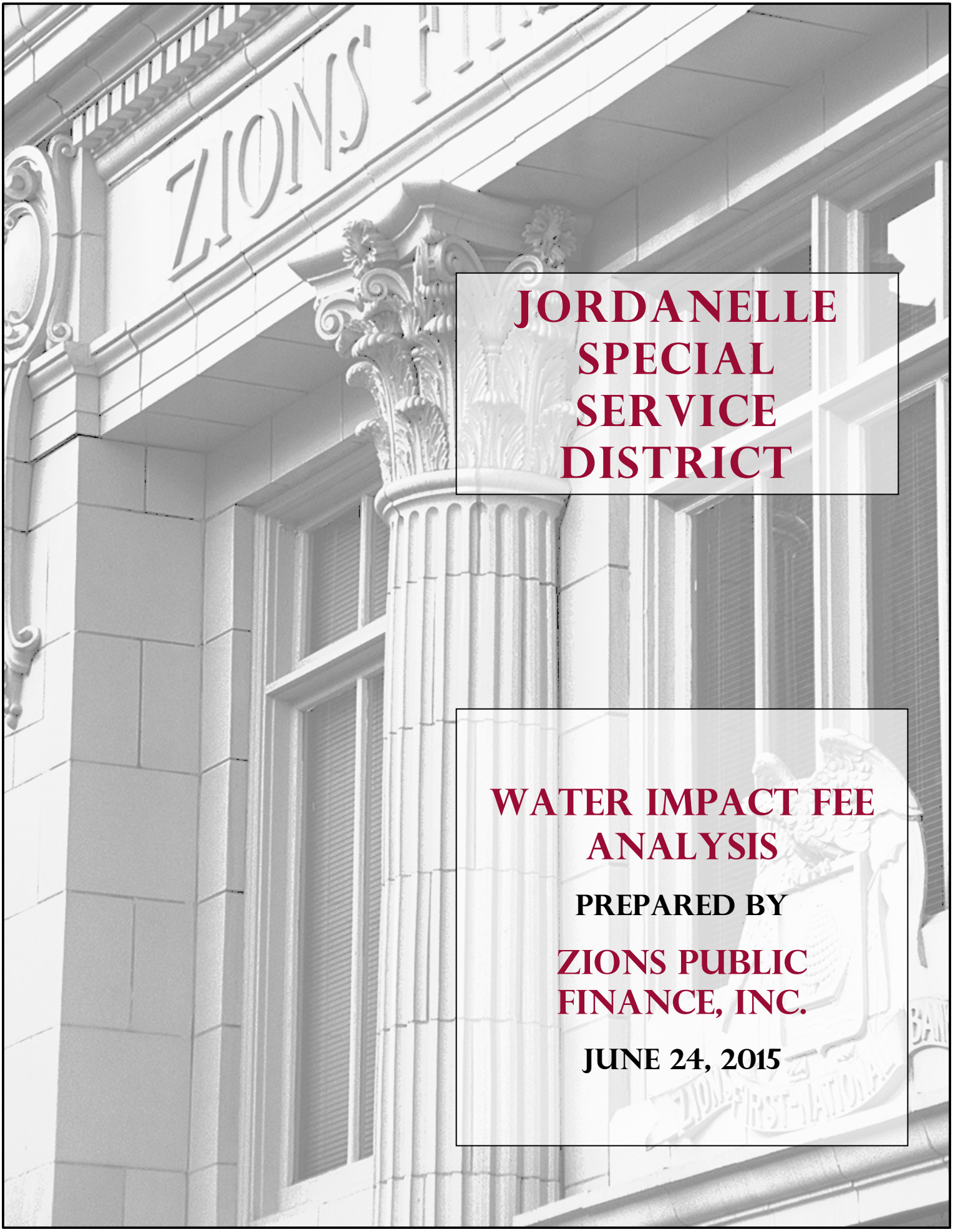
The Impact Fees Act requires that entities must publish a notice of intent to prepare or modify any IFFP. If an entity prepares an independent IFFP rather than include a capital facilities element in the general plan, the actual IFFP must be adopted by enactment. Before the IFFP can be adopted, a reasonable notice of the public hearing must be published in a local newspaper at least 14 days before the actual hearing. A copy of the proposed IFFP must be made available in each public library within the District during the 14 day noticing period for public review and inspection. Utah Code requires that the District must post a copy of the ordinance in at least three places. These places may include the District offices and the public libraries within the District's service area. Following the 14-day noticing period, a public hearing will be held, after which the District may adopt, amend and adopt, or reject the proposed IFFP.

SECTION 8
IMPACT FEE CERTIFICATION (11-36A-306.1)

This report has been prepared in accordance with Utah Code Title 11 Chapter 36a (the "Impact Fees Act"), which prescribes the laws pertaining to Utah municipal capital facilities plans and impact fee analyses. The accuracy of this report relies upon the planning, engineering, and other source data which was provided by the District and their designees.

In accordance with Utah Code Annotated, 11-36a-306(1), Bowen Collins & Associates, certifies that this impact fee facilities plan:

1. Includes only the cost of 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 the day on which each impact fee is paid;
2. Does not include:
   a. costs of operation and maintenance of public facilities;
   b. cost of 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 the methodological standards set forth by the federal Office of Management and Budget for federal grant reimbursement; and
3. Complies in each and every relevant respect with the Impact Fees Act.



JORDANELLE SPECIAL SERVICE DISTRICT

WATER IMPACT FEE ANALYSIS

PREPARED BY

ZIONS PUBLIC FINANCE, INC.

JUNE 24, 2015

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EXECUTIVE SUMMARY

Jordanelle Special Service District, Utah (the District, JSSD) recently commissioned Zions Public Finance, Inc. (Zions) to calculate the District's culinary water impact fees in accordance with Utah State Law. An impact fee is a one-time charge to new development to reimburse the District for the cost of developing new culinary water system capacity that will allow development to occur. In conjunction with this project, Bowen Collins & Associates (BC&A) prepared the *JSSD Water Impact Fee Facilities Plan* (IFFP) dated June 2015.

JSSD Culinary Water System

The water system serves indoor water use and outdoor watering demand for all retail water service within Jordanelle Special Service District boundaries. It is expected that the system will continue to expand, but that it will not extend beyond the District's current annexation boundaries. The District's culinary water system currently serves 1,256 equivalent residential units (ERUs) and is expected to grow to 2,421 ERUs by 2025. The level of service or demand per ERU is 810 gallons per average day.

Water System Funding

The District's existing culinary water production/treatment, storage and transmission assets are largely committed to existing users and have been excluded from the impact fee calculation. The District will need to build another $11M (FV) in the next ten years that will include expanding the Keetley Water Treatment Plant, constructing a new tank, 6800 Tank, and constructing a number of transmission improvements to meet demand. These projects are required to provide capacity to allow new growth to connect to a safe and reliable culinary water system. The District does not have any impact fee qualifying debt issues outstanding and does not anticipate issuing bonds at this time to fund the ten year improvements. Any changes to these assumptions may require an update to the culinary water impact fee analysis.

JSSD Water Service Areas

The construction of the District's sewer system has been funded largely through special assessment and revenue bonds that were paid by developers in exchange for future commitment to system capacity. Therefore, the sanitary sewer impact fee will be assessed to various service areas based upon geographic location and whether or not the user has participated in the bonds that funded system improvements within their service area (referred to as a "bonded" user) or if they have not (an "unbonded" user). JSSD has four geographic areas where service is provided: Area A, Area B North, Area B South and Area C. The future users forecasted for each geographic area is then divided into bonded or unbonded users which totals eight impact fee service areas. The 1,165 future ten year ERUs mentioned above includes 688 bonded future users and 477 unbonded future users. A breakdown of bonded and unbonded users by area is found in Figure 2.2 later in this report.

Recommended Water Impact Fees

The recommended impact fee structure presented in this analysis has been prepared to satisfy the Impact Fees Act, Utah Code Ann. § 11-36-101 et. seq., and represents the maximum culinary water impact fees that the District may assess within the service areas. The District will be required to use other revenue sources to fund any projects identified in the IFFP that constitute repair and replacement, cure any existing deficiencies, increase the level of service or maintain the level of service for existing users.

The following tables show the maximum legal culinary water impact fee that the District can assess per ERU within each of the eight service areas. The final impact fee paid will be based on the unique characteristics of the residential or non-residential property that is proposed to be developed. The District's engineers will review each lot's development plans to determine the ERU equivalent for each new lot. This ERU equivalent will be multiplied by the applicable fee per ERU found below and the final impact fee will be assessed accordingly.

FIGURE ES.1: MAXIMUM IMPACT FEE SCHEDULE PER ERU

	Bonded Service Areas A, B South, B North	Unbonded Service Areas A, B South, B North	Bonded Service Area C	Unbonded Service Area C
Treatment	$ -	$ 1,517	$ -	$ 1,517
Storage	-	-	-	1,682
Transmission	563	1,994	563	1,994
Credit	(108)	(108)	(108)	(108)
Professional Services	34	34	34	34
Cost per ERU	**$ 489.54**	**$ 3,437.09**	**$ 489.54**	**$ 5,119.51**

Figure ES.2 provides a calculation of the impact fee for a non-standard user that may not fit the schedule found in the previous tables. The non-standard calculation is based on the estimated gallons of use of a new property on a peak month average day basis and the proposed cost per gallon of water for each of the eight service areas. It is at the District's discretion if the non-standard calculation will be used and clear and thorough documentation of the proposed property's estimated demand must be provided.

FIGURE ES.2: CALCULATION OF NON-STANDARD CULINARY WATER IMPACT FEE

NON-STANDARD IMPACT FEE CALCULATIONS
Bonded Service Areas A, B South, B North
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $0.60 per Gallon
Unbonded Service Areas A, B South, B North
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $4.24 per Gallon
Bonded Service Area C
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $0.60 per Gallon
Unbonded Service Area C
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $6.32 per Gallon

CHAPTER 1: OVERVIEW OF THE CULINARY WATER IMPACT FEES

Impact Fee Overview

An impact fee is a one-time fee, not a tax, charged to new development to recover the District's cost of constructing water facilities with capacity that will be utilized by new growth. The fee is assessed at the time of building permit issuance as a condition of development approval. The calculation of the impact fee must strictly follow the Impact Fees Act to ensure that the fee is equitable, fair, and legally defensible. This analysis provides documentation that there is a fair comparison, or rational nexus, between the impact fee charged to new development and the impact on the capacity of the system.

Until new development utilizes the full capacity of existing facilities, the District can assess an impact fee to recover its cost of latent capacity available to serve future development. The general impact fee methodology divides the available capacity of existing and future capital projects between the number of existing and future users.

Qualifying and Non-Qualifying Costs

The impact fees proposed in this analysis are calculated based upon:

- New capital infrastructure for water production/treatment, storage, and transmission;
- Professional and planning expenses related to the construction of new infrastructure; and
- Historic costs of existing improvements that will serve new development.

The costs that cannot be included in the impact fee are as follows:

- Projects that cure existing deficiencies for existing users;
- Projects that increase the level of service above that which is currently provided;
- Operations and maintenance costs;
- Costs of facilities funded by grants or other funds that the District does not have to repay; and
- Costs of reconstruction of facilities that do not have capacity to serve new growth.

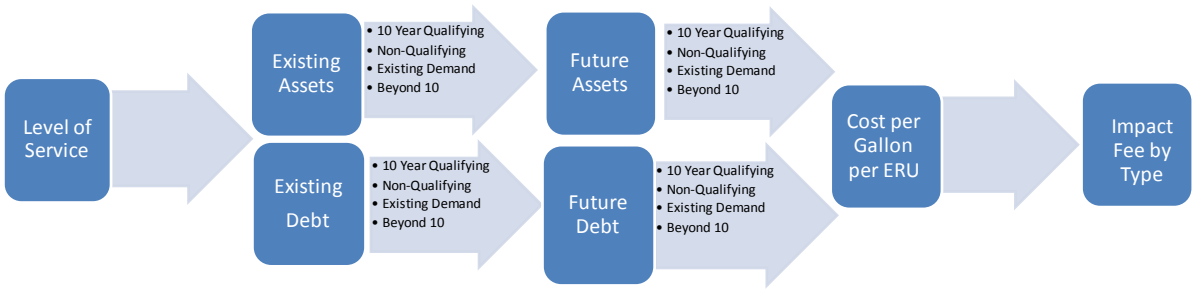
In the next ten years the District anticipates the construction of the Keetley Water Treatment Plant expansion, constructing additional storage capacity that will benefit Service Area C and completing a number of transmission projects. The District does not anticipate issuing any impact fee qualifying bonds to help fund the culinary water projects.

Impact Fee Calculations

A fair impact fee is calculated by dividing the cost of existing and future facilities by unused capacity in existing or future facilities expressed in terms of an ERU. This cost per ERU is then multiplied by the estimated demand of an individual home, business, or other non-residential user expressed in term of an

ERU or 810 gpd on an average day to determine the final impact fee to be paid. The chart below provides an overview of the impact fee calculation process.

FIGURE 1.1: IMPACT FEE CALCULATION FLOW CHART



Description of the Service Areas

The culinary water system is comprised of a combination of wells, storage and transmission facilities that will provide indoor and outdoor potable water for homes and businesses located in JSSD. The District has the four service areas: Area A, Area B North, Area B South and Area C. The service areas are then divided into unbonded users or bonded users. A map of the District is included in the Appendix.

Projected Demand

The system has been sized to provide an ERU with 810 gallons per day (gpd) on an average day, 1,800 gpd on a peak day (peaking factor of 2.22), and 2,700 gpd at the peak instantaneous demand (peaking factor is 3.33). The primary measurement used for water improvement sizing and capacity evaluations in this analysis is future water demand expressed in gallons per day. Figure 2.2 shows a detailed division of existing and future ERUs between geographic areas and a classification of bonded or unbonded.

CHAPTER 2: IMPACT FROM GROWTH UPON THE DISTRICT'S FACILITIES AND LEVEL OF SERVICE

Future Water Demand within the Service Area

Water demand within the District will increase as development activity continues and homes and other types of development are built. Currently there are 1,256 ERUs and the 2025 count for the service area is estimated to be 2,421. Throughout the impact fee analysis a 10 year planning window will be the basis for the impact fee calculation. Costs and capacities of projects will be split between bonded and unbonded users that are anticipated to develop over the next 10 years. Figure 2.1 shows the growth in total ERUs through 2025 and beyond.

FIGURE 2.1: PROJECTED GROWTH IN DEMAND (ERU)

Year	ERUS	Average Annual Growth	Projected ERUs Remaining Sold Capacity	Average Annual Growth	Current ERUs	10 Year Demand in ERUs
2015	**1,256**		**7,111**		**1,256**	
2016	1,341	6.8%	7,156	0.6%		
2017	1,432	6.8%	7,202	0.6%		
2018	1,529	6.8%	7,248	0.6%		
2019	1,633	6.8%	7,294	0.6%		
2020	1,744	6.8%	7,340	0.6%		
2021	1,862	6.8%	7,387	0.6%		
2022	1,988	6.8%	7,434	0.6%		
2023	2,123	6.8%	7,481	0.6%		
2024	2,267	6.8%	7,529	0.6%		
2025	**2,421**	**6.8%**	**7,577**	**0.6%**		**1,165**
2035	4,177	5.6%	8,340	0.5%		
2045	5,933	3.6%	9,102	0.5%		
2055	7,689	2.6%	9,865	0.3%		

FIGURE 2.2: BONDED AND UNBONDED ERUS BY SERVICE AREA

	Existing	10 Year Bonded	10 Year Unbonded	>10 year Bonded	>10 year Unbonded
Area A	504	62	411	1,324	14
Area B North	517	396	55	365	372
Area B South	221	219	10	175	453
Area C	13	11	1	3,293	54
Totals	**1,255**	**688**	**477**	**5,157**	**893**

Level of Service Analysis

The level of service standard is established in the IFFP and reflects District policies, sound engineering analysis and standards, and observed demands. This is a defensible level of service that is established in the IFFP and is anticipated that this level of service per ERU will be perpetuated into the future. However, the District has the right to increase this established level of service in the future by constructing facilities that will provide greater capacity but such level of service increases cannot be funded through impact fees. The District will have to find other funding sources, such as user rates, for projects that increase level of service should it decide to do so. There are currently no plans to increase the level of service beyond what is proposed in the IFFP.

Storage Level of Service

Storage must be adequate to meet the average observed fluctuations in each zone within the District with a safety factory of 2.0. Storage is based on operational/equalization storage, fire flow storage and emergency or standby storage. There must be adequate fire flow capacity to deliver 2,750 gallons per minute for two hours (330,000 gallons) for the upper hillside zones and the lower hillside is 3,500 gpm for 3 hours (630,000 gallons).

Production/Treatment Level of Service

Production must be adequate to satisfy the demand on both an annual and peak day basis. Average day flow is 810 gpd/ERU and peak day flow is 1,800 gpd/ERU. Culinary water is used for both indoor use and outdoor watering and production capacity. Culinary water must be sufficient to meet indoor and outdoor demand and account for limitations in supply such changes in seasonal supply or the effects of dry years.

Transmission Level of Service

The State of Utah requires that distribution pressures be greater than 40 psi during peak day production requirements. The culinary water system in JSSD does not generally drop lower than 60 psi during peak day production conditions.

CHAPTER 3: HISTORIC AND FUTURE CAPITAL PROJECTS COSTS

The Impact Fees Act allows for the inclusion of various cost components in the calculation of the impact fees. These cost components are the construction costs of growth-driven improvements and appropriate professional services inflated from current dollars to construction year costs. Impact fees can only fund system improvements which are defined as facilities or lines that contribute to the entire system's capacity rather than just to a small, localized area. Culinary water capital projects have historically been funded through bonds and may be partially bond funded for in future years through revenue bonds. A portion of future projects may be constructed by developers in development or pioneering agreements.

Capacities of Existing Components Available for Growth

The costs of future capital projects are defined in the corresponding Impact Fees Facilities Plan prepared by BC&A and are detailed in Figure 3.2 below.

Production/Treatment Costs and Capacities

The two major facilities for producing water in JSSD are Victory Ranch Well and Keetley Water Treatment Plant. Currently there is a large portion of unused capacity in both facilities; however, this latent capacity is already purchased by bonded users. These facilities do not have capacity to serve any developments that have not already paid for capacity. New development that does not have dedicated capacity will need to pay an impact fee towards the Keetley Water Treatment Plant expansion. Keetley WTP is being shared among all of the service areas and with North Village Special Service District and will serve 4,444 ERUs. The cost of the expansion is $6,740,314 which is equivalent to $1,516 per ERU. Of the expansion cost, $280,594 will be attributable to North Village Special Service District (NVSSD).

FIGURE 3.1: ERUS BY SERVICE AREA

		10-Year		>10-Year		
	Existing	10-Year Bonded	Unbonded	>10-Year Bonded	Unbonded	Totals
Area A	-	-	411	-	14	
Area B North	-	-	55	-	372	
Area B South	-	-	10	-	453	
Area C	-	-	1	-	54	
NVSSD	185	-	-	-	-	
Totals	**185**	**-**	**477**	**-**	**893**	
Area A	0%	0%	9%	0%	0%	9.57%
Area B North	0%	0%	1%	0%	8%	9.61%
Area B South	0%	0%	0%	0%	10%	10.42%
Area C	0%	0%	0%	0%	1%	1.24%
NVSSD	4%	0%	0%	0%	0%	4.16%
Totals						**34.99%**

Storage Costs and Capacities

Most of the existing water storage facilities were constructed to serve a single development only and are project level improvements, not system improvements, and thus are not impact fee qualifying. The exception is the HWY 32 storage tank in Area C. The HWY 32 tank was constructed in an area that will allow it to best serve NVSSD but it was funded by Area C residents. Therefore, the cost of the HWY 32 tank has been included in the NVSSD impact fee and Area C will be reimbursed for that tank which will allow them to construct the 6800 Tank to meet their future demands.

Transmission Costs and Capacities

JSSD's transmission system has excess capacity beyond the sold capacity to serve new development. New improvements will be added to continue to expand the transmission capacity and loop through all four JSSD service areas.

Historic Capital Project Costs

This analysis considers existing assets in the calculation of fees for bonded and unbonded users. Bonded users are entitled to a portion of existing capacity since they have paid SAA payments to fund the existing projects. Unbonded users will be benefitted from only future project capacities.

Future Capital Projects and 10 Year Demand

The District and BC&A have identified the following capital projects which are necessary to meet demand in the culinary water system. All construction estimates are shown in 2015 dollars and a 3.8% inflation rate is added to projects to be constructed after 2015. As shown in Figure 3.2, project costs were sorted by whether they will meet 10 year impact fee qualifying demand, beyond 10 year demand, or whether any portion is non-qualifying (which includes portions of the project that will be utilized by existing users or NVSSD). $2,475,280 or about 22% of the total $11,135,856 capital projects were determined to be 10 year impact fee qualifying and included in the impact fee calculation.

FIGURE 3.2: FUTURE CAPITAL PROJECT COSTS

Project Name	Year to be Constructed	2015 Cost	Construction Cost with Inflation	10 Year Bonded Impact Fee Qualifying Cost	10 Year Unbonded Impact Fee Qualifying Cost	Unbonded Impact Fee Qualifying Beyond 10 Years	Bonded Impact Fee Qualifying Beyond 10 Years	NVSSD/ Non Impact Fee Qualifying
Production Facilities								
Keetley WTP Expansions	2015	$ 6,740,314	$ 6,740,314					
A				$ -	$ 623,373	$ -	$ 21,355	$ -
B North				-	83,420	-	564,221	-
B South				-	15,167	-	687,075	-
C				-	1,517	-	81,903	-
NVSSD (Ten Year Growth)				-	-	-	-	280,594
Treatment/Production Subtotal		**$ 6,740,314**	**$ 6,740,314**	**$ -**	**$ 723,477**	**$ -**	**$ 1,354,554**	**$ 280,594**
Storage Facilities								
6800 Tank	2024	267,000	373,497					
A				$ -	$ -	$ -	$ -	$ -
B North				-	-	-	-	-
B South				-	-	-	-	-
C				-	373,497	-	-	-
NVSSD (Ten Year Growth)				-	-	-	-	-
Treatment Facilities Subtotal		**$ 267,000**	**$ 373,497**	**$ -**	**$ 373,497**	**$ -**	**$ -**	**$ -**
Transmission								
Deer Creek Preserve Pump Station	2017	122,000	131,448					
All Areas				$ 12,785	$ 31,393	$ 30,130	$ 47,357	$ 9,783
Victory Ranch to Tuhaye Pump	2023	305,869	412,206					
All Areas				$ 40,093	$ 98,444	$ 94,485	$ 148,505	$ 30,679
Victory Ranch to Tuhaye 12 Inch Pipe	2025	2,368,000	3,438,391					
All Areas				$ 334,431	$ 821,161	$ 788,145	$ 1,238,744	$ 255,910
Transmission Facilities Subtotal		**$ 2,795,869**	**$ 3,982,045**	**$ 387,309**	**$ 950,997**	**$ 912,761**	**$ 1,434,606**	**$ 296,373**
IFFP and IFA Update	2015	40,000	40,000					
All Areas				$ 23,600	$ 16,400	$ -	$ -	$ -
IFFP and IFA Update Subtotal		**$ 40,000**	**$ 40,000**	**$ 23,600**	**$ 16,400**	**$ -**	**$ -**	**$ -**
Ten Year Sanitary Sewer		**$ 9,843,183**	**$ 11,135,856**	**$ 410,909**	**$ 2,064,371**	**$ 912,761**	**$ 2,789,160**	**$ 576,966**

**Based on 20 years average cost of inflation using ENR*

Bond Debt Service and Grant Funds

The District has funded the initial infrastructure constructed for the culinary water system through bonds, rates, and special assessments. The District has not received grants for system improvements included in this analysis. The impact fee will be assessed based upon whether or not a future development has previously contributed to and reserved capacity in the existing system through past payments. Those who have previously contributed are considered to be "bonded" while the rest are "unbonded" users. The District does not anticipate issuing future debt within the ten year planning horizon. If future debt is issued then the impact fee analysis should be amended to include the interest expense.

Impact Fee Analysis Updates

As development occurs and capital project planning is periodically revised, the future lists of capital projects and their costs may be different than the information utilized in this analysis. For this reason, it is assumed that the District will perform updates to the analysis every three years. The cost of preparing this analysis, the impact fee facilities plan and the future costs of updating both documents has been included in the impact fee calculations at an estimated cost of $40,000.

CHAPTER 4: PROPORTIONATE SHARE ANALYSIS

The Impact Fees Act requires an impact fee analysis to estimate the proportionate share of the cost for existing capacity that will be recouped. The impact fee must be based on the historic costs and reasonable future costs of the system. This chapter will show in Figures 4.1 through 4.4 that the proposed impact fees for system improvements by service area are reasonably related to the impact on the water system from new development activity.

The proportionate share analysis considers the manner of funding utilized for existing public facilities. Historically the District has funded existing infrastructure with sources including the following:

- Water Impact Fees
- Water User Rates and Miscellaneous Fees
- Special Assessment Bonds
- Revenue Bonds
- Developer Exactions

In the future, the District will primarily rely upon water impact fees and developer exactions to fund the capital projects required for future expansion of the system. Some rate revenues may be used to pay the debt service of any bonds or cash-funded projects in years when impact fee revenues are insufficient to cover the annual payment to principal and interest. However, if rate revenues are used to pay what should be funded through impact fees (due to a shortfall in impact fee revenues) then the general fund will be repaid with impact fees.

Grant funding is not secured at the moment, however, if any grants are received, future impact fees will be discounted according to the size of grant and what impact fee qualifying projects it will be intended to fund.

Developer Credits

If a project included in the Impact Fee Facilities Plan (or a project that will offset the demand for a system improvement that is listed in the IFFP) is constructed by a developer then that developer is entitled to a credit against impact fees owed. (Utah Impact Fees Act, 11-36a-304(2)(f)). There are currently no situations/projects in this analysis that would entitle a developer to a credit.

User Rate Credits

Credits to the impact fees have been calculated for any projects which will benefit existing users and be paid for through user rate funds. Credits have been calculated for the transmission projects listed in the IFFP that will provide capacity to existing users.

Time-Price Differential

Utah Code 11-36a-301(2)(h) allows for the inclusion of a time-price differential in order to create fairness for amounts paid at different times. To address the time-price differential, this analysis includes an inflationary component to account for construction inflation for future projects. Projects constructed after the year 2015

will be calculated at a future value with a 3.8% inflation rate. All users who pay an impact fee today or within the next six to ten years will benefit from projects to be constructed and included in the fee.

Maximum Legal Water Impact Fees Based on GPM Demand

The maximum legal impact fee per ERU for each service area is shown in the tables below. The impact fee is the combination of individual fees for the components of production/treatment, storage, transmission and professional fees. Each fee for individual components is based upon the historic and future costs divided by the total and available capacities. The result is a very precise impact fee that complies with the Impact Fees Act.

FIGURE 4.1: WATER IMPACT FEE CALCULATION SERVICE AREAS A, B NORTH, B SOUTH BONDED

SERVICE AREA A, B BONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Production Facilities					**477**	
Future 10 Year Capital Projects	$ -	0.00%	$ -	$ -	477	$ -
Future Treatment Related Debt to be Issued	-	0.00%	-	-	477	-
Existing Treatment Projects	-	0.00%	-	-	477	-
Existing Treatment Related Debt - (Includes Interest)	-	0.00%	-	-	477	-
Credit for Existing Users' and Non-Qualifying Capital Expense						-
Transmission and Distribution Facilities						
Future 10 Year Capital Projects	$ -	0.00%	$ 387,309	$ 387,309	688	$ 562.95
Future Transmission Related Bonds	-	0.00%	-	-	688	-
Existing Tranmission Projects	-	0.00%	-	-	688	-
Existing Transmission Related Debt - (Includes Interest)	-	0.00%	-	-	688	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(108)
Miscellaneous						
Unspent Impact Fee Funds	-	0.00%		-	477	-
Credit for Existing Users' and Non-Qualifying Capital Expense						
Professional Services	40,000	0%	23,600	23,600	688	34
Total Impact Fee Per ERU	**$ 40,000**		**$ 410,909**	**$ 410,909**		**$ 489.54**

FIGURE 4.2: WATER IMPACT FEE CALCULATION SERVICE AREAS A,B NORTH, B SOUTH UNBONDED

SERVICE AREA A, B UNBONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Production Facilities					**477**	
Future 10 Year Capital Projects	$ -	0.00%	$ 723,477	$ 723,477	477	$ 1,516.72
Future Treatment Related Debt to be Issued	-	0.00%	-	-	477	-
Existing Treatment Projects	-	0.00%	-	-	477	-
Existing Treatment Related Debt - (Includes Interest)	-	0.00%	-	-	477	-
Credit for Existing Users' and Non-Qualifying Capital Expense						-
Transmission and Distribution Facilities						
Future 10 Year Capital Projects	$ -	0.00%	$ 950,997	$ 950,997	477	$ 1,993.70
Future Transmission Related Bonds	-	0.00%		-	477	-
Existing Tranmission Projects	-	0.00%		-	477	-
Existing Transmission Related Debt - (Includes Interest)	-	0.00%		-	477	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(108)
Miscellaneous						
Unspent Impact Fee Funds	-	0.00%		-	477	-
Credit for Existing Users' and Non-Qualifying Capital Expense						
Professional Services	40,000	0%	16,400	16,400	477	34
Total Impact Fee Per ERU	**$ 40,000**	**0%**	**$ 1,690,873**	**$ 1,690,873**		**$ 3,437.09**

FIGURE 4.3: WATER IMPACT FEE CALCULATION SERVICE AREA C BONDED

SERVICE AREA C BONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Production Facilities						
Future 10 Year Capital Projects	$ -	0.00%	$ -	$ -	477	$ -
Future Treatment Related Debt to be Issued	-	0.00%	-	-	477	-
Existing Treatment Projects	-	0.00%		-	477	-
Existing Treatment Related Debt - (Includes Interest)	-	0.00%		-	477	-
Credit for Existing Users' and Non-Qualifying Capital Expense						-
Transmission and Distribution Facilities						
Future 10 Year Capital Projects	$ -	0.00%	$ 387,309	$ 387,309	688	$ 562.95
Future Transmission Related Bonds	-	0.00%		-	688	-
Existing Tranmission Projects	-	0.00%		-	688	-
Existing Transmission Related Debt - (Includes Interest)	-	0.00%		-	688	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(108)
Miscellaneous						
Unspent Impact Fee Funds	-	0.00%		-	688	-
Credit for Existing Users' and Non-Qualifying Capital Expense						
Professional Services	40,000	0%	23,600	23,600	688	34
Total Impact Fee Per ERU	**$ 40,000**		**$ 410,909**	**$ 410,909**		**$ 489.54**

FIGURE 4.4: WATER IMPACT FEE CALCULATION SERVICE AREA C UNBONDED

SERVICE AREA C UNBONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Production Facilities						
Future 10 Year Capital Projects	$ -	0.00%	$ 723,477	$ 723,477	477	$ 1,516.72
Future Treatment Related Debt to be Issued	-	0.00%	-	-	477	-
Existing Treatment Projects	-	0.00%		-	477	-
Existing Treatment Related Debt - (Includes Interest)	-	0.00%		-	477	-
Credit for Existing Users' and Non-Qualifying Capital Expense		0.00%				-
Storage Facilities						
Future 10 Year Capital Projects	$ -	0.00%	$ 373,497	$ 373,497	222	$ 1,682.42
Future Storage Related Bonds	-	0.00%	-	-	222	-
Existing Storage Projects	-	0.00%	-	-	222	-
Existing Storage Related Debt - (Includes Interest)	-	0.00%	-	-	222	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(108)
Transmission and Distribution Facilities						
Future 10 Year Capital Projects	$ -	0.00%	$ 950,997	$ 950,997	477	$ 1,993.70
Future Transmission Related Bonds	-	0.00%		-	477	-
Existing Tranmission Projects	-	0.00%		-	477	-
Existing Transmission Related Debt - (Includes Interest)	-	0.00%		-	477	-
Credit for Existing Users' and Non-Qualifying Capital Expense						
Miscellaneous						
Unspent Impact Fee Funds	$ -	0.00%	$ -	$ -	477	$ -
Credit for Existing Users' and Non-Qualifying Capital Expense						
Professional Services	40,000	0%	16,400	16,400	477	34
Total Impact Fee Per ERU	**$ 40,000**		**$ 2,064,371**	**$ 2,064,371**		**$ 5,119.51**

Determination of Residential and Non-Residential Impact Fees

The impact fees to be paid by different residential and non-residential users are assessed according to water demand per ERU. Demand in terms of ERUs will be assessed individually by the District's engineers who will determine the number of ERUs per new development. The impact fee per ERU will then be multiplied by that figure.

FIGURE 4.5: IMPACT FEE PER ERU

	Bonded Service Areas A, B South, B North	Unbonded Service Areas A, B South, B North	Bonded Service Area C	Unbonded Service Area C
Treatment	$ -	$ 1,517	$ -	$ 1,517
Storage	-	-	-	1,682
Transmission	563	1,994	563	1,994
Credit	(108)	(108)	(108)	(108)
Professional Services	34	34	34	34
Cost per ERU	**$ 489.54**	**$ 3,437.09**	**$ 489.54**	**$ 5,119.51**

Non-Standard Demand Adjustments

The District reserves the right under the Impact Fees Act (Utah Code 11-36-402(1)(c,d)) to assess an adjusted fee to respond to unusual circumstances and to ensure that the impact fees are assessed fairly. The impact fee ordinance must include a provision that permits adjustment of the fee for a particular development based upon studies and data submitted by the developer that indicate a more realistic and accurate impact upon the District's infrastructure.

The impact fee formula shown below in Figure 4.6 for a non-standard user is based upon the anticipated annual water demand of that particular user.

FIGURE 4.6: CALCULATION OF NON-STANDARD IMPACT FEE

NON-STANDARD IMPACT FEE CALCULATIONS
Bonded Service Areas A, B South, B North
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $0.60 per Gallon
Unbonded Service Areas A, B South, B North
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $4.24 per Gallon
Bonded Service Area C
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $0.60 per Gallon
Unbonded Service Area C
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $6.32 per Gallon

APPENDICES: CERTIFICATION, SERVICE AREA MAP, IMPACT FEE CALCULATIONS

In accordance with Utah Code Annotated, 11-36a-306(2), Zions Public Finance, Inc., makes the following certification:

I certify that the attached impact fee analysis:

1. includes only the cost of 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 the day on which each impact fee is paid;
2. does not include:
    a. costs of operation and maintenance of public facilities;

b. cost of 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 the methodological standards set forth by the federal Office of Management and Budget for federal grant reimbursement;

3. offset costs with grants or other alternate sources of payment; and
4. complies in each and every relevant respect with the Impact Fees Act.

Zions Public Finance, Inc. makes this certification with the following caveats:

1. All of the recommendations for implementations of the Impact Fee Facilities Plan (IFFP) made in the IFFP or in the impact fee analysis are followed in their entirety by District staff and Board in accordance to the specific policies established for the Service Areas.
2. If all or a portion of the IFFP or impact fee analysis are modified or amended, this certification is no longer valid.
3. All information provided to Zions Public Finance, Inc., its contractors or suppliers is assumed to be correct, complete and accurate. This includes information provided by Jordanelle Special Service District and outside sources. Copies of letters requesting data are included as appendices to the IFFP and the impact fee analysis.

Dated: 6/24/2015

ZIONS PUBLIC FINANCE, INC.

APPENDIX A: GROWTH PROJECTIONS

Jordanelle Special Service District- Water

TABLE A.1: GROWTH IN ERUs

Year	ERUS	Average Annual Growth	Projected ERUs Remaining Sold Capacity	Average Annual Growth	Current ERUs	10 Year Demand in ERUs
2015	**1,256**		**7,111**		**1,256**	
2016	1,341	6.8%	7,156	0.6%		
2017	1,432	6.8%	7,202	0.6%		
2018	1,529	6.8%	7,248	0.6%		
2019	1,633	6.8%	7,294	0.6%		
2020	1,744	6.8%	7,340	0.6%		
2021	1,862	6.8%	7,387	0.6%		
2022	1,988	6.8%	7,434	0.6%		
2023	2,123	6.8%	7,481	0.6%		
2024	2,267	6.8%	7,529	0.6%		
2025	**2,421**	**6.8%**	**7,577**	**0.6%**		**1,165**
2035	4,177	5.6%	8,340	0.5%		
2045	5,933	3.6%	9,102	0.5%		
2055	7,689	2.6%	9,865	0.3%		

TABLE A.2: GROWTH IN ERUs

	Existing	10 Year Bonded	10 Year Unbonded	>10 year Bonded	>10 year Unbonded
Area A	504	62	411	1,324	14
Area B North	517	396	55	365	372
Area B South	221	219	10	175	453
Area C	13	11	1	3,293	54
Totals	**1,255**	**688**	**477**	**5,157**	**893**

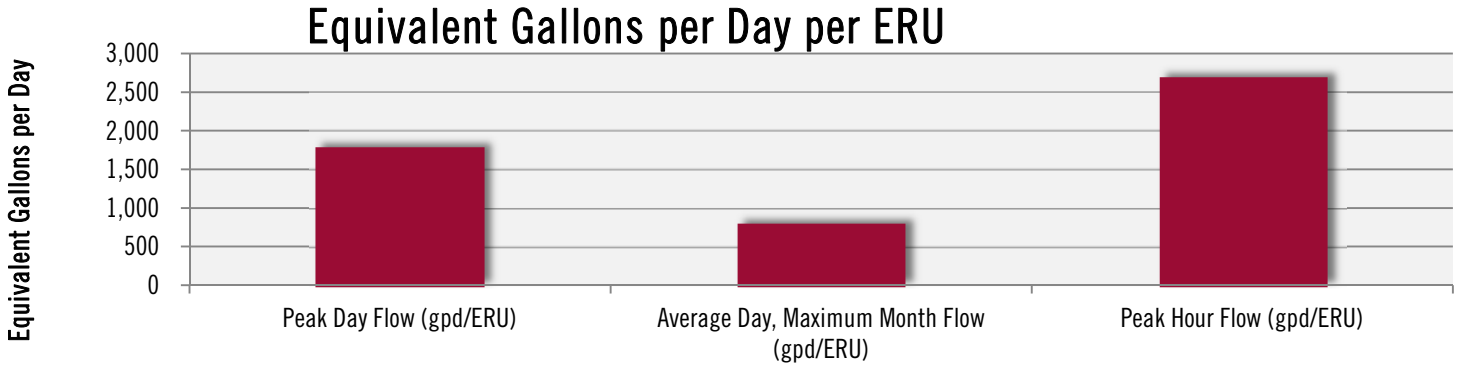
Appendix B: Culinary Water Level of Service (LOS) Analysis

Jordanelle Special Service District- Water

TABLE B.1: WATER LOS PER ERU

	Gallons per Day per ERU	Basis for Impact Fee Calculation
Peak Day Flow (gpd/ERU)	1,800	
Average Day, Maximum Month Flow (gpd/ERU)	810	
Peak Hour Flow (gpd/ERU)	2,700	

Refer to 2015 Impact Fee Facilities Plan, Table 2-1



APPENDIX C: CULINARY WATER 10 YEAR CAPITAL PROJECTS

Jordanelle Special Service District- Water

TABLE C.1: WATER CAPITAL PROJECTS — **Inflation Rate*** **3.8%**

Project Name	% to Existing/ NVSSD	% 10 Year Growth Bonded Users	% 10 Year Growth Unbonded Users	% Beyond 10 Year Growth Bonded Users	% Beyond 10 Year Growth Unbonded Users	Year to be Constructed	2015 Cost	Construction Cost with Inflation	10 Year Bonded Impact Fee Qualifying Cost	10 Year Unbonded Impact Fee Qualifying Cost	Unbonded Impact Fee Qualifying Beyond 10 Years	Bonded Impact Fee Qualifying Beyond 10 Years	NVSSD/ Non Impact Fee Qualifying
Production Facilities													
Keetley WTP Expansions						2015	$ 6,740,314	$ 6,740,314					
A	0.00%	0.00%	9.25%	0.00%	0.32%				$ -	$ 623,373	$ -	$ 21,355	$ -
B North	0.00%	0.00%	1.24%	0.00%	8.37%				-	83,420	-	564,221	-
B South	0.00%	0.00%	0.23%	0.00%	10.19%				-	15,167	-	687,075	-
C	0.00%	0.00%	0.02%	0.00%	1.22%				-	1,517	-	81,903	-
NVSSD (Ten Year Growth)	4.16%	0.00%	0.00%	0.00%	0.00%				-	-	-	-	280,594
Production Subtotal							**$ 6,740,314**	**$ 6,740,314**	**$ -**	**$ 723,477**	**$ -**	**$ 1,354,554**	**$ 280,594**
Storage Facilities													
6800 Tank						2024	$ 267,000	$ 373,497					
A	0.00%	0.00%	0.00%	0.00%	0.00%				$ -	$ -	$ -	$ -	$ -
B North	0.00%	0.00%	0.00%	0.00%	0.00%				-	-	-	-	-
B South	0.00%	0.00%	0.00%	0.00%	0.00%				-	-	-	-	-
C	0.00%	0.00%	100.00%	0.00%	0.00%				-	373,497	-	-	-
NVSSD (Ten Year Growth)									-	-	-	-	-
Treatment Facilities Subtotal							**$ 267,000**	**$ 373,497**	**$ -**	**$ 373,497**	**$ -**	**$ -**	**$ -**
Transmission													
Deer Creek Preserve Pump Station						2017	$ 122,000	$ 131,448					
All Areas	7.44%	9.73%	23.88%	22.92%	36.03%				$ 12,785	$ 31,393	$ 30,130	$ 47,357	$ 9,783
Victory Ranch to Tuhaye Pump Station						2023	305,869	412,206					
All Areas	7.44%	9.73%	23.88%	22.92%	36.03%				40,093	98,444	94,485	148,505	30,679
Victory Ranch to Tuhaye 12 Inch Pipe						2025	2,368,000	3,438,391					
All Areas	7.44%	9.73%	23.88%	22.92%	36.03%				334,431	821,161	788,145	1,238,744	255,910
Transmission Facilities Subtotal							**$ 2,795,869**	**$ 3,982,045**	**$ 387,309**	**$ 950,997**	**$ 912,761**	**$ 1,434,606**	**$ 296,373**
IFFP and IFA Update						2015	$ 40,000	$ 40,000					
All Areas	0.00%	59.00%	41.00%	0.00%	0.00%				$ 23,600	$ 16,400	$ -	$ -	$ -
IFFP and IFA Update Subtotal							**$ 40,000**	**$ 40,000**	**$ 23,600**	**$ 16,400**	**$ -**	**$ -**	**$ -**
Ten Year Sanitary Sewer							**$ 9,843,183**	**$ 11,135,856**	**$ 410,909**	**$ 2,064,371**	**$ 912,761**	**$ 2,789,160**	**$ 576,966**
	1.000	**1.038**	**1.077**	**1.118**	**1.161**	**1.205**	**1.251**	**1.298**	**1.348**	**1.399**	**1.452**		

**Based on 20 years average cost of inflation using ENR*

Table C.2: Total Sewer Capital Projects by Year

Project	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Production Facilities											
Keetley WTP Expansions	$ 6,740,314	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	$ 6,740,314	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Storage Facilities											
6800 Tank	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 373,497	$ -
	-	-	-	-	-	-	-	-	-	-	-
Treatment Facilities Subtotal	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 373,497	$ -
Transmission											
Deer Creek Preserve Pump Station	$ -	$ -	$ 131,448	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Victory Ranch to Tuhaye Pump Station	-	-	-	-	-	-	-	-	412,206	-	-
Victory Ranch to Tuhaye 12 Inch Pipe	-	-	-	-	-	-	-	-	-	-	3,438,391
	$ -	$ -	$ 131,448	$ -	$ -	$ -	$ -	$ -	$ 412,206	$ -	$ 3,438,391
IFFP and IFA Update											
IFFP and IFA Update	40,000	-	-	-	-	-	-	-	-	-	-
	$ 40,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Capital Projects	**$ 6,780,314**	**$ -**	**$ 131,448**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 412,206**	**$ 373,497**	**$ 3,438,391**

APPENDIX D: KEETLEY EXPANSION

Jordanelle Special Service District- Water

Cost per ERU

Total Cost	$	6,740,314
Capacity (ERUs)		4,444
Cost per ERU	**$**	**1,516.72**

D.1: Areas Benefitting from Keetley Expansion

		10-Year		>10-Year	
	Existing	**Bonded**	**Unbonded**	**Bonded**	**Unbonded**
Area A	-	-	411	-	14
Area B North	-	-	55	-	372
Area B South	-	-	10	-	453
Area C	-	-	1	-	54
NVSSD (10 Year)	185		-	-	-
Totals	**185**	**-**	**477**	**-**	**893**

D.2: Future Demand Adjusted to Plant Capacity (4,444 ERUs)

		10-Year		>10-Year			
	Existing	**10-Year Bonded**	**Unbonded**	**>10-Year Bonded**	**Unbonded**	**Totals**	
Area A	-	-	411	-	14		
Area B North	-	-	55	-	372		
Area B South	-	-	10	-	453		
Area C	-	-	1	-	54		
NVSSD (10 Year)	185	-	-	-	-		
Totals	**185**	**-**	**477**	**-**	**893**		
Area A	0%	0%	9%	0%	0%	9.57%	644,728
Area B North	0%	0%	1%	0%	8%	9.61%	647,640
Area B South	0%	0%	0%	0%	10%	10.42%	702,242
Area C	0%	0%	0%	0%	1%	1.24%	83,420
NVSSD (10 Year)	4%	0%	0%	0%	0%	4.16%	280,594
Totals						**34.99%**	

APPENDIX E: CALCULATION OF THE IMPACT FEE PER ERU

Jordanelle Special Service District- Water

TABLE E.1: WATER IMPACT FEE CALCULATION SERVICE AREAS A, B NORTH, B SOUTH BONDED

SERVICE AREA A, B BONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Production Facilities					**477**	
Future 10 Year Capital Projects	$ -	0.00%	$ -	$ -	477	$ -
Future Treatment Related Debt to be Issued	-	0.00%	-	-	477	-
Existing Treatment Projects	-	0.00%	-	-	477	-
Existing Treatment Related Debt - (Includes Interest)	-	0.00%	-	-	477	-
Credit for Existing Users' and Non-Qualifying Capital Expense						-
Transmission and Distribution Facilities						
Future 10 Year Capital Projects	$ -	0.00%	$ 387,309	$ 387,309	688	$ 562.95
Future Transmission Related Bonds	-	0.00%	-	-	688	-
Existing Tranmission Projects	-	0.00%	-	-	688	-
Existing Transmission Related Debt - (Includes Interest)	-	0.00%	-	-	688	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(108)
Miscellaneous						
Unspent Impact Fee Funds	-	0.00%		-	477	-
Credit for Existing Users' and Non-Qualifying Capital Expense						
Professional Services	40,000	0%	23,600	23,600	688	34
Total Impact Fee Per ERU	**$ 40,000**		**$ 410,909**	**$ 410,909**		**$ 489.54**

TABLE E.2: WATER IMPACT FEE CALCULATION SERVICE AREAS A, B NORTH, B SOUTH UNBONDED

SERVICE AREA A, B UNBONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Production Facilities					**477**	
Future 10 Year Capital Projects	$ -	0.00%	$ 723,477	$ 723,477	477	$ 1,516.72
Future Treatment Related Debt to be Issued	-	0.00%	-	-	477	-
Existing Treatment Projects	-	0.00%	-	-	477	-
Existing Treatment Related Debt - (Includes Interest)	-	0.00%	-	-	477	-
Credit for Existing Users' and Non-Qualifying Capital Expense						-
Transmission and Distribution Facilities						
Future 10 Year Capital Projects	$ -	0.00%	$ 950,997	$ 950,997	477	$ 1,993.70
Future Transmission Related Bonds	-	0.00%		-	477	-
Existing Tranmission Projects	-	0.00%		-	477	-
Existing Transmission Related Debt - (Includes Interest)	-	0.00%		-	477	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(108)
Miscellaneous						
Unspent Impact Fee Funds	-	0.00%		-	477	-
Credit for Existing Users' and Non-Qualifying Capital Expense						
Professional Services	40,000	0%	16,400	16,400	477	34
Total Impact Fee Per ERU	**$ 40,000**	**0%**	**$ 1,690,873**	**$ 1,690,873**		**$ 3,437.09**

TABLE E.3: WATER IMPACT FEE CALCULATION SERVICE AREA C BONDED

SERVICE AREA C BONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Production Facilities						
Future 10 Year Capital Projects	$ -	0.00%	$ -	$ -	477	$ -
Future Treatment Related Debt to be Issued	-	0.00%	-	-	477	-
Existing Treatment Projects	-	0.00%	-	-	477	-
Existing Treatment Related Debt - (Includes Interest)	-	0.00%	-	-	477	-
Credit for Existing Users' and Non-Qualifying Capital Expense						-
Transmission and Distribution Facilities						
Future 10 Year Capital Projects	$ -	0.00%	$ 387,309	$ 387,309	688	$ 562.95
Future Transmission Related Bonds	-	0.00%	-	-	688	-
Existing Tranmission Projects	-	0.00%	-	-	688	-
Existing Transmission Related Debt - (Includes Interest)	-	0.00%	-	-	688	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(108)
Miscellaneous						
Unspent Impact Fee Funds	-	0.00%	$ -	-	688	-
Credit for Existing Users' and Non-Qualifying Capital Expense						
Professional Services	40,000	0%	23,600	23,600	688	34
Total Impact Fee Per ERU	**$ 40,000**		**$ 410,909**	**$ 410,909**		**$ 489.54**

TABLE E.4: WATER IMPACT FEE CALCULATION SERVICE AREA C UNBONDED

SERVICE AREA C UNBONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Production Facilities						
Future 10 Year Capital Projects	$ -	0.00%	$ 723,477	$ 723,477	477	$ 1,516.72
Future Treatment Related Debt to be Issued	-	0.00%	-	-	477	-
Existing Treatment Projects	-	0.00%	-	-	477	-
Existing Treatment Related Debt - (Includes Interest)	-	0.00%	-	-	477	-
Credit for Existing Users' and Non-Qualifying Capital Expense		0.00%				-
Storage Facilities						
Future 10 Year Capital Projects	$ -	0.00%	$ 373,497	$ 373,497	222	$ 1,682.42
Future Storage Related Bonds	-	0.00%	-	-	222	-
Existing Storage Projects	-	0.00%	-	-	222	-
Existing Storage Related Debt - (Includes Interest)	-	0.00%	-	-	222	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(108)
Transmission and Distribution Facilities						
Future 10 Year Capital Projects	$ -	0.00%	$ 950,997	$ 950,997	477	$ 1,993.70
Future Transmission Related Bonds	-	0.00%	-	-	477	-
Existing Tranmission Projects	-	0.00%	-	-	477	-
Existing Transmission Related Debt - (Includes Interest)	-	0.00%	-	-	477	-
Credit for Existing Users' and Non-Qualifying Capital Expense						
Miscellaneous						
Unspent Impact Fee Funds	$ -	0.00%	$ -	$ -	477	$ -
Credit for Existing Users' and Non-Qualifying Capital Expense						
Professional Services	40,000	0%	16,400	16,400	477	34
Total Impact Fee Per ERU	**$ 40,000**		**$ 2,064,371**	**$ 2,064,371**		**$ 5,119.51**

Appendix F: Impact Fee User Rate Credit

TABLE F.1: CALCULATION OF PRODUCTION USER RATE CREDITS

Year	ERUs	Amortized Production Expense	Annual Cost per ERU	Average PV Cost per ERU
2015	1,256	$ -	$ -	$ -
2016	1,341	-	-	-
2017	1,432	-	-	-
2018	1,529	-	-	-
2019	1,633	-	-	-
2020	1,744	-	-	-
2021	1,862	-	-	-
2022	1,988	-	-	-
2023	2,123	-	-	-
2024	2,267	-	-	-
2025	2,421	-	-	-
2026	2,597	-	-	-
2027	2,772	-	-	-
2028	2,948	-	-	-
2029	3,123	-	-	-
2030	3,299	-	-	-
2031	3,475	-	-	-
2032	3,650	-	-	-
2033	3,826	-	-	-
2034	4,001	-	-	-
2035	4,177	-	-	-
2036	4,353	-	-	-
2037	4,528	-	-	-
2038	4,704	-	-	-
2039	4,879	-	-	-
2040	5,055	-	-	-
		$ -	**$ -**	**$ -**

TABLE F.2: CALCULATION OF TRANSMISSION USER RATE CREDITS

ERUs	Amortized Transmission Expense	Annual Cost per ERU	Average PV Cost per ERU
1,256	$ (14,819)	$ (11.80)	$ (11.80)
1,341	(14,819)	(11.05)	(10.68)
1,432	(14,819)	(10.35)	(9.66)
1,529	(14,819)	(9.69)	(8.74)
1,633	(14,819)	(9.07)	(7.91)
1,744	(14,819)	(8.50)	(7.15)
1,862	(14,819)	(7.96)	(6.47)
1,988	(14,819)	(7.45)	(5.86)
2,123	(14,819)	(6.98)	(5.30)
2,267	(14,819)	(6.54)	(4.80)
2,421	(14,819)	(6.12)	(4.34)
2,597	(14,819)	(5.71)	(3.91)
2,772	(14,819)	(5.35)	(3.54)
2,948	(14,819)	(5.03)	(3.21)
3,123	(14,819)	(4.74)	(2.93)
3,299	(14,819)	(4.49)	(2.68)
3,475	(14,819)	(4.26)	(2.46)
3,650	(14,819)	(4.06)	(2.26)
3,826	(14,819)	(3.87)	(2.09)
4,001	(14,819)	(3.70)	(1.93)
4,177	-	-	-
4,353	-	-	-
4,528	-	-	-
4,704	-	-	-
4,879	-	-	-
5,055	-	-	-
	$ (296,373)	**(136.73)**	**(107.71)**

Water Treatment partially serves NVSSD. NVSSD rates will pay that portion. No credit.

Discount Rate **3.50%**

APPENDIX G: RECOMMENDED IMPACT FEES PER ERU

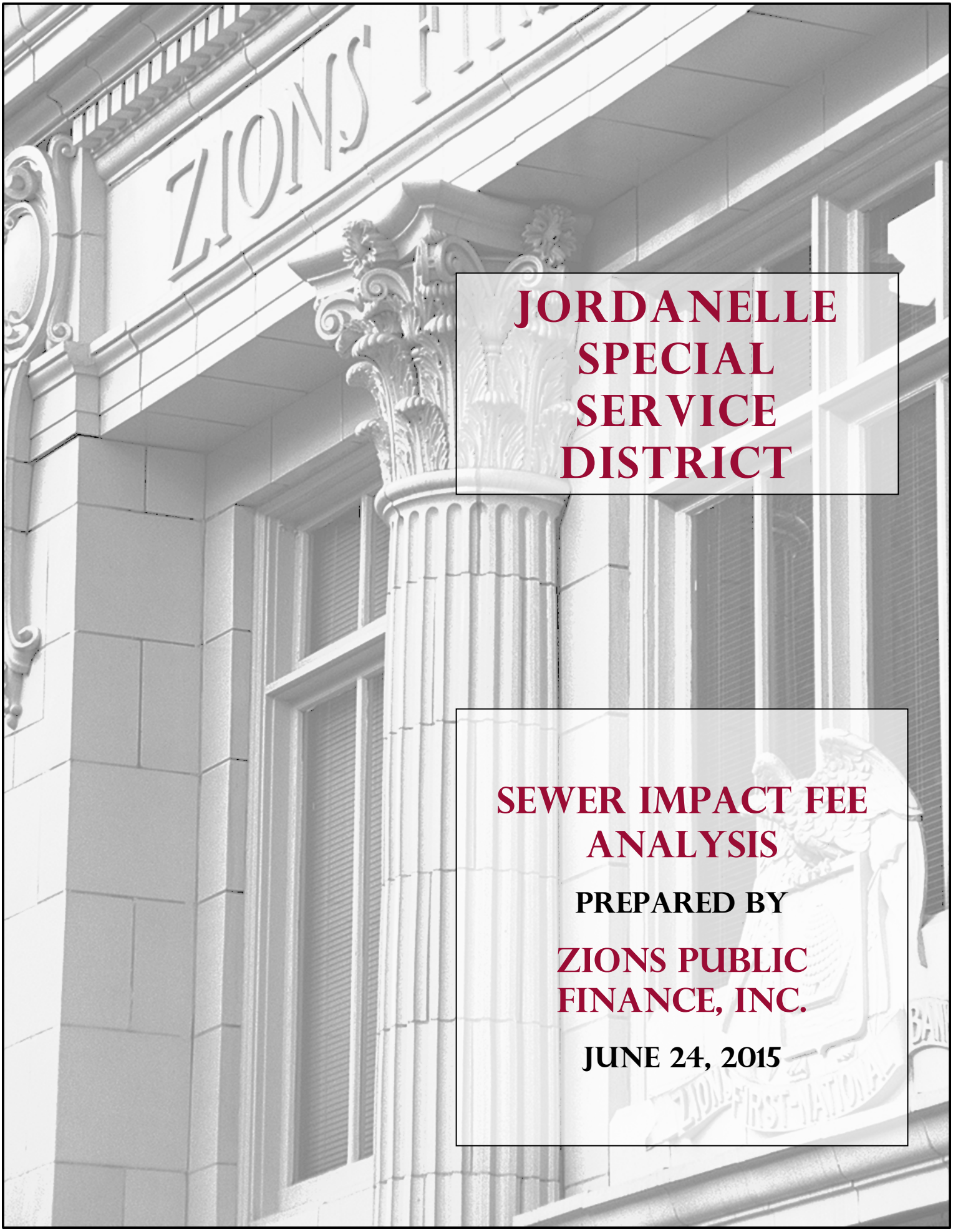
Jordanelle Special Service District- Water

Figure G.1: Impact Fee Summary

	Bonded Service Areas A, B South, B North	Unbonded Service Areas A, B South, B North	Bonded Service Area C	Unbonded Service Area C
Treatment	$ -	$ 1,517	$ -	$ 1,517
Storage	-	-	-	1,682
Transmission	563	1,994	563	1,994
Credit	(108)	(108)	(108)	(108)
Professional Services	34	34	34	34
Cost per ERU	**$ 489.54**	**$ 3,437.09**	**$ 489.54**	**$ 5,119.51**

Figure G.2: Impact Fee Summary

NON-STANDARD IMPACT FEE CALCULATIONS
Bonded Service Areas A, B South, B North
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development
Step 2: Multiply the Demand by $0.60 per Gallon
Unbonded Service Areas A, B South, B North
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development
Step 2: Multiply the Demand by $4.24 per Gallon
Bonded Service Area C
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development
Step 2: Multiply the Demand by $0.60 per Gallon
Unbonded Service Area C
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development
Step 2: Multiply the Demand by $6.32 per Gallon



JORDANELLE SPECIAL SERVICE DISTRICT

SEWER IMPACT FEE ANALYSIS

PREPARED BY

ZIONS PUBLIC FINANCE, INC.

JUNE 24, 2015

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EXECUTIVE SUMMARY

Jordanelle Special Service District, Utah (the District, JSSD) recently commissioned Zions Public Finance, Inc. (Zions) to calculate the District's sewer impact fees in accordance with Utah State Law. An impact fee is a one-time charge to new development to reimburse the District for the cost of developing new sewer system capacity that will allow development to occur. In conjunction with this project, Bowen Collins & Associates (BC&A) prepared the *JSSD Sewer Impact Fee Facilities Plan* (IFFP) dated June 2015.

JSSD Sewer System

The wastewater collection and treatment system serves all connections within JSSD boundaries. It is expected that the system will continue to expand, but that it will not extend beyond the District's current annexation boundaries. The District's sanitary sewer system currently serves 1,256 Equivalent Residential Units (ERUs) and will add 1,165 more ERUs by 2025. The level of service or demand per ERU is 340 gallons per average day in the peak month.

Sewer System Funding

The District's existing collection and treatment improvements are largely committed to existing users and have been excluded from the impact fee calculation. The District will need to build $26,193,104 (FV) of sewer projects in the next ten years that will include collection lines, lift stations and an expansion to the wastewater treatment plant. These projects are required to provide capacity to allow new growth to connect to a safe and reliable system. There are no outstanding impact fee qualifying bonds related to the sewer system and no additional bonds are anticipated to be issued to fund system improvements within the next ten years. Any changes to these assumptions may require an update to the impact fee analysis.

JSSD Sewer Service Areas

The construction of the District's sewer system has been funded largely through special assessment and revenue bonds that were paid by developers in exchange for future commitment to system capacity. Therefore, the sanitary sewer impact fee will be assessed to various service areas based upon geographic location and whether or not the user has participated in the bonds that funded system improvements within their service area (referred to as a "bonded" user) or if they have not (an "unbonded" user). JSSD has three geographic areas where service is provided: Area A, Area B North and Area B South. The future users forecasted for each geographic area is then divided into bonded or unbonded users which totals eight impact fee service areas. The 1,165 future ERUs mentioned above includes 1,074 bonded future users and 91 unbonded future users. A breakdown of bonded and unbonded users by area is found in Figure 2.2 later in this report.

Recommended Sewer Impact Fees

The recommended impact fee structure presented in this analysis has been prepared to satisfy the Impact Fees Act, Utah Code Ann. § 11-36-101 et. seq., and represents the maximum sanitary sewer impact fees that the District may assess within the service areas. The District will be required to use other revenue sources to

fund any projects identified in the IFFP that constitute repair and replacement, cure any existing deficiencies, increase the level of service or maintain the level of service for existing users.

The following table shows the maximum legal sanitary sewer impact fee that the District can assess per ERU in each of the eight service areas. The final impact fee paid will be based on the unique characteristics of the residential or non-residential property that is proposed to be developed. The District's engineers will review each lot's development plans to determine the ERU equivalent for each new lot. This ERU equivalent will be multiplied by the applicable fee per ERU found below and the final impact fee will be assessed accordingly.

FIGURE ES.1: FEE PER SEWER ERC DEMAND

	Bonded A	Unbonded A	Bonded B-North	Unbonded B-North	Bonded B-South	Unbonded B-South
Collection Facilities	$ 875	$ 2,726	$ 1,565	$ 3,713	$ 2,679	$ 5,135
Treatment Plant	4,691	4,691	4,691	4,691	4,691	4,691
Credit	(1,208)	(1,208)	(1,208)	(1,208)	(1,208)	(1,208)
Professional Services	35	35	35	35	35	35
Cost per ERU	**$ 4,392**	**$ 6,244**	**$ 5,083**	**$ 7,231**	**$ 6,196**	**$ 8,653**

Figure ES.2 provides a calculation of the impact fee for a non-standard user that may not fit the schedule found in the previous table. The non-standard calculation is based on the estimated gallons of use of a new property on a peak month average day basis and the proposed cost per gallon of wastewater for each of the eight service areas. It is at the District's discretion if the non-standard calculation will be used and clear and thorough documentation of the proposed property's estimated demand must be provided.

FIGURE ES.2: CALCULATION OF NON-STANDARD SEWER IMPACT FEE

NON-STANDARD IMPACT FEE CALCULATIONS
Bonded A
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $12.92 per Gallon
Unbonded A
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $18.36 per Gallon
Bonded B-North
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $14.95 per Gallon
Unbonded B-North
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $21.27 per Gallon
Bonded B-South
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $18.22 per Gallon
Unbonded B-South
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $25.45 per Gallon

CHAPTER 1: OVERVIEW OF THE JSSD SEWER IMPACT FEES

Impact Fee Overview

An impact fee is a one-time fee, not a tax, charged to new development to recover the District's cost of constructing sewer facilities with capacity that will be utilized by new growth. The fee is assessed at the time of building permit issuance as a condition of development approval. The calculation of the impact fee must strictly follow the Impact Fees Act to ensure that the fee is equitable, fair, and legally defensible. This analysis provides documentation that there is a fair comparison, or rational nexus, between the impact fee charged to new development and the impact on the capacity of the system.

Until new development utilizes the full capacity of existing facilities, the District can assess an impact fee to recover its cost of latent capacity available to serve future development. The general impact fee methodology divides the available capacity of existing and future capital projects between the number of existing and future users.

Qualifying and Non-Qualifying Costs

The impact fees proposed in this analysis are calculated based upon:

- New capital infrastructure for sewer treatment and collection;
- Professional and planning expenses related to the construction of new infrastructure; and
- Historic costs of existing improvements that will serve new development.

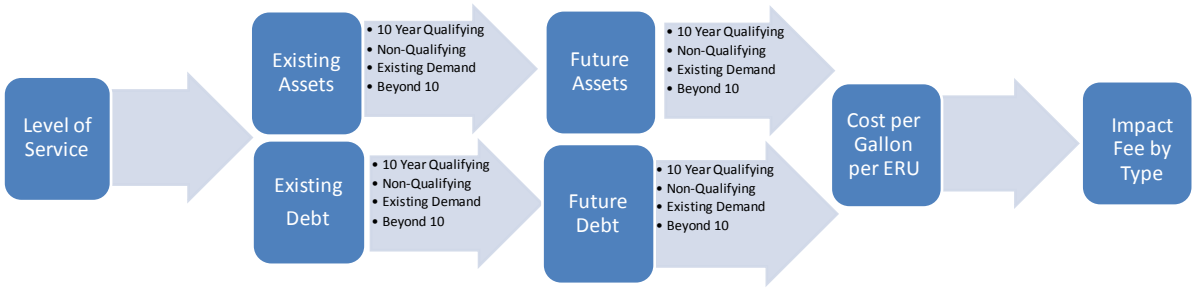
The costs that cannot be included in the impact fee are as follows:

- Projects that cure existing deficiencies for existing users;
- Projects that increase the level of service above that which is currently provided;
- Operations and maintenance costs;
- Costs of facilities funded by grants or other funds that the District does not have to repay; and
- Costs of reconstruction of facilities that do not have capacity to serve new growth.

Impact Fees Calculations

A fair impact fee is calculated by dividing the cost of existing and future facilities by unused capacity in existing or future facilities expressed in terms of an ERU. This cost per ERU is then multiplied by the estimated demand of an individual home, business, or other non-residential user expressed in term of an ERU or 340 gallons on an average day in the peak month to determine the final impact fee to be paid. The chart below provides an overview of the impact fee calculation process.

FIGURE 1.1: IMPACT FEE CALCULATION FLOW CHART



Description of the Service Area

The construction of the District's sewer system has been funded largely through bonds that were paid by developers in exchange for future commitment to system capacity. Therefore, the sanitary sewer impact fee will be assessed to various service areas based upon geographic location and whether or not the user has participated in the bonds that funded system improvements within their service area (referred to as a "bonded" user) or if they have not (an "unbonded" user). Service Area C is excluded from the analysis because if any developments come into unbonded Service Area C there is not capacity in the system to serve them and they will be required to build their own parallel sewer facilities.

Projected Demand

Sewer collection infrastructure has to be sized to be adequate to meet peak hour demand. Treatment infrastructure is sized to be adequate to meet peak month, average day demand. The primary measurement used for sewer demand and improvement sizing and capacity evaluations in this analysis is an ERU which is equal to 340 gallons per day in the peak month. Figure 2.2 shows a detailed division of existing and future ERUs between geographic areas and a classification of bonded or unbonded.

CHAPTER 2: IMPACT FROM GROWTH UPON THE DISTRICT'S FACILITIES AND LEVEL OF SERVICE

Future Sewer Demand within the Service Area

Sewer demand within the District will increase as development activity continues and homes and other types of development are built. Currently there are 1,256 ERUs and by 2025 there will be 2,421 ERUs. Throughout the impact fee analysis a 10 year planning window will be the basis for the impact fee calculation. Costs and capacities of projects will be split between bonded and unbonded users that are anticipated to develop over the next 10 years. Figure 2.1 shows the growth in total ERUs through 2025 and beyond.

FIGURE 2.1: PROJECTED GROWTH IN DEMAND (GPD)

Year	ERUS	Average Annual Growth	Projected ERUs Remaining Sold Capacity	Average Annual Growth	Current ERUs	10 Year Demand in ERUs
2015	**1,256**		**9,395**		**1,256**	
2016	1,341	6.8%	9,404	0.1%		
2017	1,432	6.8%	9,413	0.1%		
2018	1,529	6.8%	9,422	0.1%		
2019	1,633	6.8%	9,431	0.1%		
2020	1,744	6.8%	9,441	0.1%		
2021	1,862	6.8%	9,450	0.1%		
2022	1,988	6.8%	9,459	0.1%		
2023	2,123	6.8%	9,468	0.1%		
2024	2,267	6.8%	9,477	0.1%		
2025	**2,421**	**6.8%**	**9,486**	**0.1%**		**1,165**
2035	4,177	5.6%	10,000	0.5%		
2045	5,933	3.6%	10,513	0.5%		
2055	7,689	2.6%	11,027	0.3%		

FIGURE 2.2: BONDED AND UNBONDED ERUS BY SERVICE AREA

	Existing	10 Year Bonded	10 Year Unbonded	>10 year Bonded	>10 year Unbonded
Area A	504	438	35	3,233	661
Area B North	517	397	54	365	372
Area B South	221	228	1	175	453
Area C	13	11	1	3,293	54
	1,255	1,074	91	7,066	1,540

Level of Service Analysis

The level of service standard is established in the IFFP and reflects District policies, sound engineering analysis and standards, and observed demands. This is a defensible level of service that is established in the IFFP and is anticipated that this level of service per ERU will be perpetuated into the future. However, the District has the right to increase this established level of service in the future by constructing facilities that will provide greater capacity but such level of service increases cannot be funded through impact fees. The District will have to find other funding sources, such as user rates, for projects that increase level of service should it decide to do so. There are currently no plans to increase the level of service beyond what is proposed in the IFFP.

Collection and Treatment Level of Service

The collection system level of service target is a peak hour flow less than 75 percent of full flow capacity of the pipe. In the IFFP, lift stations were considered deficient if the peak flows exceeded 85 percent of the reliable pump capacity. Domestic wastewater production is 295 gpd/ERU. Total wastewater production including infiltration is 340 gpd/ERU.

CHAPTER 3: HISTORIC AND FUTURE CAPITAL PROJECTS COSTS

The Impact Fees Act allows for the inclusion of various cost components in the calculation of the impact fees. These cost components are the construction costs of growth-driven improvements and appropriate professional services inflated from current dollars to construction year costs. Impact fees can only fund system improvements which are defined as facilities or lines that contribute to the entire system's capacity rather than just to a small, localized area. Sewer capital projects have been partially funded through bonds and may continue to be partially bond funded for in future years. A portion of future projects may be constructed by developers in development or pioneering agreements.

Capacities of Existing Components Available for Growth

The costs of future capital projects are defined in the corresponding Impact Fees Facilities Plan prepared by BC&A and are detailed in Figure 3.1 below.

Collection Costs and Capacities

The capacities of existing system collection facilities were estimated using size data provided by JSSD and hydraulic computer modeling by Bowen Collins & Associates. BC&A identified two collection pipelines, installation of a skid lift station and construction of a new 600 GPM lift station that will need to be completed to serve future growth. Future improvements will cost $8,792,598 and will provide capacity for 1,154 ERUS.

Treatment

A future 8 MGD expansion to the current JSSD Wastewater Treatment Plant is planned to be utilized by the District and well as by the North Village Special Service District (NVSSD). This expansion will take the plant from 8 mgd to 16 mgd and serve 3,530 ERUs from both Districts. The total cost of the expansion is $16,560,000 in 2015 costs. The portion of the expansion capacity that will serve each of JSSD's service areas has been included in the impact fees. The average cost per ERU for the expansion is $4,691.22. $3,119,660 of the expansion cost is attributable to NVSSD.

FIGURE 3.1: CAPACITY ALLOCATION FOR THE JSSD WASTEWATER TREATMENT PLANT EXPANSION

	Existing	10-Year		>10-Year			
		Bonded	Unbonded	Bonded	Unbonded	Totals	Cost Allocation
Area A	504	438	35	289	59	**3,530**	
Area B North	517	397	54	33	33		
Area B South	221	228	1	16	40		
NVSSD	165	436	64	-	-		
Total ERUs	1,407	1,499	154	338	132		
Area A	14%	12%	1%	8%	2%	38%	$ 6,215,864
Area B North	15%	11%	2%	1%	1%	29%	4,850,720
Area B South	6%	6%	0%	0%	1%	14%	2,373,756
NVSSD	5%	12%	2%	0%	0%	19%	3,119,660
						100%	**$ 16,560,000**

Professional Expenses

As development occurs and capital project planning is periodically revised, the future lists of capital projects and their costs may be different than the information utilized in this analysis. For this reason, it is assumed that the District will perform updates to the analysis every three years. The cost of preparing this analysis, the impact fee facilities plan and the future costs of updating both documents has been included in the impact fee calculations at an estimated cost of $40,000.

Historic Capital Project Costs

This analysis considers existing assets in the calculation of fees for bonded and unbonded users. Bonded users are entitled to a portion of existing capacity since they have paid SAA payments to fund the existing projects. Unbonded users will be benefitted from only future project capacities.

Future Capital Projects and 10 Year Demand

The District and BC&A have identified the following capital projects which are necessary to meet demand in the sewer system. All construction estimates are shown in 2015 dollars and a 3.8% inflation rate is added to projects to be constructed after 2015. As shown in Figure 3.1, project costs were sorted by 10 year impact fee qualifying demand, beyond 10 year demand, or whether any portion is non-qualifying which includes portions of the project that will be utilized by existing users or NVSSD. $9,546,726 or about 36% of the total $26,193,104 capital projects were determined to be 10 year impact fee qualifying and included in the impact fee calculation.

FIGURE 3.1: FUTURE CAPITAL PROJECT COSTS

Project Name	Year to be Constructed	2015 Cost	Construction Cost with Inflation	10 Year Bonded Impact Fee Qualifying Cost	10 Year Unbonded Impact Fee Qualifying Cost	Bonded Impact Fee Qualifying Beyond 10 Years	Bonded Impact Fee Qualifying Beyond 10 Years	Non Impact Fee Qualifying
Collection System								
Install New 18" to 24" Line From Force Main 4 to the New WWTP	2023	$ 3,499,693	$ 4,716,380					
A				$ 229,801	$ 24,831	$ 1,695,526	$ 469,229	$ 264,225
B North				256,333	41,238	235,366	284,415	395,573
B South				161,161	842	123,698	381,333	152,809
Install 18" Parallel Line Next to Line B	2025	$ 1,039,737	$ 1,509,722					
A				$ -	$ 28,979	$ -	$ 244,545	$ -
B North				104,094	70,684	42,682	217,699	-
B South				183,506	2,002	62,897	404,967	$ 147,668
Install New Lift Station to Supply 4400 GPM	2025	$ 2,166,803	$ 3,146,248					
A				$ 153,298	$ 16,564	$ 1,131,068	$ 313,018	$ 176,262
B North				170,997	27,510	157,010	189,731	263,883
B South				107,509	562	82,518	254,383	101,937
Install New Lift Station to Supply 1620 GPM	2025	$ 898,369	$ 1,304,453					
A				$ -	$ 25,039	$ -	$ 211,295	$ -
B North				89,941	61,074	36,879	188,099	-
B South				158,555	1,730	54,345	349,906	127,590
IFFP and IFA Update	2015	$ 40,000	$ 40,000					
A, B -North, B-South				$ 36,876	$ 3,124	$ -	$ -	$ -
Collection System Subtotal		**$ 7,644,602**	**$ 10,716,803**	**$ 1,652,069**	**$ 304,178**	**$ 3,621,988**	**$ 3,508,620**	**$ 1,629,947**
Treatment Facilities								
New WWTP	2015	$ 16,560,000	$ 16,560,000					
A				$ 2,054,754	$ 164,193	$ 1,355,762	$ 276,782	$ 2,364,374
B North				1,862,414	253,326	154,810	154,810	2,425,360
B South				1,069,598	4,691	75,059	187,649	1,036,759
NVSSD				2,045,371	300,238	-	-	774,051
				-	-	-	-	-
Treatment Facilities Subtotal		**$ 16,560,000**	**$ 16,560,000**	**$ 7,032,136**	**$ 722,448**	**$ 1,585,632**	**$ 619,241**	**$ 6,600,544**
Ten Year Sanitary Sewer		**$ 24,204,602**	**$ 27,276,803**	**$ 8,684,205**	**$ 1,026,626**	**$ 5,207,620**	**$ 4,127,861**	**$ 8,230,490**

**Based on 20 years average cost of inflation using ENR*

Bond Debt Service and Grant Funds

The District has funded the initial infrastructure constructed for the sewer system through bonds, rates, and special assessments. The District has not received grants for system improvements included in this analysis. The impact fee will be assessed based upon whether or not a future development has previously contributed to and reserved capacity in the existing system through past payments. Those who have previously contributed are considered to be "bonded" while the rest are "unbonded" users. The District does not anticipate issuing future debt within the ten year planning horizon. If future debt is issued then the impact fee analysis should be amended to include the interest expense.

CHAPTER 4: PROPORTIONATE SHARE ANALYSIS

The Impact Fees Act requires the impact fee analysis to estimate the proportionate share of the cost for existing capacity that will be recouped. The impact fee must be based on the historic costs and reasonable future costs of the system. This chapter will show in Figures 4.1 through 4.6 that the proposed impact fees for system improvements by service area are reasonably related to the impact on the sewer system from new development activity.

The proportionate share analysis considers the manner of funding utilized for existing public facilities. Historically the District has funded existing infrastructure with sources including the following:

- Sewer Impact Fees
- Sewer User Rates and Miscellaneous Fees
- Special Assessment Bonds
- Revenue Bonds
- Developer Exactions

In the future, the District will primarily rely upon sewer impact fees and developer exactions to fund the expansion of the system. Some rate revenues will be used to pay the debt service of the bonds in years when impact fee revenues are insufficient to cover the annual payment to principal and interest. However, if rate revenues are used to pay what should be funded through impact fees (due to a shortfall in impact fee revenues) then the general fund will be repaid with impact fees.

Grant funding is not secured at the moment, however, if any grants are received, future impact fees will be discounted according to the size of grant and what impact fee qualifying projects it will be intended to fund.

Developer Credits

If a project included in the Impact Fee Facilities Plan (or a project that will offset the demand for a system improvement that is listed in the IFFP) is constructed by a developer then that developer is entitled to a credit against impact fees owed. (Utah Impact Fees Act, 11-36a-304(2)(f)). There are currently no situations/projects in this analysis that would entitle a developer to a credit.

User Rate Credits

Credits to the impact fees have been calculated for any projects which will benefit existing users and be paid for through user rate funds. Credits have been calculated for collection and treatment projects listed in the IFFP that will provide capacity to existing users.

Time-Price Differential

Utah Code 11-36a-301(2)(h) allows for the inclusion of a time-price differential in order to create fairness for amounts paid at different times. To address the time-price differential, this analysis includes an inflationary component to account for construction inflation for future projects. Projects constructed after the year 2015

will be calculated at a future value with a 3.8% inflation rate. All users who pay an impact fee today or within the next six to ten years will benefit from projects to be constructed and included in the fee.

Maximum Legal Sewer Impact Fees Based per ERU

The maximum legal impact fee per ERU for each service area is shown in Figures 4.1 through 4.7. This fee is the combination of individual fees for the components of collection, treatment and professional fees. Each fee for individual components is based upon the historic and future costs divided by the total and available capacities. The result is a very precise impact fee per ERU demand that complies with the Impact Fees Act.

FIGURE 4.1: SEWER IMPACT FEE CALCULATION- SERVICE AREA A BONDED

SERVICE AREA A BONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Collection Facilities					**438**	
Future 10 Year Capital Projects	$ 8,792,598	4.36%	$ 383,098	$ 383,098	438	$ 875
Future Collection Related Debt to be Issued	-	0.00%	-	-	438	-
Existing Collection Projects	-	0.00%	-	-	438	-
Existing Collection Related Debt (Includes Interest)	-	0.00%	-	-	438	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(592)
Subtotal	**$ 8,792,598**		**$ 383,098**	**$ 383,098**		**$ 282**
Treatment Plant						
Future 10 Year Capital Projects	$ -	0.00%	$ 2,054,754	$ 2,054,754	438	$ 4,691
Future Treatment Related Bonds	-	0.00%	-	-	438	-
Existing Treatment Projects	-	0.00%	-	-	438	-
Existing Treatment Related Debt (Includes Interest)	-	0.00%	-	-	438	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(616)
Subtotal	**$ -**		**$ 2,054,754**	**$ 2,054,754**		**$ 4,075**
Miscellaneous						
Unspent Impact Fee Funds	-	0.00%	$ -	-	438	$ -
Professional Expenses		0.00%	36,876	36,876	1,063	35
Subtotal	**$ -**		**$ 36,876**	**$ 36,876**		**$ 35**
Total Impact Fee Per ERU	**$ 8,792,598**		**$ 2,474,727**	**$ 2,474,727**		**$ 4,392**

FIGURE 4.2: SEWER IMPACT FEE CALCULATION- SERVICE AREA A UNBONDED

SERVICE AREA A UNBONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Collection Facilities					**35**	
Future 10 Year Capital Projects	$ 8,792,598	1.09%	$ 95,414	$ 95,414	35	$ 2,726
Future Collection Related Debt to be Issued	-	0.00%	-	-	35	-
Existing Collection Projects	-	0.00%	-	-	35	-
Existing Collection Related Debt (Includes Interest)	-	0.00%	-	-	35	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(592)
Subtotal	**$ 8,792,598**		**$ 95,414**	**$ 95,414**		**$ 2,134**
Treatment Plant						
Future 10 Year Capital Projects	$ -	0.00%	$ 164,193	$ 164,193	35	$ 4,691
Future Treatment Related Bonds	-	0.00%	-	-	35	-
Existing Treatment Projects	-	0.00%	-	-	35	-
Existing Treatment Related Debt (Includes Interest)	-	0.00%	-	-	35	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(616)
Subtotal	**$ -**		**$ 164,193**	**$ 164,193**		**$ 4,075**
Miscellaneous						
Unspent Impact Fee Funds	-	0.00%	$ -	-	35	$ -
Professional Expenses	-	0.00%	3,124	3,124	90	35
Subtotal	**$ -**		**$ 3,124**	**$ 3,124**		**$ 35**
Total Impact Fee Per ERU	**$ 8,792,598**		**$ 262,731**	**$ 262,731**		**$ 6,244**

FIGURE 4.3: SEWER IMPACT FEE CALCULATION- SERVICE AREA B NORTH BONDED

SERVICE AREA B NORTH BONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Collection Facilities					**397**	
Future 10 Year Capital Projects	$ 8,792,598	7.07%	$ 621,364	$ 621,364	397	$ 1,565
Future Collection Related Debt to be Issued	-	0.00%	-	-	397	-
Existing Collection Projects	-	0.00%	-	-	397	-
Existing Collection Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	397	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(592)
Subtotal	**$ 8,792,598**		**$ 621,364**	**$ 621,364**		**$ 973**
Treatment Plant						
Future 10 Year Capital Projects	$ -	0.00%	$ 1,862,414	$ 1,862,414	397	$ 4,691
Future Treatment Related Bonds	-	0.00%	-	-	397	-
Existing Treatment Projects	-	0.00%	-	-	397	-
Existing Treatment Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	397	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(616)
Subtotal	**$ -**		**$ 1,862,414**	**$ 1,862,414**		**$ 4,075**
Miscellaneous						
Unspent Impact Fee Funds	-	0.00%	$ -	-	397	$ -
Professional Expenses	-	0.00%	36,876	36,876	1,063	35
Subtotal	**-**		**$ 36,876**	**$ 36,876**		**$ 35**
Total Impact Fee Per ERU	**$ 8,792,598**		**$ 2,520,654**	**$ 2,520,654**		**$ 5,083**

FIGURE 4.4: SEWER IMPACT FEE CALCULATION- SERVICE AREA B NORTH UNBONDED

SERVICE AREA B NORTH UNBONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Collection Facilities					**54**	
Future 10 Year Capital Projects	$ 8,792,598	2.28%	$ 200,506	$ 200,506	54	$ 3,713
Future Collection Related Debt to be Issued	-	0.00%	-	-	54	-
Existing Collection Projects	-	0.00%	-	-	54	-
Existing Collection Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	54	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(592)
Subtotal	**$ 8,792,598**		**$ 200,506**	**$ 200,506**		**$ 3,121**
Treatment Plant						
Future 10 Year Capital Projects	$ -	0.00%	$ 253,326	$ 253,326	54	$ 4,691
Future Treatment Related Bonds	-	0.00%	-	-	54	-
Existing Treatment Projects	-	0.00%	-	-	54	-
Existing Treatment Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	54	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(616)
Subtotal	**$ -**		**$ 253,326**	**$ 253,326**		**$ 4,075**
Miscellaneous						
Unspent Impact Fee Funds	-	0.00%	$ -	-	54	-
Professional Expenses	-	0.00%	3,124	3,124	90	35
Subtotal	**$ -**		**$ 3,124**	**$ 3,124**		**$ 35**
Total Impact Fee Per ERU	**$ 8,792,598**		**$ 456,956**	**$ 456,956**		**$ 7,230.85**

FIGURE 4.5: SEWER IMPACT FEE CALCULATION- SERVICE AREA B SOUTH BONDED

SERVICE AREA B SOUTH BONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Collection Facilities					**228**	
Future 10 Year Capital Projects	$ 8,792,598	6.95%	$ 610,731	$ 610,731	228	$ 2,679
Future Collection Related Debt to be Issued	-	0.00%	-	-	228	-
Existing Collection Projects	-	0.00%	-	-	228	-
Existing Collection Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	228	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(592)
Subtotal	**$ 8,792,598**		**$ 610,731**	**$ 610,731**		**$ 2,086.26**
Treatment Plant						
Future 10 Year Capital Projects	$ -	0.00%	$ 1,069,598	$ 1,069,598	228	$ 4,691
Future Treatment Related Bonds	-	0.00%	-	-	228	-
Existing Treatment Projects	-	0.00%	-	-	228	-
Existing Treatment Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	228	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(616)
Subtotal	**$ -**		**$ 1,069,598**	**$ 1,069,598**		**$ 4,075**
Miscellaneous						
Unspent Impact Fee Funds	-	0.00%	$ -	-	228	-
Professional Expenses		0.00%	36,876	36,876	1,063	34.69
Subtotal	**$ -**		**$ 36,876**	**$ 36,876**		**$ 35**
Total Impact Fee Per ERU	**$ 8,792,598**		**$ 1,717,205**	**$ 1,717,205**		**$ 6,196.40**

FIGURE 4.6: SEWER IMPACT FEE CALCULATION- SERVICE AREA B SOUTH UNBONDED

SERVICE AREA B SOUTH UNBONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Collection Facilities					**1**	
Future 10 Year Capital Projects	$ -	0.00%	$ 5,135	$ 5,135	1	$ 5,135
Future Collection Related Debt to be Issued	-	0.00%	-	-	1	-
Existing Collection Projects	-	0.00%	-	-	1	-
Existing Collection Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	1	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(592)
Subtotal	**$ -**		**$ 5,135**	**$ 5,135**		**$ 4,542**
Treatment Plant						
Future 10 Year Capital Projects	$ -	0.00%	$ 4,691	$ 4,691	1	$ 4,691
Future Treatment Related Bonds	-	0.00%	-	-	1	-
Existing Treatment Projects	-	0.00%	-	-	1	-
Existing Treatment Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	1	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(616)
Subtotal	**$ -**		**$ 4,691**	**$ 4,691**		**$ 4,075**
Miscellaneous						
Unspent Impact Fee Funds	-	0.00%	$ -	$ -	1	$ -
Professional Expenses		0.00%	3,124	3,124	90	35
Subtotal	**$ -**		**$ 3,124**	**$ 3,124**		**$ 35**
Total Impact Fee Per ERU	**$ -**		**$ 12,950**	**$ 12,950**		**$ 8,653**

Determination of Residential and Non-Residential Impact Fees

The impact fees to be paid by different residential and non-residential users are assessed according to demand per ERU. Demand in terms of ERUs will be assessed individually by the District's engineers who will determine the number of ERUs per new development. The impact fee per ERU will then be multiplied by the unique ERU equivalent for that lot.

FIGURE 4.7: MAXIMUM INDOOR IMPACT FEE SCHEDULE

	Bonded A	Unbonded A	Bonded B-North	Unbonded B-North	Bonded B-South	Unbonded B-South
Collection Facilities	$ 875	$ 2,726	$ 1,565	$ 3,713	$ 2,679	$ 5,135
Treatment Plant	4,691	4,691	4,691	4,691	4,691	4,691
Credit	(1,208)	(1,208)	(1,208)	(1,208)	(1,208)	(1,208)
Professional Services	35	35	35	35	35	35
Cost per ERU	**$ 4,392**	**$ 6,244**	**$ 5,083**	**$ 7,231**	**$ 6,196**	**$ 8,653**

Non-Standard Demand Adjustments

The District reserves the right under the Impact Fees Act (Utah Code 11-36-402(1)(c,d)) to assess an adjusted fee to respond to unusual circumstances and to ensure that the impact fees are assessed fairly. The impact fee ordinance must include a provision that permits adjustment of the fee for a particular development based upon studies and data submitted by the developer that indicate a more realistic and accurate impact upon the District's infrastructure.

The impact fee formula shown below in Figure 4.8 for a non-standard user is based upon the anticipated annual sewer demand of that particular user.

FIGURE 4.8: CALCULATION OF NON-STANDARD IMPACT FEE

NON-STANDARD IMPACT FEE CALCULATIONS
Bonded A
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $12.92 per Gallon
Unbonded A
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $18.36 per Gallon
Bonded B-North
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $14.95 per Gallon
Unbonded B-North
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $21.27 per Gallon
Bonded B-South
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $18.22 per Gallon
Unbonded B-South
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $25.45 per Gallon

APPENDICES: CERTIFICATION, SERVICE AREA MAP, IMPACT FEE CALCULATIONS

In accordance with Utah Code Annotated, 11-36a-306(2), Zions Public Finance, Inc., makes the following certification:

I certify that the attached impact fee analysis:

1. includes only the cost of 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 the day on which each impact fee is paid;
2. does not include:
    a. costs of operation and maintenance of public facilities;
b. cost of 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 the methodological standards set forth by the federal Office of Management and Budget for federal grant reimbursement;
3. offset costs with grants or other alternate sources of payment; and
4. complies in each and every relevant respect with the Impact Fees Act.

Zions Public Finance, Inc. makes this certification with the following caveats:

1. All of the recommendations for implementations of the Impact Fee Facilities Plan (IFFP) made in the IFFP or in the impact fee analysis are followed in their entirety by District staff and Board in accordance to the specific policies established for the Service Area.
2. If all or a portion of the IFFP or impact fee analysis are modified or amended, this certification is no longer valid.
3. All information provided to Zions Public Finance, Inc., its contractors or suppliers is assumed to be correct, complete and accurate. This includes information provided by Jordanelle Special Service District and outside sources. Copies of letters requesting data are included as appendices to the IFFP and the impact fee analysis.

Dated: 6/24/2015

ZIONS PUBLIC FINANCE, INC.

APPENDIX A: GROWTH PROJECTIONS

Jordanelle Special Service District- Sewer

TABLE A.1: GROWTH IN ERUs

Year	ERUS	Average Annual Growth	Projected ERUs Remaining Sold Capacity	Average Annual Growth	Current ERUs	10 Year Demand in ERUs
2015	**1,256**		**9,395**		**1,256**	
2016	1,341	6.8%	9,404	0.1%		
2017	1,432	6.8%	9,413	0.1%		
2018	1,529	6.8%	9,422	0.1%		
2019	1,633	6.8%	9,431	0.1%		
2020	1,744	6.8%	9,441	0.1%		
2021	1,862	6.8%	9,450	0.1%		
2022	1,988	6.8%	9,459	0.1%		
2023	2,123	6.8%	9,468	0.1%		
2024	2,267	6.8%	9,477	0.1%		
2025	**2,421**	**6.8%**	**9,486**	**0.1%**		**1,165**
2035	4,177	5.6%	10,000	0.5%		
2045	5,933	3.6%	10,513	0.5%		
2055	7,689	2.6%	11,027	0.3%		

TABLE A.2: GROWTH IN ERUs

	Existing	10 Year Bonded	10 Year Unbonded	>10 year Bonded	>10 year Unbonded
Area A	504	438	35	3,233	661
Area B North	517	397	54	365	372
Area B South	221	228	1	175	453
Area C	13	11	1	3,293	54
	1,255	1,074	91	7,066	1,540

Appendix B: Sanitary Sewer Level of Service (LOS) Analysis

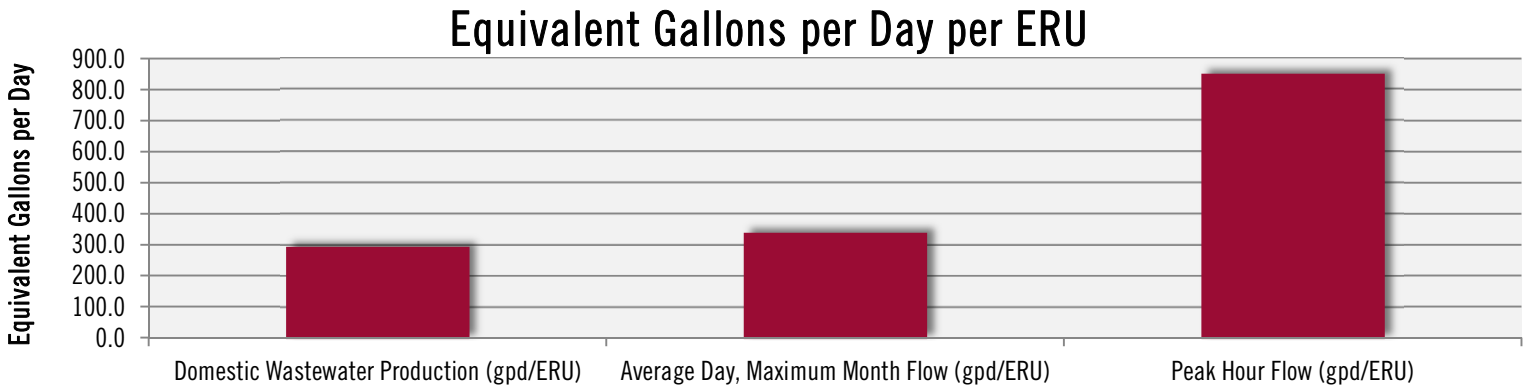
Jordanelle Special Service District- Sewer

TABLE B.1: SEWER LOS PER ERU

	Gallons per Day per ERU	Basis for Impact Fee Calculation
Domestic Wastewater Production (gpd/ERU)	295.0	
Average Day, Maximum Month Flow (gpd/ERU)	340.0	Treatment/Collection
Peak Hour Flow (gpd/ERU)	850.0	
Average Indoor Water Use (gpd/ERU)	325.0	

Refer to 2013 Impact Fee Facilities Plan, Table 7-1

Includes allowance for peak month infiltration. Basis for most treatment plant design.



APPENDIX C: SANITARY SEWER 10 YEAR CAPITAL PROJECTS

Jordanelle Special Service District- Sewer

TABLE C.1: SEWER CAPITAL PROJECTS — **Inflation Rate*** 3.8%

Project Name	% to Existing	% 10 Year Growth Bonded Users	% 10 Year Growth Unbonded Users	% Beyond 10 Year Growth Bonded Users	% Beyond 10 Year Growth Unbonded Users	Year to be Constructed	2015 Cost	Construction Cost with Inflation	10 Year Bonded Impact Fee Qualifying Cost	10 Year Unbonded Impact Fee Qualifying Cost	Bonded Impact Fee Qualifying Beyond 10 Years	Bonded Impact Fee Qualifying Beyond 10 Years	Non Impact Fee Qualifying
Collection System													
Install New 18" to 24" Line From Force Main 4 to the New WWTP						2023	$ 3,499,693	$ 4,716,380					
A	5.60%	4.87%	0.53%	35.95%	9.95%				$ 229,801	$ 24,831	$ 1,695,526	$ 469,229	$ 264,225
B North	8.39%	5.43%	0.87%	4.99%	6.03%				256,333	41,238	235,366	284,415	395,573
B South	3.24%	3.42%	0.02%	2.62%	8.09%				161,161	842	123,698	381,333	152,809
Install 18" Parallel Line Next to Line B						2025	$ 1,039,737	$ 1,509,722					
A	0.00%	0.00%	1.92%	0.00%	16.20%				$ -	$ 28,979	$ -	$ 244,545	$ -
B North	0.00%	6.89%	4.68%	2.83%	14.42%				104,094	70,684	42,682	217,699	-
B South	9.78%	12.15%	0.13%	4.17%	26.82%				183,506	2,002	62,897	404,967	$ 147,668
Install New Lift Station to Supply 4400 GPM						2025	$ 2,166,803	$ 3,146,248					
A	5.60%	4.87%	0.53%	35.95%	9.95%				$ 153,298	$ 16,564	$ 1,131,068	$ 313,018	$ 176,262
B North	8.39%	5.43%	0.87%	4.99%	6.03%				170,997	27,510	157,010	189,731	263,883
B South	3.24%	3.42%	0.02%	2.62%	8.09%				107,509	562	82,518	254,383	101,937
Install New Lift Station to Supply 1620 GPM						2025	$ 898,369	$ 1,304,453					
A	0.00%	0.00%	1.92%	0.00%	16.20%				$ -	$ 25,039	$ -	$ 211,295	$ -
B North	0.00%	6.89%	4.68%	2.83%	14.42%				89,941	61,074	36,879	188,099	-
B South	9.78%	12.15%	0.13%	4.17%	26.82%				158,555	1,730	54,345	349,906	127,590
IFFP and IFA Update						2015	$ 40,000	$ 40,000					
A, B -North, B-South	0.00%	92.19%	7.81%	0.00%	0.00%				$ 36,876	$ 3,124	$ -	$ -	$ -
Collection System Subtotal							**$ 7,644,602**	**$ 10,716,803**	**$ 1,652,069**	**$ 304,178**	**$ 3,621,988**	**$ 3,508,620**	**$ 1,629,947**
Treatment Facilities													
New WWTP						2015	$ 16,560,000	$ 16,560,000					
A	14.28%	12.41%	0.99%	8.19%	1.67%				$ 2,054,754	$ 164,193	$ 1,355,762	$ 276,782	$ 2,364,374
B North	14.65%	11.25%	1.53%	0.93%	0.93%				1,862,414	253,326	154,810	154,810	2,425,360
B South	6.26%	6.46%	0.03%	0.45%	1.13%				1,069,598	4,691	75,059	187,649	1,036,759
NVSSD	4.67%	12.35%	1.81%	0.00%	0.00%				2,045,371	300,238	-	-	774,051
									-	-	-	-	-
Treatment Facilities Subtotal							**$ 16,560,000**	**$ 16,560,000**	**$ 7,032,136**	**$ 722,448**	**$ 1,585,632**	**$ 619,241**	**$ 6,600,544**
Ten Year Sanitary Sewer							**$ 24,204,602**	**$ 27,276,803**	**$ 8,684,205**	**$ 1,026,626**	**$ 5,207,620**	**$ 4,127,861**	**$ 8,230,490**

**Based on 20 years average cost of inflation using ENR*

	1.000	1.038	1.077	1.118	1.161	1.205	1.251	1.298	1.348	1.399	1.452

Table C.2: Total Sewer Capital Projects by Year

Project	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Collection System											
Install New 18" to 24" Line From Force Main 4 to the New WWTP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,716,380	$ -	$ -
Install 18" Parallel Line Next to Line B	-	-	-	-	-	-	-	-	-	-	1,509,722
Install New Lift Station to Supply 4400 GPM	-	-	-	-	-	-	-	-	-	-	3,146,248
Install New Lift Station to Supply 1620 GPM	-	-	-	-	-	-	-	-	-	-	1,304,453
IFFP and IFA Update	40,000	-	-	-	-	-	-	-	-	-	-
Collection System Subtotal	$ 40,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,716,380	$ -	$ 5,960,423
Treatment Facilities											
New WWTP	$ 16,560,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
IFFP and IFA Update	40,000	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-
Treatment Facilities Subtotal	$ 16,600,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Capital Projects	**$ 16,640,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 4,716,380**	**$ -**	**$ 5,960,423**

APPENDIX D: WASTEWATER TREATMENT PLANT CAPACITY

Jordanelle Special Service District- Sewer

Table D.1: Total Future ERUs

	Existing	10-Year		>10-Year	
		Bonded	Unbonded	Bonded	Unbonded
Area A	504	438	35	3,233	661
Area B North	517	397	54	365	372
Area B South	221	228	1	175	453
NVSSD	165	436	64		
Total ERUs	1,407	1,499	154	3,773	1,487

Table D.2: ERUs Adjusted Down to Plant Capacity

	Existing	10-Year		>10-Year			
		Bonded	Unbonded	Bonded	Unbonded	Totals	Cost Allocation
Area A	504	438	35	289	59	**3,530**	
Area B North	517	397	54	33	33		
Area B South	221	228	1	16	40		
NVSSD	165	436	64	-	-		
Total ERUs	1,407	1,499	154	338	132		
Area A	14%	12%	1%	8%	2%	38%	$ 6,215,864
Area B North	15%	11%	2%	1%	1%	29%	4,850,720
Area B South	6%	6%	0%	0%	1%	14%	2,373,756
NVSSD	5%	12%	2%	0%	0%	19%	3,119,660
						100%	**$ 16,560,000**

Appendix E: Impact Fee User Rate Credit

Jordanelle Special Service District- Sewer

TABLE E.1: CALCULATION OF COLLECTION USER RATE CREDITS

Year	ERUs	Amortized Collection Expense	Annual Cost per ERU	Average PV Cost per ERU
2015	1,256	$ (81,497)	$ (64.89)	$ (64.89)
2016	1,341	(81,497)	(60.77)	(58.72)
2017	1,432	(81,497)	(56.91)	(53.13)
2018	1,529	(81,497)	(53.30)	(48.07)
2019	1,633	(81,497)	(49.91)	(43.49)
2020	1,744	(81,497)	(46.73)	(39.35)
2021	1,862	(81,497)	(43.77)	(35.61)
2022	1,988	(81,497)	(40.99)	(32.22)
2023	2,123	(81,497)	(38.39)	(29.15)
2024	2,267	(81,497)	(35.95)	(26.38)
2025	2,421	(81,497)	(33.66)	(23.86)
2026	2,597	(81,497)	(31.39)	(21.50)
2027	2,772	(81,497)	(29.40)	(19.46)
2028	2,948	(81,497)	(27.65)	(17.68)
2029	3,123	(81,497)	(26.09)	(16.12)
2030	3,299	(81,497)	(24.70)	(14.75)
2031	3,475	(81,497)	(23.46)	(13.53)
2032	3,650	(81,497)	(22.33)	(12.44)
2033	3,826	(81,497)	(21.30)	(11.47)
2034	4,001	(81,497)	(20.37)	(10.59)
2035	4,177		-	-
2036	4,353		-	-
2037	4,528		-	-
2038	4,704		-	-
2039	4,879		-	-
2040	5,055		-	-
		$ (1,629,947)	**$ (751.95)**	**$ (592.39)**

TABLE E.2: CALCULATION OF TREATMENT USER RATE CREDITS

ERUs	Amortized Treatment Expense	Annual Cost per ERU	Average PV Cost per ERU
1,256	$ (84,713)	$ (67.45)	$ (67.45)
1,341	(84,713)	(63.17)	(61.04)
1,432	(84,713)	(59.16)	(55.22)
1,529	(84,713)	(55.40)	(49.97)
1,633	(84,713)	(51.88)	(45.21)
1,744	(84,713)	(48.57)	(40.90)
1,862	(84,713)	(45.50)	(37.01)
1,988	(84,713)	(42.61)	(33.49)
2,123	(84,713)	(39.90)	(30.30)
2,267	(84,713)	(37.37)	(27.42)
2,421	(84,713)	(34.99)	(24.81)
2,597	(84,713)	(32.62)	(22.35)
2,772	(84,713)	(30.56)	(20.22)
2,948	(84,713)	(28.74)	(18.37)
3,123	(84,713)	(27.12)	(16.76)
3,299	(84,713)	(25.68)	(15.33)
3,475	(84,713)	(24.38)	(14.06)
3,650	(84,713)	(23.21)	(12.93)
3,826	(84,713)	(22.14)	(11.92)
4,001	(84,713)	(21.17)	(11.01)
4,177		-	-
4,353		-	-
4,528		-	-
4,704		-	-
4,879		-	-
5,055		-	-
	$ (1,694,253)	**(781.62)**	**(615.76)**

APPENDIX F: CALCULATION OF THE IMPACT FEE PER ERU

Jordanelle Special Service District- Sewer

TABLE F.1: SEWER IMPACT FEE CALCULATION SERVICE AREA A BONDED

SERVICE AREA A BONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Collection Facilities					**438**	
Future 10 Year Capital Projects	$ 8,792,598	4.36%	$ 383,098	$ 383,098	438	$ 875
Future Collection Related Debt to be Issued	-	0.00%	-	-	438	-
Existing Collection Projects	-	0.00%	-	-	438	-
Existing Collection Related Debt (Includes Interest)	-	0.00%	-	-	438	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(592)
Subtotal	**$ 8,792,598**		**$ 383,098**	**$ 383,098**		**$ 282**
Treatment Plant						
Future 10 Year Capital Projects	$ -	0.00%	$ 2,054,754	$ 2,054,754	438	$ 4,691
Future Treatment Related Bonds	-	0.00%	-	-	438	-
Existing Treatment Projects	-	0.00%	-	-	438	-
Existing Treatment Related Debt (Includes Interest)	-	0.00%	-	-	438	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(616)
Subtotal	**$ -**		**$ 2,054,754**	**$ 2,054,754**		**$ 4,075**
Miscellaneous						
Unspent Impact Fee Funds	$ -	0.00%	$ -	$ -	438	$ -
Professional Expenses		0.00%	36,876	36,876	1,063	35
Subtotal	**$ -**		**$ 36,876**	**$ 36,876**		**$ 35**
Total Impact Fee Per ERU	**$ 8,792,598**		**$ 2,474,727**	**$ 2,474,727**		**$ 4,392**

TABLE F.2: SEWER IMPACT FEE CALCULATION SERVICE AREA A UNBONDED

SERVICE AREA A UNBONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Collection Facilities					**35**	
Future 10 Year Capital Projects	$ 8,792,598	1.09%	$ 95,414	$ 95,414	35	$ 2,726
Future Collection Related Debt to be Issued	-	0.00%	-	-	35	-
Existing Collection Projects	-	0.00%	-	-	35	-
Existing Collection Related Debt (Includes Interest)	-	0.00%	-	-	35	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(592)
Subtotal	**$ 8,792,598**		**$ 95,414**	**$ 95,414**		**$ 2,134**
Treatment Plant						
Future 10 Year Capital Projects	$ -	0.00%	$ 164,193	$ 164,193	35	$ 4,691
Future Treatment Related Bonds	-	0.00%	-	-	35	-
Existing Treatment Projects	-	0.00%	-	-	35	-
Existing Treatment Related Debt (Includes Interest)	-	0.00%	-	-	35	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(616)
Subtotal	**$ -**		**$ 164,193**	**$ 164,193**		**$ 4,075**
Miscellaneous						
Unspent Impact Fee Funds	$ -	0.00%	$ -	$ -	35	$ -
Professional Expenses	-	0.00%	3,124	3,124	90	35
Subtotal	**$ -**		**$ 3,124**	**$ 3,124**		**$ 35**
Total Impact Fee Per ERU	**$ 8,792,598**		**$ 262,731**	**$ 262,731**		**$ 6,244**

TABLE F.3: SEWER IMPACT FEE CALCULATION SERVICE AREA B NORTH BONDED

SERVICE AREA B NORTH BONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Collection Facilities					**397**	
Future 10 Year Capital Projects	$ 8,792,598	7.07%	$ 621,364	$ 621,364	397	$ 1,565
Future Collection Related Debt to be Issued	-	0.00%	-	-	397	-
Existing Collection Projects	-	0.00%	-	-	397	-
Existing Collection Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	397	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(592)
Subtotal	**$ 8,792,598**		**$ 621,364**	**$ 621,364**		**$ 973**
Treatment Plant						
Future 10 Year Capital Projects	$ -	0.00%	$ 1,862,414	$ 1,862,414	397	$ 4,691
Future Treatment Related Bonds	-	0.00%	-	-	397	-
Existing Treatment Projects	-	0.00%	-	-	397	-
Existing Treatment Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	397	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(616)
Subtotal	**$ -**		**$ 1,862,414**	**$ 1,862,414**		**$ 4,075**
Miscellaneous						
Unspent Impact Fee Funds	$ -	0.00%	$ -	$ -	397	$ -
Professional Expenses	-	0.00%	36,876	36,876	1,063	35
Subtotal	**$ -**		**$ 36,876**	**$ 36,876**		**$ 35**
Total Impact Fee Per ERU	**$ 8,792,598**		**$ 2,520,654**	**$ 2,520,654**		**$ 5,083**

TABLE F.4: SEWER IMPACT FEE CALCULATION SERVICE AREA B NORTH UNBONDED

SERVICE AREA B NORTH UNBONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Collection Facilities					**54**	
Future 10 Year Capital Projects	$ 8,792,598	2.28%	$ 200,506	$ 200,506	54	$ 3,713
Future Collection Related Debt to be Issued	-	0.00%	-	-	54	-
Existing Collection Projects	-	0.00%	-	-	54	-
Existing Collection Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	54	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(592)
Subtotal	**$ 8,792,598**		**$ 200,506**	**$ 200,506**		**$ 3,121**
Treatment Plant						
Future 10 Year Capital Projects	$ -	0.00%	$ 253,326	$ 253,326	54	$ 4,691
Future Treatment Related Bonds	-	0.00%	-	-	54	-
Existing Treatment Projects	-	0.00%	-	-	54	-
Existing Treatment Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	54	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(616)
Subtotal	**$ -**		**$ 253,326**	**$ 253,326**		**$ 4,075**
Miscellaneous						
Unspent Impact Fee Funds	$ -	0.00%	$ -	$ -	54	$ -
Professional Expenses	-	0.00%	3,124	3,124	90	35
Subtotal	**$ -**		**$ 3,124**	**$ 3,124**		**$ 35**
Total Impact Fee Per ERU	**$ 8,792,598**		**$ 456,956**	**$ 456,956**		**$ 7,230.85**

TABLE F.5: SEWER IMPACT FEE CALCULATION SERVICE AREA B SOUTH BONDED

SERVICE AREA B SOUTH BONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Collection Facilities					**228**	
Future 10 Year Capital Projects	$ 8,792,598	6.95%	$ 610,731	$ 610,731	228	$ 2,679
Future Collection Related Debt to be Issued	-	0.00%	-	-	228	-
Existing Collection Projects	-	0.00%	-	-	228	-
Existing Collection Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	228	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(592)
Subtotal	**$ 8,792,598**		**$ 610,731**	**$ 610,731**		**$ 2,086.26**
Treatment Plant						
Future 10 Year Capital Projects	$ -	0.00%	$ 1,069,598	$ 1,069,598	228	$ 4,691
Future Treatment Related Bonds	-	0.00%	-	-	228	-
Existing Treatment Projects	-	0.00%	-	-	228	-
Existing Treatment Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	228	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(616)
Subtotal	**$ -**		**$ 1,069,598**	**$ 1,069,598**		**$ 4,075**
Miscellaneous						
Unspent Impact Fee Funds	$ -	0.00%	$ -	$ -	228	$ -
Professional Expenses		0.00%	36,876	36,876	1,063	34.69
Subtotal	**$ -**		**$ 36,876**	**$ 36,876**		**$ 35**
Total Impact Fee Per ERU	**$ 8,792,598**		**$ 1,717,205**	**$ 1,717,205**		**$ 6,196.40**

TABLE F.6: SEWER IMPACT FEE CALCULATION SERVICE AREA B SOUTH UNBONDED

SERVICE AREA B SOUTH UNBONDED	Total Cost to Component	% that will Serve Ten Year Demand	Dollar Amount that will Serve Ten Year Demand	Impact Fee Cost	ERUs to be Served	Cost per ERU
Collection Facilities					**1**	
Future 10 Year Capital Projects	$ -	0.00%	$ 5,135	$ 5,135	1	$ 5,135
Future Collection Related Debt to be Issued	-	0.00%	-	-	1	-
Existing Collection Projects	-	0.00%	-	-	1	-
Existing Collection Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	1	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(592)
Subtotal	**$ -**		**$ 5,135**	**$ 5,135**		**$ 4,542**
Treatment Plant						
Future 10 Year Capital Projects	$ -	0.00%	$ 4,691	$ 4,691	1	$ 4,691
Future Treatment Related Bonds	-	0.00%	-	-	1	-
Existing Treatment Projects	-	0.00%	-	-	1	-
Existing Treatment Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	1	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(616)
Subtotal	**$ -**		**$ 4,691**	**$ 4,691**		**$ 4,075**
Miscellaneous						
Unspent Impact Fee Funds	$ -	0.00%	$ -	$ -	1	$ -
Professional Expenses		0.00%	3,124	3,124	90	35
Subtotal	**$ -**		**$ 3,124**	**$ 3,124**		**$ 35**
Total Impact Fee Per ERU	**$ -**		**$ 12,950**	**$ 12,950**		**$ 8,653**

Appendix G: Impact Fee By Service Area

Jordanelle Special Service District- Sewer

Figure G.1: Proposed Sewer Impact Fee by Service Area

	Bonded A	Unbonded A	Bonded B-North	Unbonded B-North	Bonded B-South	Unbonded B-South
Collection Facilities	$ 875	$ 2,726	$ 1,565	$ 3,713	$ 2,679	$ 5,135
Treatment Plant	4,691	4,691	4,691	4,691	4,691	4,691
Credit	(1,208)	(1,208)	(1,208)	(1,208)	(1,208)	(1,208)
Professional Services	35	35	35	35	35	35
Cost per ERU	**$ 4,392**	**$ 6,244**	**$ 5,083**	**$ 7,231**	**$ 6,196**	**$ 8,653**

Figure G.2: Non-Standard Impact Fee Calculation

NON-STANDARD IMPACT FEE CALCULATIONS
Bonded A
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development
Step 2: Multiply the Demand by $12.92 per Gallon
Unbonded A
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development
Step 2: Multiply the Demand by $18.36 per Gallon
Bonded B-North
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development
Step 2: Multiply the Demand by $14.95 per Gallon
Unbonded B-North
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development
Step 2: Multiply the Demand by $21.27 per Gallon
Bonded B-South
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development
Step 2: Multiply the Demand by $18.22 per Gallon
Unbonded B-South
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development
Step 2: Multiply the Demand by $25.45 per Gallon

WATER AND SEWER RATE STUDY

June 2015

Project No. 056-12-02

Prepared for:

Jordanelle Special Service District

Prepared by:

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

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SECTION 1
PROJECTED REVENUE NEEDS

INTRODUCTION

Jordanelle Special Service District (JSSD) authorized Bowen, Collins & Associates (BC&A) to update its water and sewer rates in Fiscal Year 2014-15. The purpose of this study is to update the District's water and sewer rates based on changes in demand patterns and system revenue requirements that have occurred since the last study. The rate study will calculate detailed rates for the next six years and present a longer term finance plan to achieve the District's primary objectives of:

- Maintaining high quality, reliable water and sewer service at affordable prices for customers;
- Encouraging wise use of resources through water conservation;
- Maintaining stable revenue generation adequate to fund system needs; and
- Minimizing the District's long-term costs by avoiding further debt where possible.

Implementing the recommendations contained in this report will help JSSD keep its water and sewer systems adequately funded to maintain its current infrastructure and keep pace with its currently approved capital improvements plans. The report will first examine water rates and then discuss sewer rates.

PROJECTED REVENUE NEEDS

Before calculating detailed rates for individual customer classes, it is important to consider the overall plan for meeting the future revenue needs of the District. The first step in this process is to project future expenditures. Historic and projected expenditures for the District from 2013 through 2025 are shown in Figures 1-1 and 1-2. Figure 1-1 shows water expenditures and Figure 1-2 shows sewer expenditures. Tables containing the values used to generate these figures are contained in Appendix A. Future expenditures can be grouped into three categories:

- **Operation and Maintenance Expenditures –** These are the annual costs of running the system. They include items such as salary and benefit costs for District staff, equipment and supplies, power costs, and all other costs associated with doing business throughout the year. Operation and maintenance (O&M) costs are relatively constant from year to year and tend to follow the rate of inflation. It should be noted that some O&M cost categories for the District have not been historically divided between water and sewer. Where combined expenditures exist, costs have been assigned 80 percent to water and 20 percent to sewer. The District is currently collecting data to better track actual expenditures so that they can be more accurately divided between the services in the future.

Figure 1
10-Year Revenue and Expenditures - JSSD Water

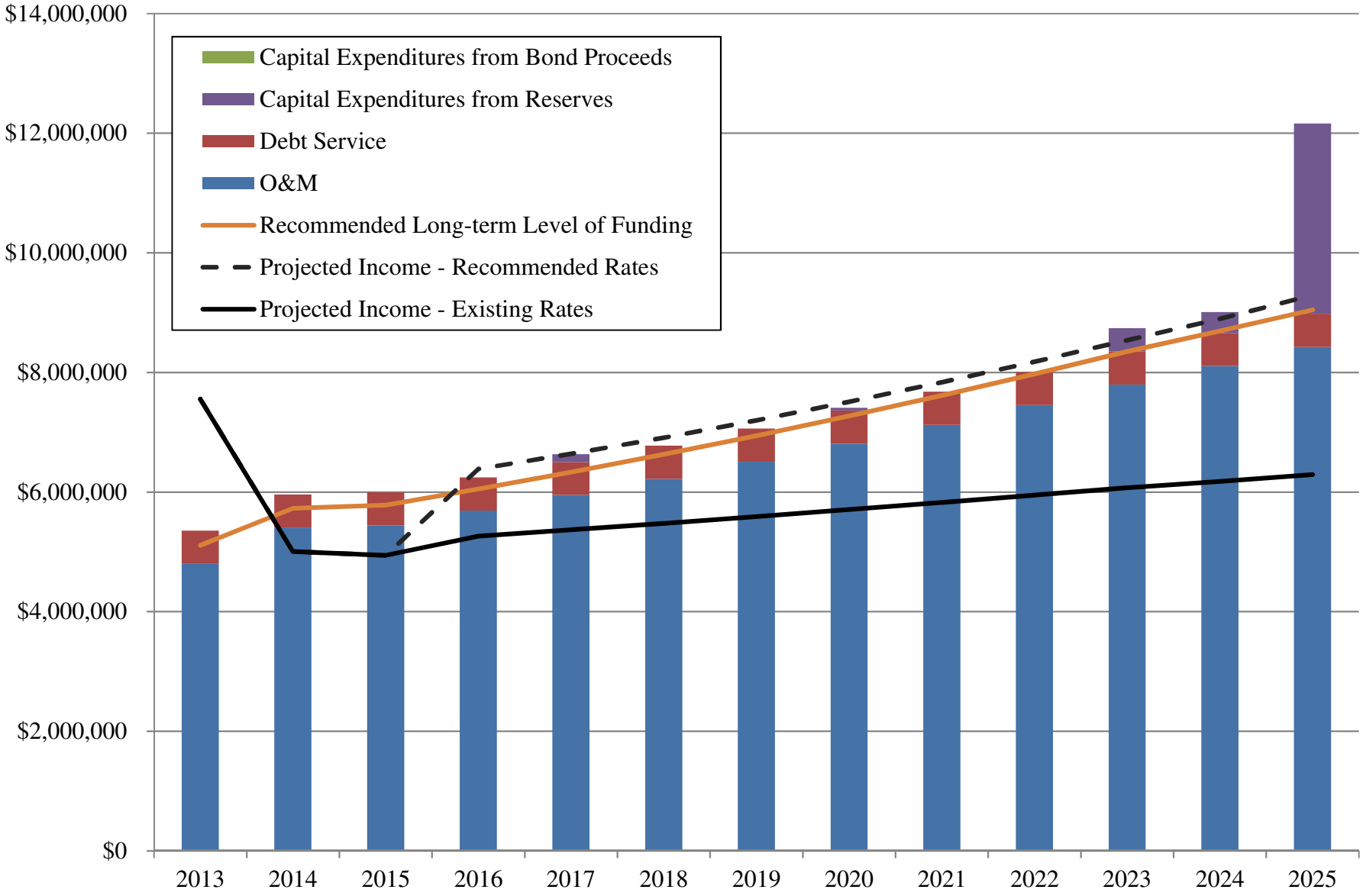
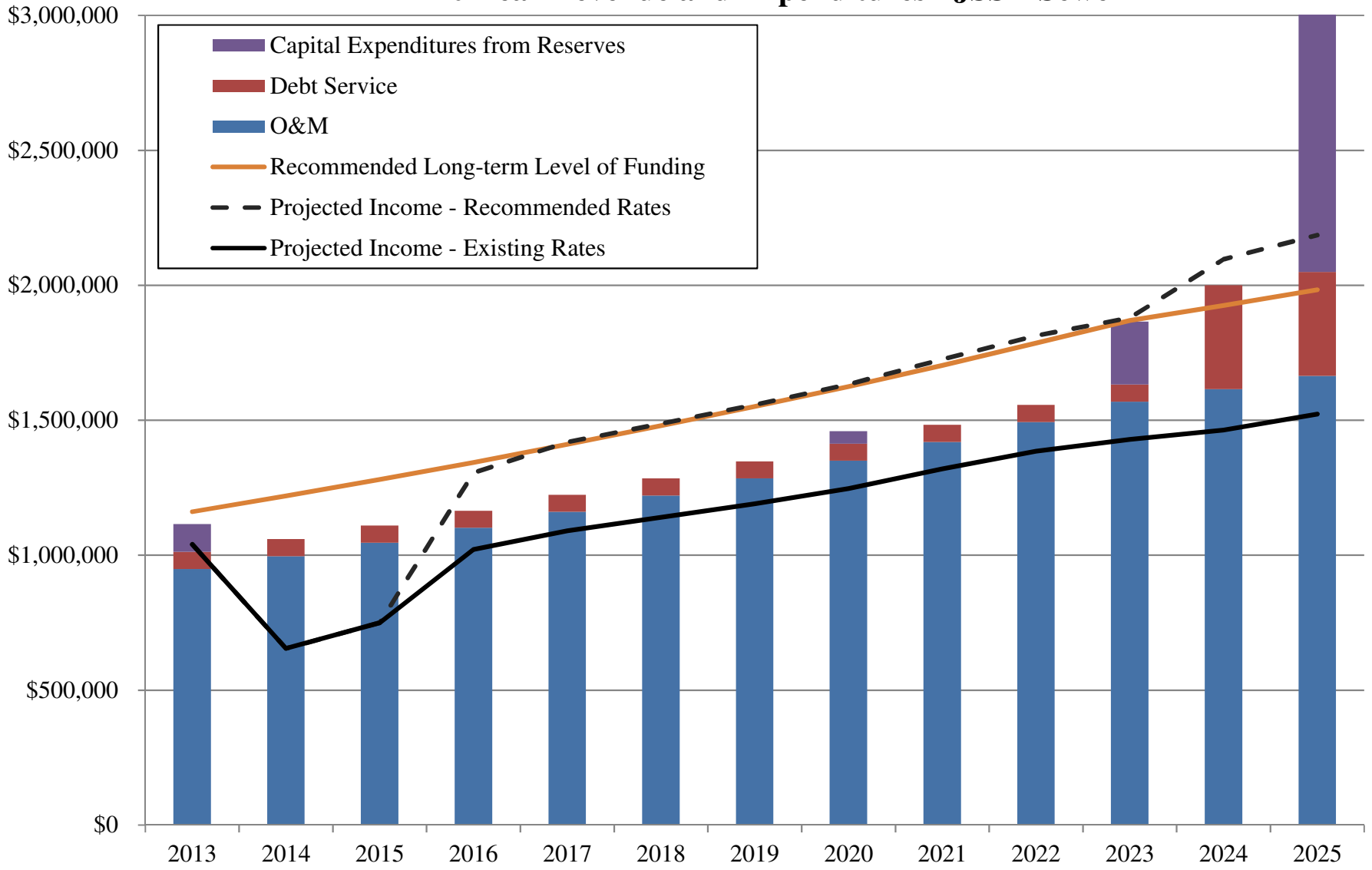


Figure 1-2
10-Year Revenue and Expenditures - JSSD Sewer



* Chart Shows only actual expenditures from District. Capital expenditures from bond proceeds not shown. This includes $4.2 million in 2023 for completion of project P-1.

JSSD's largest O&M cost is employee wages and benefits. Two other significant O&M costs are JSSD Water costs and sewage treatment costs:

- JSSD Water costs include the costs associated with lease and purchase agreements to secure the water required to serve the District. These costs have been increasing at about the rate of inflation. It has been assumed that they will continue to do so for the planning window of this study.
- JSSD has historically paid for sewage treatment at the Heber Valley Water Reclamation Facility. In the future, it is expected that JSSD will treat their own sewage at the new WWTP. The exact cost to operate the new WWTP is unknown, but was estimated in the Master Plan. Based on the analysis contained there, it is anticipated that the cost to operate the plant will be similar to the costs required to have flows treated at Heber Valley Reclamation Facility.

When compared to other entities serving a similar number of customers, the cost to operate the JSSD system is higher than average. However, this is not unexpected given the extremely large area of land that the District covers. The overall length of pipeline owned and operated by the District and the amount of pumping required for both water and sewer service is much larger than observed for most other service providers.

- **Debt Service Expenditures –** These are the costs paid toward bonds taken out by the District in previous years. These costs are easily predictable because they are tied to set payment schedules for each bond.
- **Capital Improvement Expenditures –**These are costs for constructing new facilities within the District. This can include completely new facilities or replacement of existing facilities. Capital improvement expenditures are usually the most volatile of expenditure categories. Because O&M and debt service costs are basically fixed, budgets are usually balanced by increasing or decreasing capital improvement expenditures as necessary.

10-YEAR BUDGET PLAN

With the expected expenditures outlined above, it is possible to prepare a future budget plan. A budget plan has been developed for both water and sewer and is shown on top of projected expenditures in Figures 1-1 and 1-2. The process of creating this budget plan was as follows:

1. **Identify projected revenue based on existing water and sewer rates –** Using the District's existing water and sewer rates, BC&A calculated the revenue the District could expect to receive over the next 10 years. These projections include consideration of future system growth. As can be seen in the figure, projected revenue based on existing rates falls well short of projected expenditures. If there are no changes in existing rates, the District will be unable to meet even O&M costs.
2. **Identify recommended level of funding based on long-term system needs** – As with most things, each component of a water and sewer system has a finite service life. As such, it is necessary to continually budget money for the rehabilitation or replacement of these system components. If adequate funds are not set aside for regular system renewal, the system will fall into disrepair and be incapable of providing the level of service customers in the District expect. To maintain the water and sewer systems in good

operating condition, it is generally recommended that the District's annual investment into the system (including debt service costs and capital improvements) be approximately equal to the replacement value of the system divided by its estimated service life.

- **Water System** – The estimated replacement value of the District's water system is $110 million. This estimate includes the value of District pipelines, pump stations, wells, and storage reservoirs. The service life for water facilities can vary greatly depending on the type of facility it is and the conditions in which it serves. Some facilities such as the mechanical equipment at wells may last as little as 5 or 10 years. Conversely pump stations may last 20-30 years and pipelines 60-80 years. For the purposes of this analysis, it has been estimated that the average life of water facilities in the District system (weighted by facility value) is 50 to 100 years. This would suggest the District should invest between $1.1 and $2.2 million dollars per year into its water system. However, it should be remembered that the District has a fairly new system and that many of its pipelines were built with capacity to meet demand through 2055. As a result, it does not seem fair to shoulder the smaller number of existing customers with the full burden of system replacement at this time. For the purposes of this report, a lower system renewal budget of $345,000 has been recommended. This smaller value is based on a long-term investment goal of $2.2 million multiplied by the ratio of current users in JSSD to the total number of users each system facility can sustain. As the system ages and the number of users increases, the system investment values should increase to meet the suggested investment goal.
- **Sewer System** – The estimated replacement value of the District's sewer system is $84.6 million. For the purposes of this analysis, it has been estimated that the average life of sewer facilities in the District system is 80-100 years. Based on the recommendation of the Sewer Master Plan, the recommended long-term investment goal in the sewer system is $940,000. However, for the same reasons as noted for the water system above (and following the same calculation procedure), it is recommended that a lower value of $235,000 be used as the current system investment goal. This should be increased to the suggested amount as the District grows into the capacity of the system.

The recommended system investment budgets identified above were added to the District's projected O&M costs to estimate a recommended long-term level of funding based on system needs. This projected funding level is shown in Figures 1-1 and 1-2. As can been seen in the figures, the District's historic level of investment in the water system exceeded the recommended level in 2013, but has fallen short over the last two years. The historic investment in the sewer system has also been less than recommended in recent year. The gap is projected to become larger and larger in future years unless increases to existing rates are made.

3. **Create a plan to transition from existing revenue to revenue adequate to support long-term system needs** – To close the gap between projected revenue from existing rates and recommended revenue for long-term system needs, it is recommended that existing rates be increased over the next several years. In most cases, it is preferable to raise rates gradually over time. In the District's case, however, it will be necessary to implement a few large increases over the next year or two in order to meet projected

O&M and debt service requirements. After the large increases are implemented, rates can remain fairly flat as shown in Figures 1-1 and 1-2. To generate the revenue shown in the budget plan in the figures, annual increases to existing rates will need to be as shown in Table 1-1.

Table 1-1
Recommended Annual Rate Increase for 10-Year Budget Plan

Year	Percent Rate Increase (Water)	Percent Rate Increase (Sewer)
2015	72.0%	70.0%
2016	4.0%	5.0%
2017	4.0%	1.0%
2018	4.0%	1.0%
2019	4.0%	1.0%
2020	4.0%	1.0%
2021	4.0%	1.0%
2022	4.0%	1.0%
2023	4.0%	1.0%
2024	4.0%	17.2%
2025	4.0%	1.0%

4. **Modify capital improvement expenditures to fit within the identified budget** – As noted previously, there is not much change that can be made to O&M or debt service expenditures. As a result, any modifications required to meet the recommended budget plan will need to come through capital improvement expenditures. The District has prepared capital improvement plans for both the water and sewer systems based on the results of master planning efforts and knowledge of District staff. These plans were used as a starting point to project future capital improvement expenditures in the District. Projects were then moved forward or back to fit within the available budget plan. The capital expenditures shown in Figures 1-1 and 1-2 represent the level of expenditures that can be supported by the budget plan. Included in the figures is a distinction between those projects that will be cash financed and those that will be bond financed. A detailed outline of available capital expenditures in each year is contained in the rate models described in subsequent chapters of this report.

   One project of special note is shown in 2023 of the sewer plan. This large project has been identified to build those facilities required to convey sewer from the north end of the District (Service Areas A and B) to the existing JSSD treatment plant. To pay for this project, the District will need to either secure a bond or some other form of financing. It is recommended that the District review its options with a bond professional to determine how to best proceed. For the purposes of this analysis, it has been assumed that the project will be financed with a 20-year bond. Recommended rates include required revenue to maintain typical debt service coverage ratios.

SECTION 2
WATER RATE ANALYSIS

In Section 1, a 10-year budget plan was developed for both the water and sewer systems. Based on this overall budget plan, detailed rates can now be calculated for each utility. The purpose of this chapter is to calculate detailed water rates for the next 6 years based on the overall budget plan.

This analysis focuses on four major tasks:

1. **Projecting Water Use:** Future water sales were estimated by examining current use patterns and by projecting water system growth for the next several years.
2. **Calculating Revenue Requirements:** Total revenue requirements for the system were projected for the next several years based on the budget plan outlined in Section 1. Non-rate revenue (including impact fee revenue) was deducted from the total to give the net revenue requirement to be recovered from rate payers.
3. **Cost Allocation:** This analysis generally follows the basic cost-of-service approach recommended by the American Water Works Association (AWWA).[1] The essential principle of this method is that "water rates and charges should be recovered from classes of customers in proportion to the cost of serving those customers."[2] To accomplish this goal, the system revenue requirements were allocated to four customer service characteristics: average day demand, peak day demand, billing & collection, and meters & services.
4. **Rate Design:** Rates were calculated to recover the allocated cost of service for each customer service characteristic based on a given rate structure. The report discusses three basic rate structures (uniform rates, seasonal rates, and increasing block rates) and develops detailed rates based on the District's existing rate structure.

The remainder of this report details the results of each of these four major tasks. Detailed rate tables from the model used to develop the rate recommendations are located in Appendix B.

KEY ASSUMPTIONS

The results presented in this report are based on the following assumptions:

1. The JSSD Water Fund will continue to be a self-funding, enterprise-type fund.
2. Customers will continue to be billed using the District's current residential customer class. Individual rates may need to be calculated for any customers with specific contractual obligations. It should also be noted that water reservation fees will continue to be charged.

[1] American Water Works Association. *Principles of Water Rates, Fees, and Charges: Manual M1*. 2000.
[2] *Ibid*, p. xix.

3. The study follows the basic recommended methodologies of AWWA in developing cost-of-service water rate options for consideration by JSSD. Only the "cash basis" approach has been used to allocate costs to users. The "cash basis" study methodology is summarized later in this report.
4. The District's current rate structure does include a water allowance of 10,000 gallons in the monthly base charge. It has been assumed this practice will continue.
5. This District is relatively new and has only limited water use data available to evaluate historic water use patterns. As a result, all projected water use in this study has been based on recent historic water use patterns with no reduction in use associated with conservation. Given the short planning window being looked at as part of this study, it is expected that this will not have a significant effect on overall revenues. However, conservation and future water use patterns should be looked at in more detail as additional data becomes available.

   Although additional water conservation will not be included in this study, rate increases and other changes in rate structures can have varying effects on conservation. In addition, factors outside of the rate structure can also have a significant effect on conservation. Possible factors affecting conservation include public education, changes in District ordinances, weather, and mandated water restrictions. Over the next several years, District personnel should monitor the effect of conservation on rate revenue and adjust rates if needed.
6. This rate study is based on projections of future water demands and projected system operation, maintenance, and improvement costs. These projections are based on current economic conditions and weather patterns over the last several years. Because conditions may change over time, it is recommended that JSSD review the rates annually and adjust them as needed to provide a revenue stream that will adequately fund operation and maintenance costs as well as needed capital improvements. It is also recommended that a comprehensive review and updating of water rates be undertaken in three to five years so that the basic analytical foundations of this study can be re-evaluated.

PROJECTING WATER USE

Historical Water Use

JSSD provides water service to almost 1,300 accounts, as summarized in Table 2-1. All customers have been shown under a single customer class identified as "Residential". This was done because detailed information regarding customer demographics was not available and it is known that the majority of the users are residential customers. Regardless of the type of user, it is expected that JSSD will continue to bill under a single customer class for the foreseeable future.

Table 2-1
2015 Account and Water Use Summary

Customer Class	Annual Use (kgal)	Accounts	Average Use per Account (kgal/year)
Residential	371,336	1,256	295.7
Total	**371,336**	**1,256**	**295.7**

Note: Number of accounts based on Jan 1, 2015.

Projected Accounts

JSSD has historically seen a wide range of growth rates depending on economic conditions in the area. Current master plan projections available from the District project growth of around 7 percent over the next 6 years. Due to the inconsistent growth within the District in recent years, more conservative growth projections have been used for this rate study. In this report, it has been assumed that growth will be 3.35 percent for the next 6 years and then be reduced to 3 percent for the following 4 years. Projected growth rates and accounts by customer type are summarized in Table 2-1. Included in the table is a summary of the total number of connections added each year. It should be noted that the number of connections is the same as the number of equivalent residential connections added each year.

Table 2-2
Projected Growth in System Accounts

	2016	2017	2018	2019	2020	2021
Customer Class	**3.35%**	**3.35%**	**3.35%**	**3.35%**	**3.35%**	**3.35%**
Residential	1,298	1,342	1,386	1,433	1,481	1,530
Total	**1,298**	**1,342**	**1,386**	**1,433**	**1,481**	**1,530**
Additional Connections/Year	*42*	*44*	*44*	*47*	*48*	*49*

Projected Water Use

Future water demands were projected by multiplying the average use per account in 2015 from Table 2-1 by the projected number of accounts in Table 2-2. Using this methodology, the projected growth in total water sales are shown in Table 2-3.

Table 2-3
Projected Growth in Water Sales

Customer Class	Average Use/Acct.	Amount (kgal/year)					
		2016	2017	2018	2019	2020	2021
Residential	295.7	383,771	396,622	409,903	423,628	437,814	452,474
Total		**383,771**	**396,622**	**409,903**	**423,628**	**437,814**	**452,474**

Peaking Characteristics

The peak day demand is the highest daily water demand during the year and was estimated based on projections contained in the Water System Master Plan. The system-wide peak day peaking factor is 2.2.

Demands by Water Use Block

JSSD currently uses an increasing block rate with an allowance for residential customers. Table 2-4 summarizes the District's current block structure and the historic use by block for existing customers. Block 1 consists of water use less than 10,000 gallons per month. Block 2 includes all water use above this amount. Projected use by block will be used to calculate how to distribute costs between the various blocks for future rate structures.

Table 2-4
Block Water Use by Residential Customers

Block Limits (kgal)		2015 Total Use by Block	
Block 1	**Block 2**	**Block 1**	**Block 2**
10	+	99,439	271,897
Percent Total Use		**26.8%**	**73.2%**

CALCULATING REVENUE REQUIREMENTS

There are two methods for determining a water utility's revenue requirements. One is called the Cash Basis of revenue requirements. The other method is called the Utility Basis of revenue requirements. The revenue requirements for each approach are summarized below.

	Cash Basis		**Utility Basis**
	Operation and Maintenance Costs		Operation and Maintenance Cost
Plus:	Debt Service	Plus:	Depreciation
	Cash-Financed Capital Outlays		Return on Investment
	Taxes (if applicable)		Taxes (if applicable)
	Net Additions to Reserves		
	Total Requirements		Total Requirements
Less:	Non-Rate Revenues	Less:	Non-Rate Revenues
Equals:	Net Requirements from Rates	Equals:	Net Requirements from Rates

The cash basis of revenue requirements is based on the actual cash expenditures of the system. Its goal is to make sure revenues match the cash needs of the system. In public utilities, this method generally matches the budgetary expenditures for the period. It has the additional advantage of being more understandable to most ratepayers and more directly meets any debt service coverage requirements that the system might need to comply with.

The utility basis approach simulates the financial requirements of private sector companies. It ensures that revenue requirements reflect the depreciation incurred by the system, as well as a return on the investment in rate base by system owners. In the municipal utility setting, the utility basis is most often used when there is significant utility service to customers outside the jurisdictional boundaries of the system owners, such as outside-District customers. It allows the system owners (i.e., inside-District customers) to earn a return from the investments to serve the outside-District customers. Because JSSD does not have any outside-District users, other than wholesale contracts, rates for this study were developed under the cash basis only.

Impact Fee Revenue

The projected impact fee revenue for the next six years is estimated to increase from about $138,000 a year to $214,000 a year as summarized in Table 2-5. It should be noted that JSSD will be receiving revenues from impact fees collected in North Village Special Service District (NVSSD) in order to purchase storage capacity and well production capacity from JSSD. The projected annual revenue from impact fees is based on the projected number of new accounts as discussed previously. For this analysis, it has been assumed that the District's future impact fee rates will be in accordance with the recommendations contained in the District's impact fee plan that is currently being completed. If the District does not adopt the recommended impact fees, the rates calculated in this report will need to be adjusted accordingly.

Table 2-5
Projected Impact Fee Revenue

Year	2016	2017	2018	2019	2020	2021
Annual Growth Rate	3.35%	3.35%	3.35%	3.35%	3.35%	3.35%
Projected NVSSD Impact Fee Revenue	$78,000	$91,000	$104,000	$117,000	$130,000	$143,000
Projected JSSD Impact Fee Revenue	$60,035	$62,045	$64,123	$66,270	$68,489	$70,783
Projected Total Impact Fee Revenue	**$138,035**	**$153,045**	**$168,123**	**$183,270**	**$198,489**	**$213,783**
Additional JSSD ERUs/Year	*42*	*43*	*45*	*46*	*48*	*50*

Non-Rate Revenue

The projected non-rate revenue for the District is summarized in Table 2-6. This revenue is the net income from activities not associated with water sales or impact fees. It may include hookup fees, interest revenue, fees, and water reserve. For accounting purposes, the District separates this income into operating and non-operating revenue.

Table 2-6
Projected Non-Rate Revenue

Item	Projected 2016	Projected 2017	Projected 2018	Projected 2019	Projected 2020	Projected 2021
Operating						
Penalty Revenue	$62,958	$66,955	$71,206	$75,727	$80,534	$85,647
Interest Revenue	$60,292	$63,111	$66,061	$69,148	$72,381	$75,764
TCSSD Maintenance Revenue	$303,493	$322,761	$343,251	$365,043	$388,218	$412,864
NVSSD Maintenance Revenue	$172,355	$183,297	$194,934	$207,309	$220,470	$234,467
SLSSD Maintenance Revenue	$0	$0	$0	$0	$0	$0
Hookup Fees	$22,461	$23,887	$25,403	$27,016	$28,731	$30,555
Shared Employee	$32,383	$33,355	$34,355	$35,386	$36,448	$37,541
Mine Maintenance Revenue	$77,250	$79,568	$81,955	$84,413	$86,946	$89,554
Snowmaking Revenue	$217,021	$223,532	$230,238	$237,145	$244,259	$251,587
Water Reservation	$2,618,869	$2,607,403	$2,595,552	$2,583,305	$2,570,647	$2,557,566
Total Operating Non-Rate Revenue	**$3,567,083**	**$3,603,867**	**$3,642,954**	**$3,684,491**	**$3,728,633**	**$3,775,544**
Non-Operating						
JSSD Impact Fees	$60,035	$62,045	$64,123	$66,270	$68,489	$70,783
Impact Fees paid from NVSSD	$78,000	$91,000	$104,000	$117,000	$130,000	$143,000
Total Non-Operating Non-Rate Revenue	**$138,035**	**$153,045**	**$168,123**	**$183,270**	**$198,489**	**$213,783**
Total Non-Rate Revenue	**$3,705,118**	**$3,756,912**	**$3,811,077**	**$3,867,761**	**$3,927,122**	**$3,989,326**

As can be seen in the table, the largest component of non-rate revenue received by the District comes through Water Reservation Fees. This is the revenue received from fees to potential future water users to reserve water supply in the District for their demand. As properties are developed and property owners begin using their water, water reservation fees will decrease.

District Expenditures

The projected District expenditures for the planning period are summarized in Table 2-7. Included in the table are the projected total costs for the three major categories of expenditures: operations and maintenance, debt service, and capital expenditures. Each of these categories is discussed in more detail in following sections.

Table 2-7
Projected Revenue Requirements

Item	2016	2017	2018	2019	2020	2021
O&M	$5,688,172	$5,948,266	$6,220,955	$6,506,880	$6,806,716	$7,121,173
Debt Services	$553,998	$553,998	$553,998	$553,998	$553,998	$553,998
Capital (Net of bond revenue)	$146,149	$138,618	$135,887	$138,585	$147,405	$163,100
Total Expenditures	**$6,388,318**	**$6,640,882**	**$6,910,840**	**$7,199,463**	**$7,508,118**	**$7,838,270**

Operation and Maintenance Costs

The projected operation and maintenance (O&M) costs for the District have been taken from the District's budget for 2015. A detailed list of all O&M budget categories is included as part of the rate model in Appendix B. Beyond 2015, it has been assumed that most of these O&M cost categories will increase at a rate equal to half the system growth rate in each year and an assumed inflation rate of 3.0 percent (e.g. budget growth in 2016 = 3.35%/2 + 3% = 4.675%). However, utilities and services have been assumed to grow at the full system growth rate plus inflation, while JSSD Water costs are anticipated to grow with inflation only.

Debt Service Costs

The projected debt service costs for the District have been taken from the District's bond payment schedule through 2021. A detailed list of all bond payments is included as part of the rate model in Appendix B.

Capital Improvement Costs

The projected capital improvement costs for the District have been taken from the District's 10-year capital improvement plan. A detailed list of all capital improvements is included as part of the rate model in Appendix B. As noted in Chapter 1, development of the 10-year capital improvement plan was an iterative process. Some individual projects were postponed to be able to fit the capital improvements within the available projected budget.

A few items should be noted regarding the capital improvements budget. First, included in the budget are some costs associated with future growth and system expansion (e.g. the 6800 Tank). The actual timing of these projects will be very dependent on future growth rates. For this reason, it has been assumed that these projects will be primarily funded through developer contributions which will allow them to subsequently be reimbursed through impact fees.

Second, included under the capital improvements budget is a section for the transfer of funds to or from the District's reserve fund. As noted in Chapter 1, the reserve fund is being used to smooth out total, overall capital expenditures in the District. There will be years in which excess funds are generated and added to the reserve, only to be drawn out in subsequent years for large projects.

COST ALLOCATIONS

A key step in a cost-of-service rate analysis is the allocation of costs to customer service characteristics. The allocation approach used in this rate update reflects the basic approaches recommended by the AWWA. The cost allocation method is the Base-Extra Capacity Method, which is one of the two methods specifically recognized by AWWA. Unlike the AWWA suggested approach, this update limits the analysis of peaking costs to peak day costs. It does not include peak hour costs as a customer service characteristic. This is because JSSD does not have any estimates of peak hour requirements. This variation is minor and does not materially affect the outcome of the analysis or the validity of the results. AWWA specifically recognizes

that utilities' circumstances may justify changes from the AWWA methods, and this is one such variation.

Customer Service Characteristics

Customer service characteristics are demands or other "services" that each customer receives. Specifically, the customer service characteristics considered in this rate study include:

- average demand,
- peak day demand,
- billing & collection, and
- meters & services.

The first step in allocating costs is to divide each of the District's revenue requirements into these four categories. This has been done in the water rate model (see Tables B-12 and B-13 of Appendix B). In each case, these allocations are based on information provided by JSSD personnel, professional engineering judgment, and knowledge of system operations. Table B-12 in Appendix B provides a division by customer service characteristics for O&M expenditures. Table B-13 in Appendix B provides the same information for capital and bonding expenditures.

To understand how this has been done, it may be useful to consider a few examples. As one example, the majority of costs for distribution pipelines (70 percent) are attributed to average day demand. This basically represents the cost of maintaining pipes and valves in the ground to provide water to system users. However, the size of the pipelines in the system must be larger than would be required to convey average flow, because of daily and seasonal fluctuations in system flow. Thus, a portion of the distribution budget (15 percent) has been allocated to peak demand to account for the increased costs of maintaining a larger system. An additional 15 percent has been allocated to cover the costs of meters and service lines.

In contrast to the distribution pipelines is the postage line item. Because this budget item is almost entirely associated with monthly billing, 100 percent is assigned to billing and collection. Each of the other revenue requirements has been divided among the customer service characteristic categories based on similar logic.

Using the percentages assigned to each budget category, the system revenue costs are distributed among the customer service characteristics. This is also shown in detail in the rate model. The total revenue requirement for each customer service characteristic is given in Table B-15 of Appendix B. Table B-16 of Appendix B shows the total cost allocation for each customer class.

RATE DESIGN

Projected revenues based on existing District water rates are shown in Table 2-8.

Table 2-8
Projected Revenue Based on Existing Water Rates

	2016	2017	2018	2019	2020	2021
Projected Revenue-Existing Rates	$5,265,118	$5,369,149	$5,477,301	$5,589,779	$5,706,802	$5,828,600
Projected Revenue Requirements	$6,388,318	$6,640,882	$6,910,840	$7,199,463	$7,508,118	$7,838,270
Projected Difference	**($1,123,200)**	**($1,271,733)**	**($1,433,539)**	**($1,609,684)**	**($1,801,316)**	**($2,009,670)**

As shown in the table, current water rates are inadequate to meet projected revenue requirements in any of the next six years. This table indicates an annual budget shortfall increasing from $1.12 million in 2016 to $2.01 million by 2021. Changes will need to be made to the existing rate structure to meet this shortfall. This section discusses potential rate options and then calculates a recommended rate structure that will meet projected revenue requirements.

Rate Structures

Water rates are commonly divided into two components: monthly base charges and volumetric charges. The monthly base charge is the amount charged to existing users to be connected to the system, regardless of the amount of water used. This is usually assessed based on meter size and may or may not include a monthly water allowance. Volumetric charges are those charges assessed based on the amount of water used by the customer.

Volumetric charges can be assessed using one of three general rate structures: uniform rates, seasonal rates, and block rates (both increasing and decreasing).

- **Uniform Rates –** A uniform rate structure charges the same for each gallon of water regardless of the amount of water used or time of year. Uniform rate structures are among the easiest rate structures to administer and understand. Unfortunately, they do little to encourage conservation.
- **Seasonal Rates –** A seasonal rate structure charges one rate during the winter and another rate during the summer. Generally, higher rates are charged during the summer months to account for the additional costs of producing water during times of peak demand. This also provides a financial incentive for users to conserve during the summer months. Unfortunately, it does little to encourage conservation during the winter months. However, this is not a major concern since the vast majority of water use and the greatest opportunity for conservation occurs during the summer months. Seasonal rates also have the advantage of being easy to understand and easy to implement.
- **Block Rates –** Block rates charge different amounts for each gallon of water depending on the total amount of water metered each month. For example, the first 10,000 gallons of water sold during a month may be charged at one rate, while any water in excess of

10,000 gallons is charged at a different rate. Blocks can increase with the amount of water sold as well as decrease. Since decreasing blocks generally discourage conservation, they will not be discussed further. In contrast, increasing block rates have the greatest potential of all rate structures for encouraging conservation. The greatest challenge with increasing block rates is that they are difficult to implement and administer fairly. Although one set of blocks could be developed to encourage conservation among family residential users, this same set of blocks might unfairly penalize a large commercial user.

Any of the above rate structures could be used to develop reasonable, cost-based rates that could be implemented by JSSD. They all generate the same revenues and meet the basic standards established by AWWA for equitable, cost-of-service approaches for rate development. Additionally, any combination of the rate structures could be used to develop an acceptable pricing policy for JSSD. Therefore, within this set of rates, a recommendation for any individual rate structure is based only on differences in objectives or concepts among the options.

The District currently implements a block rate structure with an allowance. An allowance is when a certain amount of water is provided at no additional charge as part of the monthly base rate. In JSSD's case, the first block of water use (up to 10,000 gallons) is included in the monthly base rate as shown in the following section. Including Block 1 water use in the monthly allowance is beneficial for the District as it guarantees the District a set amount of revenue. This provides some stability to the District while still allowing for higher water rates in Block 2 to encourage conservation amongst its users.

Calculated Cost-of-Service Rates

Following the AWWA cost-of-service methodology, basic rates for the District's block rate schedule were calculated as summarized in Table 2-9 (without consideration of the allowance). For ease of discussion, only rates for 1-inch meters are shown. Rates for additional meter sizes will be included in the final recommendations.

Table 2-9
Calculated Cost-of-Service Water Rates

	2016	2017	2018	2019	2020	2021
Monthly Base Rate w/ 10,000 gallon Allowance ($/month)	$36.98	$38.85	$40.77	$42.73	$44.74	$46.80
Block Rate 0-10,000 gal ($/kgal)	$4.37	$4.53	$4.70	$4.87	$5.06	$5.25
Block Rate 10,000 + gal ($/kgal)	$5.91	$6.13	$6.36	$6.60	$6.86	$7.11

A few conclusions can be made based on calculated cost-of-service rates:

- To meet the District's projected revenue requirements, rates will need to be increased significantly today and then will increase slightly over the next few years.

Recommended Rates

The cost-of-service rates summarized above provide a good starting point for developing recommended rates for the system. Before finalizing the rates, however, it is necessary to make a few adjustments to account for some of the practical limitations in the rate making process. Items to consider in developing final rates include:

1. **Monthly Water Allowance** – District personnel indicate that the current allowance of 10,000 gallons/month has been generally well accepted by customers. Although higher than the average monthly use, this current allowance appears to be working well to balance the District's need for rate stability while still encouraging wise water use. It is recommended that the allowance be maintained at its current level for the planning period, but that it be revisited in future rate studies.

   If the allowance is maintained at its current level, all Block 1 water costs will be absorbed into the monthly base rate. Based on historic Block 1 water use and the proposed allowance, the final recommended rates for the District are summarized in Table 2-10. Since all of Block 1 water falls under the allowance, only Block 2 rates are shown under the volumetric schedule.

Table 2-10
Recommended Water Rates

Monthly Base Rate ($/month)

Meter Size	2016	2017	2018	2019	2020	2021
1" and smaller	$65.81	$68.74	$71.78	$74.86	$78.12	$81.44
1 ½"	$87.31	$90.99	$94.84	$98.79	$102.97	$107.27
2"	$113.10	$117.69	$122.51	$127.50	$132.79	$138.27
3"	$173.28	$180.00	$187.09	$194.50	$202.38	$210.61
4"	$259.26	$269.00	$279.34	$290.22	$301.79	$313.95
6"	$474.21	$491.51	$509.96	$529.51	$550.32	$572.29
8"	$732.15	$758.52	$786.70	$816.66	$848.55	$882.30
10"	$1,033.07	$1,070.04	$1,109.57	$1,151.66	$1,196.48	$1,243.98
12"	$1,692.25	$1,752.41	$1,816.81	$1,885.48	$1,958.63	$2,036.24

Volume Rates ($/kgal)

	2016	2017	2018	2019	2020	2021
All use over 10,000 gallons/month						
Residential	$5.91	$6.13	$6.36	$6.60	$6.86	$7.11

2. **Reservation Fee** – The reservation fee charged by the District is for holding water for future development. It is not associated with the cost of operating and maintaining the system. As a result, the cost-of-service methodology used here is not applicable to the calculation of the reservation fee. For the purpose of his rate study, it was assumed that rate for the reservation fee will remain unchanged during the planning period.

SECTION 3
SEWER RATE ANALYSIS

In Section 1, a 10-year budget plan was developed for both the water and sewer systems. Based on this overall budget plan, detailed rates can now be calculated for each utility. The purpose of this chapter is to calculate detailed sewer rates for the next 6 years based on the overall budget plan. To accomplish this goal, this analysis focused on four major tasks:

1. **Projecting Wastewater Production:** Future wastewater production was estimated by examining current production patterns and by projecting sewer system growth for the next several years.

2. **Calculating Revenue Requirements:** Total revenue requirements for the system were projected for the next several years based on the budget plan outlined in Section 1. Non-rate revenue (including impact fee revenue) was deducted from the total to give the net revenue requirement to be recovered from rate payers.

3. **Cost Allocation:** This analysis generally followed the design cost-causative procedure recommended by the Water Pollution Control Federation (WPCF), American Society of Civil Engineers (ASCE), and American Public Works Association (APWA)[1]. The essential principle of this method is that wastewater revenue should be recovered from classes of customers in proportion to the cost of serving those customers.

4. **Wastewater Rate Design:** Wastewater rates were calculated to recover the allocated cost of service based on operation and maintenance costs and capital improvement plan costs. The report develops rates based on the District's existing rate structure.

The remainder of this report details the results of each of these four major tasks. Detailed rate tables from the model used to develop the rate recommendations are located in Appendix C.

KEY ASSUMPTIONS

The results presented in this report are based on the following assumptions:

1. The District operating fund will continue to be a self-funding enterprise fund.

2. The study follows the basic recommended methodologies of the joint publication, "Financing and Charges for Wastewater Systems". Only the "cash basis" approach has been used to allocate costs to users. The "cash basis" study methodology was summarized in Section 2 of this report.

3. This wastewater rate study is based on projections of future wastewater production and projected system operation, maintenance, and improvement costs. These projections are based on current economic conditions and wastewater use patterns. Because conditions may change over time, it is recommended that the District review the wastewater rates periodically and adjust them as needed to provide a revenue stream that will adequately

[1] Water Pollution Control Federation, American Society of Civil Engineers, and American Public Works Association. Financing and Charges for Wastewater Systems, 1984.

fund operation and maintenance costs as well as needed rehabilitation and replacement projects. It is also recommended that a comprehensive review and updating of wastewater rates be undertaken in three to five years so that the basic analytical foundations of this study can be reevaluated.

PROJECTING WASTEWATER PRODUCTION

Indoor Water Use

The District currently provides sewer service to approximately 1,236 accounts. For the purposes of this report, it has been assumed that winter water meter data can be used to estimate indoor water use. During the winter, irrigation demands are not present and metered water should be proportionate to wastewater production. Estimated indoor water use for the District in 2015 is summarized in Table 3-1. All customers have been shown under a single customer class identified as "Residential". This was done because detailed information regarding customer demographics was not available and it is known that the majority of the users are residential customers. Regardless of the type of user, it is expected that JSSD will continue to bill under a single customer class for the foreseeable future.

Table 3-1
2015 Indoor Water Use

Customer Class	Use	Accounts	Use per Account	Use/Acct. (kgal/month)
Residential	148,993	1,256	118.6	9.9
Total	**148,993**	**1,256**	**118.6**	**9.9**

Projected Accounts

JSSD has historically seen a wide range of growth rates depending on economic conditions in the area. Current master plan projections available from the District project growth of around 7 percent over the next 6 years. Due to the inconsistent growth within the District in recent years more conservative growth projections have been used for this rate study. In this report, it has been assumed that growth will be between 3 and 3.5 percent over the next 6 year. Projected growth rates are summarized in Table 3-2. Included in the table is a summary of the total number of connections added each year. It should be noted that the total number of connections is the same as the number of new ERU's.

Table 3-2
Projected Growth in System Accounts

	2016	2017	2018	2019	2020	2021
Customer Class	**3.35%**	**3.46%**	**3.25%**	**3.12%**	**3.05%**	**3.12%**
Residential	1,298	1,343	1,387	1,430	1,473	1,519
Additional Connections/year	*42*	*45*	*44*	*43*	*43*	*46*

Projected Indoor Water Use

Future water demands were projected by multiplying the average use per account in 2015 from Table 3-1 by the projected number of accounts in Table 3-2. Using this methodology, the projected growth in indoor water sales are shown in Table 3-3.

Table 3-3
Projected Growth in Indoor Water Sales

Customer Class	Average Use/Acct	Amount (kgal/year)					
		2016	2017	2018	2019	2020	2021
Residential	118.6	153,975	159,313	164,533	169,634	174,735	180,191
Total		**153,975**	**159,313**	**164,533**	**169,634**	**174,735**	**180,191**

Infiltration and Inflow

Infiltration and inflow is the intrusion of groundwater or stormwater into the sewer system through cracked pipes, broken and offset joints, improper connections, leaky manholes, etc. In areas with aging sewer lines and high groundwater, infiltration can actually be the largest component of flow being conveyed in the sewer. Infiltration is very difficult to measure because it varies across the service area based on climate conditions, water table levels, pipe diameter, and pipe condition. Because of the difficulty of identifying the source of infiltration, the District does not bill sewer accounts for infiltration directly. Thus, infiltration and inflow are not included in the rate model and billing flows are based on indoor water use only. However, total flow observed at the sewer plant (including infiltration and inflow) is used for calculation of total BOD and TSS loading as will be discussed subsequently.

Peaking Characteristics

Unlike water used for outdoor irrigation, indoor water use is relatively constant year round. As a result, the calculation of sewer rates does not need to consider peak day demands. However, sewer flow does tend to vary significantly over the course of a single day. Thus, the sewer rate model includes consideration of peak hour factors so that users with varying peaking rates can be assessed fairly. Unfortunately, there is no data available to isolate accurate peak hour factors for the District. Thus, based on State guidelines, a peaking factor of 2.5 has been used for all residential customers.

Strength Characteristics

Similar to peaking characteristics, there is no data currently available to isolate accurate wastewater strength characteristics for any individual customer class. Thus, a BOD concentration of 250 mg/L and a TSS concentration of 250 mg/L have been used for the purposes of this study (typical strength for residential customers based on measured strengths in similar systems). Additional consideration of strength for individual industrial users should be addressed when necessary. The total projected strength loadings for the District are summarized in Table 3-4.

Table 3-4
Projected Growth in Strength Loading

	Average Concentration (mg/L)	Amount (lbs/year)					
		2016	2017	2018	2019	2020	2021
BOD	250	335,856	347,499	358,884	370,010	381,137	393,039
TSS	250	335,856	347,499	358,884	370,010	381,137	393,039

CALCULATING REVENUE REQUIREMENTS

There are two methods for determining revenue requirements for a District as outlined in Section 2, the cash basis and utility basis. As with the water rate analysis, wastewater rates were developed under the cash basis only.

Impact Fee Revenue

The projected impact fee revenue for the next six years is estimated to increase from about $337,000 a year to $474,000 a year as summarized in Table 3-5. It should be noted that JSSD will be receiving impact fees from North Village Special Service District who is purchasing treatment capacity in the District. The projected annual revenue from impact fees is based on the projected number of new accounts as discussed previously. For this analysis, it has been assumed that the District's future impact fee rates will be in accordance with the recommendations contained in the District's impact fee plan that is currently being completed. If the District does not adopt the recommended impact fees, the rates calculated in this report will need to be adjusted accordingly.

Table 3-5
Projected Impact Fee Revenue

Year	2016	2017	2018	2019	2020	2021
Annual Growth Rate	3.34%	3.47%	3.28%	3.10%	3.01%	3.12%
Projected JSSD Impact Fee Revenue	$197,031	$211,105	$206,414	$201,722	$201,722	$215,796
Projected NVSSD Impact Fee Revenue	$140,737	$164,193	$187,649	$211,105	$234,561	$258,017
Total Projected Impact Fee Revenue	**$337,768**	**$375,298**	**$394,062**	**$412,827**	**$436,283**	**$473,813**
Additional JSSD ERUs/year	*42*	*45*	*44*	*43*	*43*	*46*

Non-Rate Revenue

The projected non-rate revenue for the District is summarized in Table 3-6. This revenue is the net income from activities not associated with sewer user rates or impact fees. It may include service charges, net interest income, fees, and tax revenue. For accounting purposes, the District separates this income into operating and non-operating revenue.

Table 3-6
Projected Non-Rate Revenue

Item	Projected 2016	Projected 2017	Projected 2018	Projected 2019	Projected 2020	Projected 2021
Operating						
Penalty Revenue	$15,740	$16,756	$17,803	$18,893	$20,036	$21,262
Interest Revenue	$15,073	$15,786	$16,516	$17,269	$18,050	$18,873
TCSSD Maintenance Revenue	$147,348	$156,866	$166,670	$176,869	$187,566	$199,044
NVSSD Maintenance Revenue	$78,737	$83,823	$89,062	$94,512	$100,228	$106,362
SLSSD Maintenance Revenue	$6,419	$6,612	$6,810	$7,014	$7,225	$7,441
Hookup Fees	$5,615	$5,978	$6,352	$6,740	$7,148	$7,585
Shared Employee	$8,096	$8,339	$8,589	$8,846	$9,112	$9,385
Inspection Fees	$1,648	$1,697	$1,748	$1,801	$1,855	$1,910
Total Operating Non-Rate Revenue	$278,676	$295,857	$313,550	$331,946	$351,219	$371,863
Non-Operating						
JSSD Impact Fees	$197,031	$211,105	$206,414	$201,722	$201,722	$215,796
Impact Fees from NVSSD	$140,737	$164,193	$187,649	$211,105	$234,561	$258,017
Total Non-Operating Non-Rate Revenue	$337,768	$375,298	$394,062	$412,827	$436,283	$473,813
Total Non-Rate Revenue	**$616,444**	**$671,154**	**$707,612**	**$744,773**	**$787,503**	**$845,676**

District Expenditures

The projected District expenditures for the planning period are summarized in Table 3-7. Included in the table are the projected total costs for the three major categories of expenditures: operations and maintenance, debt service, and capital expenditures. Each of these categories is discussed in more detail in following sections.

Table 3-7
Projected Revenue Requirements

Item	2016	2017	2018	2019	2020	2021
O&M	$1,101,088	$1,160,276	$1,221,048	$1,283,980	$1,349,583	$1,419,281
Debt Services	$63,493	$63,493	$63,493	$63,493	$63,493	$63,493
Capital (Net of bond revenue)	$140,322	$195,329	$203,244	$209,703	$219,627	$243,213
Total Expenditures	**$1,304,903**	**$1,419,098**	**$1,487,785**	**$1,557,176**	**$1,632,703**	**$1,725,987**

Operation and Maintenance Costs

The projected operation and maintenance (O&M) costs for the District have been taken from the District's budget for 2015. A detailed list of all O&M budget categories is included as part of the rate model in Appendix C. Beyond 2015, it has been assumed that Interest Revenue will increase at a rate equal to half the system growth rate in each year and an assumed inflation rate of 3.0 percent (e.g. budget growth in 2016 = 3.34%/2 + 3% = 4.67%). Inspection fees and shared employees are estimated to grow with inflation only. Penalty revenue, Maintenance revenue, and hookup fees are estimated to increase at the full rate of growth plus inflation.

Debt Service Costs

The projected debt service costs for the District have been taken from the District's bond payment schedule through 2021. A detailed list of all bond payments is included as part of the rate model in Appendix C.

Capital Improvement Costs

The projected capital improvement costs for the District have been taken from the District's 10-year capital improvement plan. A detailed list of all capital improvements is included as part of the rate model in Appendix C. As noted in Chapter 1, development of the 10-year capital improvement plan was an iterative process. Some individual projects were postponed to be able fit the capital improvements within the available projected budget.

A few items should be noted regarding the capital improvements budget. First, included in the budget are some costs associated with future growth and system expansion (e.g. the Keetley Lift Station). The actual timing of these projects will be very dependent on future growth rates. For this reason, it has been assumed that these projects will be primarily funded through developer contributions which will allow them to subsequently be reimbursed through impact fees.

Second, included under the capital improvements budget is a section for the transfer of funds to or from the District's reserve fund. As noted in Chapter 1, the reserve fund is being used to smooth out total, overall capital expenditures in the District. There will be years in which excess funds are generated and added to the reserve, only to be drawn out in subsequent years for large projects.

COST ALLOCATIONS

A key step in a cost-causative wastewater rate analysis is the allocation of costs to customer service characteristics. The allocation approach used in this study reflects the basic approaches recommended by WPCF, ASCE, and APWA. This approach recommends the allocation of costs into one of four cost allocation categories:

- **Volume costs –**Volume costs refer to costs that are determined by the volume of wastewater generated in the system. Costs associated with treatment at Heber Valley's wastewater reclamation facility and future treatment at the District's WWTP would fit under this category.

- **Capacity costs –**Capacity costs are costs determined by the peak wastewater production of system users. This category would include such items as the design and construction of major trunk lines since they are sized based on peak flow rates.

- **Strength costs –**Strength costs are those costs determined by biochemical oxygen demand (BOD) or total suspended solids (TSS) concentrations.

- **Customer related costs –**Finally, customer related costs are any costs independent of the quantity or quality of wastewater generated. This category is mostly limited to administrative services such as the cost of generating and sending out a bill each month.

Each of the revenue requirements discussed previously was divided between these four customer service characteristic categories. This has been done in the sewer rate model (see Tables C-12 and C-13 of Appendix C). In each case, these allocations are based on information provided by JSSD personnel, professional engineering judgment, and knowledge of system operations. Table C-12 in Appendix C provides a division by cost allocation category for O&M expenditures. Table C-13 in Appendix C provides the same information for capital and bonding expenditures.

To understand how this has been done, it may be useful to consider a few examples. Under the budget item for sewer only utilities, (50 percent) has been assigned to the volume cost category. This basically represents the cost of needed to operate the infrastructure and is proportional to the amount of waste put into the system by each customer. However, each customer is benefitting from the system and should pay a portion for use of the system as whole. Thus, a portion of the sewer only utility costs (50 percent) has been allocated to customers for use in the system.

Another example is the Heber Valley Treatment O&M budget item. This budget item has been divided between volume, strength, and customer costs. The total volume of wastewater is assumed to account for 20 percent of treatment costs. An additional 20 percent of treatment costs are from the total strength loading. The remaining 60 percent are associated to billing customers since much of the treatment plant costs are fixed, regardless of the amount of wastewater received each month. Each of the other revenue requirements has been divided among the customer service characteristic categories based on similar logic.

Using the percentages assigned to each budget category, the system revenue costs are distributed among the customer service characteristics. This is also shown in detail in the rate model. The total revenue requirement for each customer service characteristic is given in Table C-15 of Appendix C Table C-16 of Appendix C shows the total cost allocation for each customer class.

CURRENT WASTEWATER RATE STRUCTURE

Existing wastewater rates and projected revenue for each customer class are shown in Table 3-8. The monthly base administrative charge is the amount charged to existing users to be connected to the system, regardless of the amount of wastewater discharged. It should be noted that the District does not currently have a volumetric charge for wastewater and that a flat base rate is charged regardless of discharge.

Table 3-8
Existing Sewer Rates

Base Rate ($/month)	Existing
All Customers	$26.00

Total projected revenues based on existing District water rates are shown in Table 3-9. As can be seen in the table, current wastewater rates are inadequate to meet projected revenue requirements in any of the next six years. This table indicates an annual budget shortfall increasing from $283,000 in 2016 to $406,000 by 2021. Changes will need to be made to the existing rate structure to meet this shortfall. The following section discusses potential rate options and then calculates a recommended rate structure that will meet projected revenue requirements.

Table 3-9
Projected Revenue Based on Existing Sewer Rates

	2016	2017	2018	2019	2020	2021
Projected Revenue-Existing Rates	$1,021,420	$1,090,170	$1,140,356	$1,190,933	$1,247,079	$1,319,604
Projected Revenue Requirements	$1,304,903	$1,419,098	$1,487,785	$1,557,176	$1,632,703	$1,725,987
Projected Difference	**($283,483)**	**($328,928)**	**($347,429)**	**($366,243)**	**($385,624)**	**($406,383)**

CALCULATED COST-OF-SERVICE RATES

Following the recommended cost-of-service methodology, required rates to satisfy the District's projected revenue requirements were calculated as summarized in Table 3-10 (without consideration of the allowance). For ease of discussion, only rates for 1-inch meters are shown. Rates for additional meter sizes will be included in the final recommendations.

Table 3-10
Calculated Cost-of-Service Sewer Rates

Monthly Base Rate	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
All customers	$35.56	$37.57	$37.84	$38.10	$38.35	$38.61
Volume Rate	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
Volume Component						
All customers	*$1.11*	*$1.13*	*$1.16*	*$1.18*	*$1.21*	*$1.24*
Strength Component						
All customers	*$0.33*	*$0.34*	*$0.35*	*$0.36*	*$0.37*	*$0.38*
Total Volume Rate						
All customers	$1.44	$1.48	$1.51	$1.54	$1.58	$1.62

Monthly Base Rate	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
Industrial Surcharges	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
Volume Surcharge ($/kgal)	$1.11	$1.13	$1.16	$1.18	$1.21	$1.24
BOD Surcharge ($/lb)	$0.0801	$0.0822	$0.0843	$0.0866	$0.0890	$0.0913
TSS Surcharge($/lb)	$0.0801	$0.0822	$0.0843	$0.0866	$0.0890	$0.0913

A few conclusions can be made based on calculated cost-of-service rates:

- To meet the District's projected revenue requirements, rates will need to be increased significantly over the next two years. After that, rates can be held at approximately the same level for the next several years. However, cost of service allocations do show a slight drift in costs from monthly base rates to volume rates over time.

RECOMMENDED RATES

The cost-of-service rates summarized above provide a good starting point for developing recommended rates for the system. Before finalizing the rates, however, it is necessary to make a few adjustments to account for some of the practical limitations in the rate making process. Items to consider in developing final rates include:

1. **Wastewater Strength Data Availability -** For most customers in the District's system, there is no practical way of measuring strength on a regular basis. As a result, it does not make sense to charge current customers separately based on strength. However, the cost-of-service information documented above may be used to calculate equitable rates if the District ever has a request to provide service to an industrial or other high strength user.

2. **Rate Stability –** In general, it is preferable for at least some component of the wastewater charge to be based on the volume of water used. However, putting all costs into the monthly base rate does provide some additional revenue stability to the District and simplifies billing and collection. Given the magnitude of recommended rate changes over the next few years, the District has indicated a preference to continue forward with the same rate structure for this planning window, charging only a monthly base rate. In future rate studies, it is recommended that the District revisit this issue and consider adding a volumetric charge to its sewer rates.

Based on these consideration, recommended wastewater rates will be limited to a flat monthly base charge. The monthly base charge is the amount charged to existing users to be connected to the system, regardless of the amount of wastewater discharged. There will be no separate charges based on wastewater strength or volume of water used unless merited by specific circumstances. Following this approach, the recommended wastewater rates necessary to meet projected revenue requirements for the next six years are summarized in Table 3-11.

Table 3-11
Proposed JSSD Sewer Rates

Monthly Base Rate	2016	2017	2018	2019	2020	2021
Residential	$44.20	$46.41	$46.87	$47.34	$47.82	$48.29

SECTION 4
CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis contained in the previous sections of this report, BC&A would recommend the following actions:

Adopt the Recommended Rate Increases: It is recommended that the JSSD adopt the proposed rate increases as summarized below in Tables 4-1 and 4-2. These are aggressive increases over the next couple years, but are required to meet projected District revenue needs. After the initial large increases, much more modest increases (if any) are projected in subsequent years.

Table 4-1
Recommended Water Rates

Monthly Base Rate ($/month)

Meter Size	2016	2017	2018	2019	2020	2021
1" and smaller	$65.81	$68.74	$71.78	$74.86	$78.12	$81.44
1 ½"	$87.31	$90.99	$94.84	$98.79	$102.97	$107.27
2"	$113.10	$117.69	$122.51	$127.50	$132.79	$138.27
3"	$173.28	$180.00	$187.09	$194.50	$202.38	$210.61
4"	$259.26	$269.00	$279.34	$290.22	$301.79	$313.95
6"	$474.21	$491.51	$509.96	$529.51	$550.32	$572.29
8"	$732.15	$758.52	$786.70	$816.66	$848.55	$882.30
10"	$1,033.07	$1,070.04	$1,109.57	$1,151.66	$1,196.48	$1,243.98
12"	$1,692.25	$1,752.41	$1,816.81	$1,885.48	$1,958.63	$2,036.24

Volume Rates ($/kgal)

	2016	2017	2018	2019	2020	2021
All use over 10,000 gallons/month						
All Customers	$5.91	$6.13	$6.36	$6.60	$6.86	$7.11

Table 4-2
Recommended Sewer Rates

Monthly Base Rate	2016	2017	2018	2019	2020	2021
All Customers	$44.20	$46.41	$46.87	$47.34	$47.82	$48.29

For comparison purposes, Tables 4-3 and 4-4 shows the existing and proposed future rates for JSSD and other communities nearby. The tables show the average monthly bill that each municipality charges a residential connection for indoor water use and sewer respectively. Only indoor water use is shown because of significant variability in access to secondary water between the various providers.

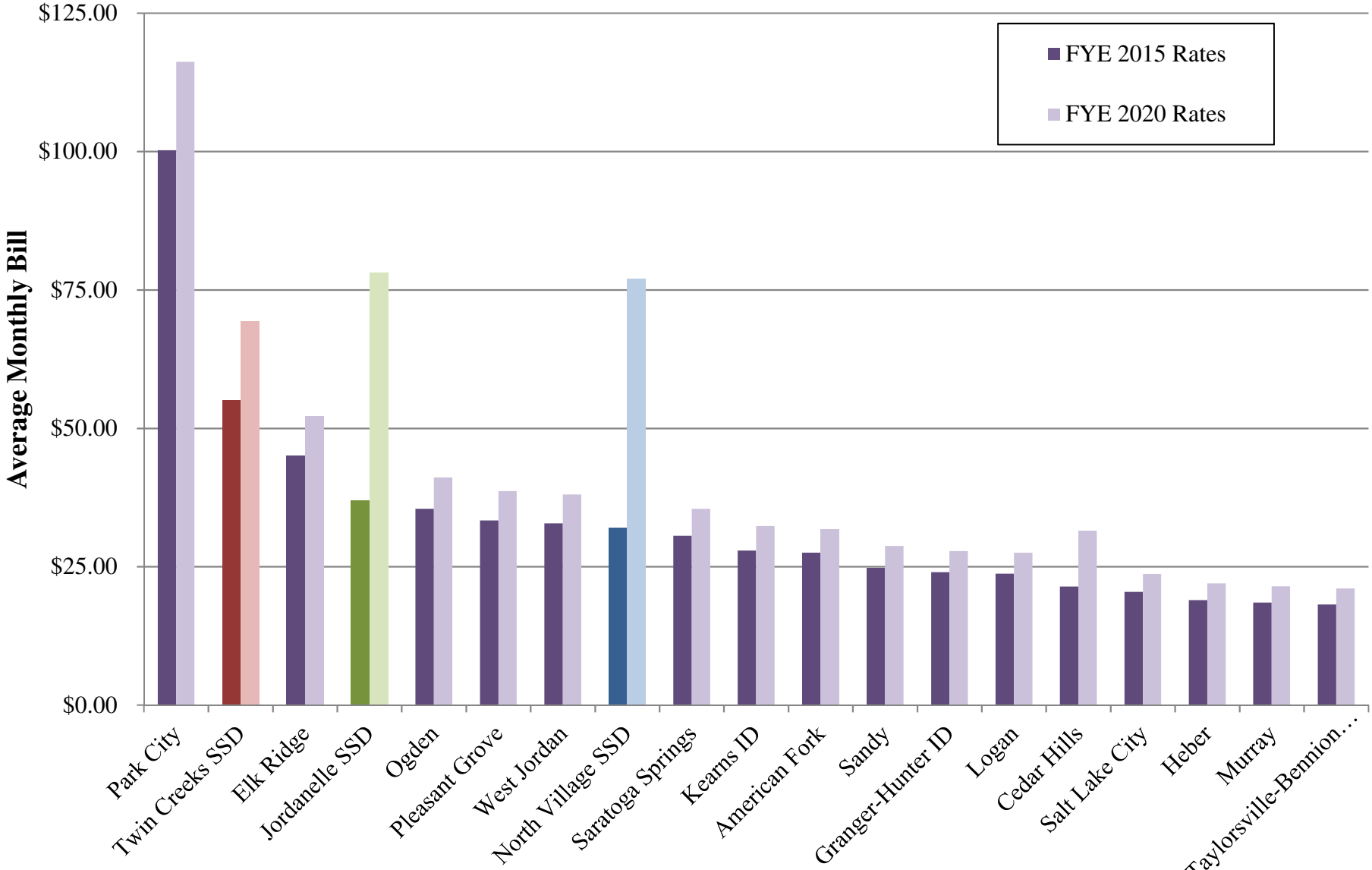
For JSSD, the future rate shown assumes the District adopts the rates recommended in this report. For Twin Creeks SSD and North Village SSD, the future rate includes proposed rates from their respective rate studies. For all other entities, future rates are simply based on a constant annual inflation of 3 percent. This likely underestimates future rates for most entities, but provides a starting point for comparison. This same information is shown graphically in Figures 4-1 and 4-2.

Table 4-3
Water Rate Comparison
(Indoor Water Use Only)

City	Cost per Average Connection[1] for FYE 2015	Cost per Average Connection for FYE 2020[2]
Park City	$100.22	$116.19
Twin Creeks SSD	$55.07	$69.32
Elk Ridge	$45.02	$52.19
Jordanelle SSD	$37.01	$78.12
Ogden	$35.47	$41.12
Pleasant Grove	$33.34	$38.65
West Jordan	$32.80	$38.03
North Village SSD	$32.00	$77.02
Saratoga Springs	$30.58	$35.45
Kearns ID	$27.88	$32.33
American Fork	$27.42	$31.79
Sandy	$24.78	$28.73
Granger-Hunter ID	$24.01	$27.83
Logan	$23.72	$27.50
Cedar Hills	$21.43	$31.48
Salt Lake City	$20.45	$23.71
Heber	$18.95	$21.97
Murray	$18.52	$21.47
Taylorsville-Bennion ID	$18.18	$21.08

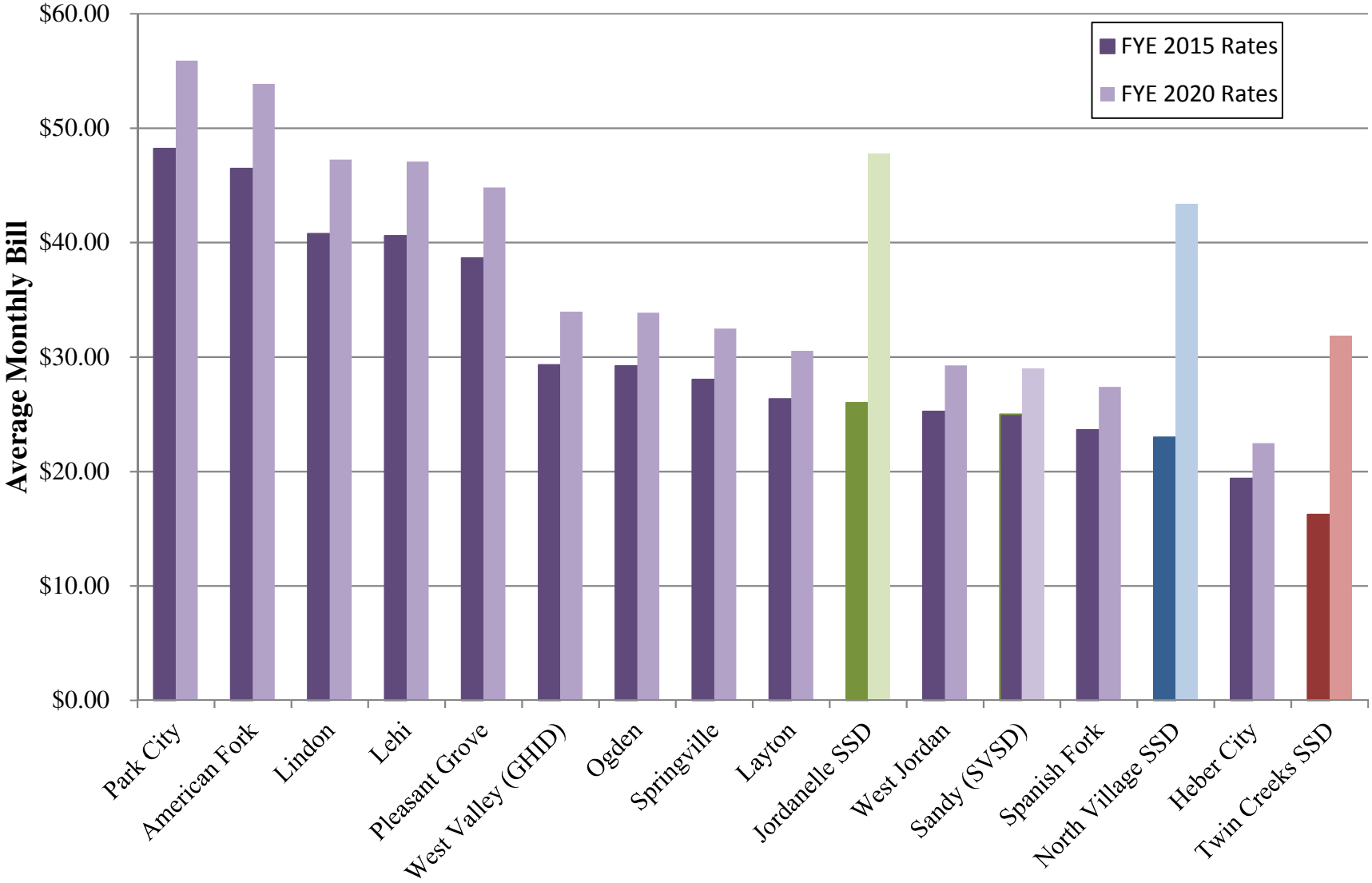
[1] Based on the average consumption for a JSSD connection
[2] JSSD, TCSSD, and NVSSD based on proposed rates. Assumes all other rates are inflated at 3.0% annually

Figure 4-1
Comparison of Monthly Water Rates, Average Customer Indoor Use



*Unless otherwise published, FYE 2020 rates based on annual increase to account for inflation only (3%)

Figure 4-2
Comparison of Annual Sewer Rates, Average Residential Customer



*FYE 2020 rates based on annual increase to account for inflation only (3%)

Table 4-4
Sewer Rate Comparison

City	Cost per Average Residential Connection[1] for FYE 2015	Cost per Average Residential Connection for FYE 2020[2]
Park City	$48.21	$55.89
American Fork	$46.47	$53.87
Lindon	$40.76	$47.25
Lehi	$40.60	$47.07
Pleasant Grove	$38.65	$44.80
West Valley (GHID)	$29.31	$33.98
Ogden	$29.21	$33.86
Springville	$28.03	$32.49
Layton	$26.34	$30.54
Jordanelle SSD	$26.00	$47.82
West Jordan	$25.25	$29.27
Sandy (SVSD)	$25.00	$28.98
Spanish Fork	$23.63	$27.39
North Village SSD	$23.00	$43.40
Heber City	$19.39	$22.48
Twin Creeks SSD	$16.24	$31.88

[1] Based on 7,000 gal/month indoor per average residential connection
[2] JSSD, TCSSD, and NVSSD based on proposed rates. Assumes all other rates are inflated at 3.0% annually

Based on this information, the following observations can be made regarding District rates compared to other entities:

- **Water –** As can be seen in the table, JSSD's current water rates are a little higher than average. With the proposed increases, the water rates will move toward the upper end of surveyed rates. While keeping rates as competitive as possible is a priority of the District, the magnitude of the proposed rates is not unexpected due to the large land area the District serves along with the significant elevation changes that require additional infrastructure. Even with the proposed increases, water rates will still be significantly less than Park City which has topography and service requirements that are similar to the District.
- **Sewer –**JSSD's current sewer rates are a little lower than average. With the proposed increases, the sewer rates will move to the top end of rates surveyed. As with water, sewer costs are expected to be higher than other communities due to the large land area the District serves along with the significant elevation changes which require additional

pumping and infrastructure. With the proposed increases, sewer rates will continue to be less than Park City which has topography and service requirements that are similar to the District.

Update This Rate Study Periodically: After the implementation of any change to the rate structure, we would suggest that the District monitor customer responses and demand patterns for a period of one year. Following this initial observation period, the change should be re-examined to determine if there should be any subsequent adjustments. A comprehensive review of this rate study should also be performed in three to five years. The projections, assumptions, and data contained in this report may need to be revised over time. For these reasons, it is prudent to update water and sewer rates to ensure they are sufficient to meet system requirements, as well as maintain cost-of-service equity in charges to customers.

APPENDIX A

10-YEAR BUDGET PLANS

Table A-1
10-Year Budget Plan Water

	Historic			Projected									
	Year			Year									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total ERUs	1,207	1231	1256	1298	1342	1386	1433	1481	1530	1576	1624	1672	1723
% Growth from Previous Year	-	2.03%	1.99%	3.35%	3.35%	3.35%	3.35%	3.35%	3.35%	3.00%	3.00%	3.00%	3.00%
Expenditures													
O&M	$4,800,121	$5,405,200	$5,440,064	$5,688,172	$5,948,266	$6,220,955	$6,506,880	$6,806,716	$7,121,173	$7,450,999	$7,796,984	$8,104,689	$8,425,080
Debt Service	$553,998	$553,998	$553,998	$553,998	$553,998	$553,998	$553,998	$553,998	$553,998	$553,998	$553,998	$553,998	$553,998
Total Capital Expenditures	$0	$0	$0	$0	$129,430	$0	$0	$46,371	$0	$0	$387,466	$348,374	$3,182,394
Total Expenditures	*$5,354,119*	*$5,959,198*	*$5,994,062*	*$6,242,170*	*$6,631,694*	*$6,774,953*	*$7,060,878*	*$7,407,085*	*$7,675,170*	*$8,004,997*	*$8,738,448*	*$9,007,061*	*$12,161,472*
Capital Expenditures from Bond Proceeds	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Capital Expenditures from Reserves	$0	$0	$0	$0	$129,430	$0	$0	$46,371	$0	$0	$387,466	$348,374	$3,182,394
Income													
Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Impact Fees	$0	$0	$34,989	$138,035	$153,045	$168,123	$183,270	$198,489	$213,783	$229,153	$242,595	$248,289	$262,970
Other Non-Rate	$ 2,656,515	$ 899,604	$902,502	$3,567,083	$3,603,867	$3,642,954	$3,684,491	$3,728,633	$3,775,544	$3,825,399	$3,878,386	$3,918,835	$3,960,498
Sales - Existing Rates	$ 4,900,093	$ 4,107,600	$ 4,004,500	$1,560,000	$1,612,237	$1,666,224	$1,722,018	$1,779,681	$1,839,274	$1,894,452	$1,951,286	$2,009,824	$2,070,119
Projected Income - Existing Rates	*$7,556,608*	*$5,007,204*	*$4,941,991*	*$5,265,118*	*$5,369,149*	*$5,477,301*	*$5,589,779*	*$5,706,802*	*$5,828,600*	*$5,949,004*	*$6,072,266*	*$6,176,948*	*$6,293,587*
System Investment Goal	$309,428	$324,995	$341,213	$362,875	$385,913	$410,413	$436,468	$464,177	$493,646	$523,264	$554,660	$587,940	$623,216
Recommended Long-term Level of Funding	$5,109,549	$5,730,195	$5,781,277	$6,051,047	$6,334,179	$6,631,368	$6,943,348	$7,270,893	$7,614,818	$7,974,264	$8,351,644	$8,692,629	$9,048,296
Recommended Rate Increases				72.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Sales Revenue With Increase	$4,900,093	$4,107,600	$4,004,500	$2,683,200	$2,883,970	$3,099,763	$3,331,702	$3,580,996	$3,848,944	$4,122,989	$4,416,545	$4,731,004	$5,067,851
Projected Income - Recommended Rates	$7,556,608	$5,007,204	$4,941,991	$6,388,318	$6,640,882	$6,910,840	$7,199,463	$7,508,118	$7,838,270	$8,177,541	$8,537,526	$8,898,127	$9,291,319

Table A-2
10-Year Budget Plan - Sewer

	Historic Year			Projected Year									
	FYE 2013	**FYE 2014**	**FYE 2015**	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**	FYE 2022	FYE 2023	FYE 2024	FYE 2025
Total ERUs	1,207	1,231	1,256	1,298	1,343	1,387	1,430	1,473	1,519	1,565	1,612	1,660	1,710
% Growth from Previous Year	-	2.03%	1.99%	3.34%	3.47%	3.28%	3.10%	3.01%	3.12%	3.00%	3.00%	3.00%	3.00%
Expenditures													
O&M	$948,322	$996,030	$1,045,736	$1,101,088	$1,160,276	$1,221,048	$1,283,980	$1,349,583	$1,419,281	$1,493,102	$1,568,207	$1,615,253	$1,663,711
Debt Service	$63,493	$63,493	$63,493	$63,493	$63,493	$63,493	$63,493	$63,493	$63,493	$63,493	$63,493	$384,898	$384,898
Total Capital Expenditures	$103,506	$0	$0	$0	$0	$0	$0	$46,371	$0	$0	$4,433,307	$0	$4,228,056
Total Expenditures	*$1,115,321*	*$1,059,523*	*$1,109,229*	*$1,164,581*	*$1,223,769*	*$1,284,541*	*$1,347,473*	*$1,459,447*	*$1,482,774*	*$1,556,596*	*$6,065,007*	*$2,000,151*	*$6,276,665*
Capital Expenditures from Bond Proceeds	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$4,200,000	$0	$0
Capital Expenditures from Reserves	$103,506	$0	$0	$0	$0	$0	$0	$46,371	$0	$0	$233,307	$0	$4,228,056
Income													
Connection Fees	$18,225	$34,400	$114,989	$337,768	$375,298	$394,062	$412,827	$436,283	$473,813	$503,743	$510,411	$517,279	$547,810
Other Non-Rate	$697,805	$260,271	$262,761	$278,676	$295,857	$313,550	$331,946	$351,219	$371,863	$393,895	$416,329	$428,818	$441,683
Sales - Existing Rates	$324,068	$359,800	$372,300	$404,976	$419,016	$432,744	$446,160	$459,576	$473,928	$488,146	$502,790	$517,874	$533,410
Projected Income - Existing Rates	*$1,040,098*	*$654,471*	*$750,050*	*$1,021,420*	*$1,090,170*	*$1,140,356*	*$1,190,933*	*$1,247,079*	*$1,319,604*	*$1,385,784*	*$1,429,530*	*$1,463,972*	*$1,522,903*
System Investment Goal	$212,881	$223,590	$234,748	$242,598	$251,009	$259,232	$267,269	$275,306	$283,903	$292,421	$301,193	$310,229	$319,536
Recommended Long-term Level of Funding	$1,161,203	$1,219,621	$1,280,484	$1,343,686	$1,411,285	$1,480,280	$1,551,249	$1,624,889	$1,703,184	$1,785,523	$1,869,400	$1,925,482	$1,983,247
Recommended Rate Increases				70.0%	5.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	17.2%	1.0%
Sales Revenue With Increase	$324,068	$359,800	$372,300	$688,459	$747,944	$780,173	$812,403	$845,200	$880,311	$915,787	$952,694	$1,150,278	$1,196,634
Projected Income - Recommended Rates	*$1,040,098*	*$654,471*	*$750,050*	*$1,304,903*	*$1,419,098*	*$1,487,785*	*$1,557,176*	*$1,632,703*	*$1,725,987*	*$1,813,426*	*$1,879,434*	*$2,096,376*	*$2,186,127*

APPENDIX B

DETAILED WATER RATE MODEL TABLES

Table B-1

Jordanell Special Service District - Water Rate Study
Historical Water Use
(kgal)

	2013			*2014*			*2015*				
Customer Class	**Use**	**Accounts**	**Use per Account**	**Use**	**Accounts**	**Use per Account**	**Use**	**Accounts**	**Use per Account**	**Planning Use/Acct.**	**Use/Acct. (kgal/month)**
All Customers	356,843	1,207	295.7	364,090	1,231	295.7	371,336	1,256	295.7	295.7	24.6
Water Reserve	0	7,755	0.0	0	7,755	0.0	0	7,975	0.0	0.0	0.0
Unused	0	0	0.0	0	0	0.0	0	0	0.0	0.0	0.0
Unused	0	0	0.0	0	0	0.0	0	0	0.0	0.0	0.0
Unused	0	0	0.0	0	0	0.0	0	0	0.0	0.0	0.0
Unused	0	0	0.0	0	0	0.0	0	0	0.0	0.0	0.0
Total	**356,843**	**8,962**	**39.8**	**364,090**	**8,986**	**40.5**	**371,336**	**9,231**	**40.2**	**40.2**	**3.4**
					1			1.028419084			
								27.48036982			

Table B-2

Jordanell Special Service District - Water Rate Study
Projected Accounts

		Number							
Customer Class		**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
	% Growth	**3.35%**	**3.35%**	**3.35%**	**3.35%**	**3.35%**	**3.35%**	**3.35%**	**3.35%**
All Customers		1,298	1,342	1,386	1,433	1,481	1,530	1,582	1,635
Water Reserve		7,942	7,907	7,871	7,834	7,796	7,756	7,715	7,672
Unused		0	0	0	0	0	0	0	0
Unused		0	0	0	0	0	0	0	0
Unused		0	0	0	0	0	0	0	0
Unused		0	0	0	0	0	0	0	0
Subtotal (Impact Fee Eligible)		7,942	7,907	7,871	7,834	7,796	7,756	7,715	7,672
Total		**9,240**	**9,248**	**9,257**	**9,267**	**9,276**	**9,286**	**9,297**	**9,307**
			1.000940844	1.000971434	1.001002989	1.001035536	1.001069104	1.001103724	1.001139425
			0.995621511	0.995454995	0.995281357	0.995100231	0.994911226	0.994713927	0.994507888

% Decreasing of Water Reserve	80%

Table B-3

Jordanell Special Service District - Water Rate Study
Projected Annual Water Use

	3-Year Avg.	**Amount (kgal)**							
Customer Class	**Use/Acct.**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
All Customers	295.7	383,771	396,622	409,903	423,628	437,814	452,474	467,625	483,284
Water Reserve	0.0	0	0	0	0	0	0	0	0
Unused	0.0	0	0	0	0	0	0	0	0
Unused	0.0	0	0	0	0	0	0	0	0
Unused	0.0	0	0	0	0	0	0	0	0
Unused	0.0	0	0	0	0	0	0	0	0
Total		**383,771**	**396,622**	**409,903**	**423,628**	**437,814**	**452,474**	**467,625**	**483,284**

Table B-4
Jordanell Special Service District - Water Rate Study
Peaking Factors

Customer Class	Max. Mo./ Avg. Mo.	Est. Peak Day Factor
All Customers	2.00	2.18
Water Reserve	0.00	-
Unused	0.00	-
Unused	0.00	-
Unused	0.00	-
Unused	0.00	-
System	2.00	2.18

System Peak Day to Average Day Factor	2.18

Table B-5
Jordanell Special Service District - Water Rate Study
Projected Water Peaking Characteristics

	Estimated Peak Day (kgal)						Excess Over Average (kgal)					
Customer Class	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
All Customers	2,294.02	2,370.84	2,450.23	2,532.27	2,617.07	2,704.70	1,242.60	1,284.20	1,327.21	1,371.65	1,417.58	1,465.05
Water Reserve	-	-	-	-	-	-	-	-	-	-	-	-
Unused	-	-	-	-	-	-	-	-	-	-	-	-
Unused	-	-	-	-	-	-	-	-	-	-	-	-
Unused	-	-	-	-	-	-	-	-	-	-	-	-
Unused	-	-	-	-	-	-	-	-	-	-	-	-
Total	**2,294.02**	**2,370.84**	**2,450.23**	**2,532.27**	**2,617.07**	**2,704.70**	**1,242.60**	**1,284.20**	**1,327.21**	**1,371.65**	**1,417.58**	**1,465.05**

Table B-6
Jordanell Special Service District - Water Rate Study
Block Water Use

All Customers

	Upper Block Limits (kgal)				FY 2011-2012 Total Use by Block			
Meter Size	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 1**	**Block 2**	**Block 3**	**Block 4**
3/4" and smaller	10	+	+	+	0	1	0.0	0.0
1"	10	+	+	+	0	0	0	0
1 1/2"	10	+	+	+	0	0	0	0
2"	10	+	+	+	0	0	0	0
3"	10	+	+	+	0	0	0	0
4"	10	+	+	+	0	0	0	0
6"	10	+	+	+	0	0	0	0
8"	10	+	+	+	0	0	0	0
10"	10	+	+	+	0	0	0	0
Total	**--**	**--**	**--**	**--**	**0.3**	**0.7**	**0.0**	**0.0**
Percentage of Total Use	**--**	**--**	**--**	**--**	**26.8%**	**73.2%**	**0.0%**	**0.0%**

Table B-7
Jordanell Special Service District - Water Rate Study
Meters and Equivalent Meters

Meters **2015**

	Size (Inches)									
Customer Class	**1 and smaller**	**1 1/2**	**2**	**3**	**4**	**6**	**8**	**10**	**12**	**Total**
All Customers	1,256	0	0	0	0	0	0	0	0	1,256
Water Reserve	0	0	0	0	0	0	0	0	0	0
Total	**1,256**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1,256**
% of Total	**100.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**100.0%**

AWWA Equiv. Meter Ratios	1.0	1.3	2.1	7.9	10.0	15.0	20.7	28.6	36.4

Equivalent Meters

	Size (Inches)									
Customer Class	**1 and smaller**	**1 1/2**	**2**	**3**	**4**	**6**	**8**	**10**	**12**	**Total**
All Customers	1,256	0	0	0	0	0	0	0	0	1,256
Water Reserve	0	0	0	0	0	0	0	0	0	0
Total	**1,256**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1,256**
% of Total	**100.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**100.0%**

Table B-8
Jordanell Special Service District - Water Rate Study
Projected Number of Equivalent Meters by Size

Customer Class	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
All Customers	1,298	1,342	1,386	1,433	1,481	1,530
Water Reserve	0	0	0	0	0	0
Total	**1,298**	**1,342**	**1,386**	**1,433**	**1,481**	**1,530**

Table B-9
Jordanell Special Service District - Water Rate Study
Connection Fee Revenue

Size of Meter	Impact Fee	Projected 2015	Projected 2016	Projected 2017	Projected 2018	Projected 2019	Projected 2020	Projected 2021
3/4 and smaller	$1,427		$60,035	$62,045	$64,123	$66,270	$68,489	$70,783
Total Impact Fee Revenue		$34,988.74	**$60,035**	**$62,045**	**$64,123**	**$66,270**	**$68,489**	**$70,783**

Table B-10
Jordanell Special Service District - Water Rate Study
Non-Rate Revenue (Including Connection Fees)

Assumed Inflation Rate = 3.0% **Assumed Water Portion of Overhead =** 80.0%

Item		Projected 2015	Projected 2016	Projected 2017	Projected 2018	Projected 2019	Projected 2020	Projected 2021
Operations								
Penalty Revenue	$ 74,000	$59,200	$62,958	$66,955	$71,206	$75,727	$80,534	$85,647
Interest Revenue	$ 72,000	$57,600	$60,292	$63,111	$66,061	$69,148	$72,381	$75,764
TCSSD Maintenance Revenue	$ 216,000	$285,376	$303,493	$322,761	$343,251	$365,043	$388,218	$412,864
NVSSD Maintenance Revenue		$162,066	$172,355	$183,297	$194,934	$207,309	$220,470	$234,467
SLSSD Maintenance Revenue	$ 6,000	$0	$0	$0	$0	$0	$0	$0
Hookup Fees	$ 26,400	$21,120	$22,461	$23,887	$25,403	$27,016	$28,731	$30,555
Laboratory Fees	$ -	$0	$0	$0	$0	$0	$0	$0
Shared Employee	$ 39,300	$31,440	$32,383	$33,355	$34,355	$35,386	$36,448	$37,541
Mine Maintenance Revenue	$ 75,000	$75,000	$77,250	$79,568	$81,955	$84,413	$86,946	$89,554
Snowmaking Revenue	$ 210,700	$210,700	$217,021	$223,532	$230,238	$237,145	$244,259	$251,587
Water Reservation		$0	$2,618,869	$2,607,403	$2,595,552	$2,583,305	$2,570,647	$2,557,566
Total Operations Non-Rate Revenue		$902,502	$3,567,083	$3,603,867	$3,642,954	$3,684,491	$3,728,633	$3,775,544
Expansion and Replacement								
Impact Fees paid from NVSSD	$ -	$0	$78,000	$91,000	$104,000	$117,000	$130,000	$143,000
Inspection Fees	$ -	$0	$0	$0	$0	$0	$0	$0
JSSD Impact Fees		$34,989	$60,035	$62,045	$64,123	$66,270	$68,489	$70,783
Total Expansion Non-Rate Revenue		**$34,989**	**$138,035**	**$153,045**	**$168,123**	**$183,270**	**$198,489**	**$213,783**
Total Non-Rate Revenue		**$937,491**	**$3,705,118**	**$3,756,912**	**$3,811,077**	**$3,867,761**	**$3,927,122**	**$3,989,326**

Table B-11
Jordanell Special Service District - Water Rate Study
Revenue Requirements
Cash Basis

Item			2015	Projected 2016	Projected 2017	Projected 2018	Projected 2019	Projected 2020	Projected 2021
O&M	Total Expense	Water Only							
Travel	25900		$20,720	$21,689	$22,702	$23,763	$24,874	$26,037	$27,254
Training/Conferences	17800		$14,240	$14,906	$15,602	$16,332	$17,095	$17,894	$18,731
Utilities	458900		$367,120	$390,427	$415,213	$441,573	$469,607	$499,420	$531,126
Water Only Utilities	396400		$396,400	$421,566	$448,329	$476,791	$507,061	$539,252	$573,486
Phones	32000		$25,600	$26,797	$28,049	$29,360	$30,733	$32,169	$33,673
Employee Wages/Benefits	2069500		$1,655,600	$1,732,987	$1,813,992	$1,898,783	$1,987,537	$2,080,440	$2,177,685
Legal Fees	600000		$480,000	$502,437	$525,922	$550,505	$576,237	$603,172	$631,366
JSSD Water	1387700		$1,387,700	$1,429,331	$1,472,211	$1,516,377	$1,561,869	$1,608,725	$1,656,986
Bank Charges	10200		$8,160	$8,786	$9,460	$10,187	$10,968	$11,810	$12,716
Miscellaneous Expense	4000		$3,200	$3,350	$3,506	$3,670	$3,842	$4,021	$4,209
Supplies	146800		$117,440	$122,929	$128,676	$134,690	$140,986	$147,576	$154,474
Water Only Supplies	403100		$403,100	$421,942	$441,665	$462,309	$483,919	$506,539	$530,216
Postage	1200		$960	$1,005	$1,052	$1,101	$1,152	$1,206	$1,263
Equipment and maintenance	86600		$69,280	$72,518	$75,908	$79,456	$83,170	$87,058	$91,127
Services	300880		$240,704	$255,985	$272,237	$289,520	$307,900	$327,447	$348,235
Heber Valley Treatment Costs	196120		$0	$0	$0	$0	$0	$0	$0
Insurance-Liability	192800		$154,240	$161,450	$168,996	$176,896	$185,164	$193,819	$202,879
Vehicle Expense	89500		$71,600	$74,947	$78,450	$82,117	$85,955	$89,973	$94,179
Depreciation Expense	0		$0	$0	$0	$0	$0	$0	$0
Debt Service Fees	30000		$24,000	$25,122	$26,296	$27,525	$28,812	$30,159	$31,568
Total O&M			**$5,440,064**	**$5,688,172**	**$5,948,266**	**$6,220,955**	**$6,506,880**	**$6,806,716**	**$7,121,173**
Debt Service									
Cert of Part 2003 AB	$317,466		$253,973	$253,973	$253,973	$253,973	$253,973	$253,973	$253,973
JSSD Wtr & Swr 2009	$300,025		$300,025	$300,025	$300,025	$300,025	$300,025	$300,025	$300,025
Total Debt Service			**$553,998**	**$553,998**	**$553,998**	**$553,998**	**$553,998**	**$553,998**	**$553,998**
Capital Improvements									
Growth Related									
PS-2	$ 122,000		$0	$0	$129,430	$0	$0	$0	$0
-	$ 40,000		$0	$0	$0	$0	$0	$46,371	$0
PS-3	$ 305,869		$0	$0	$0	$0	$0	$0	$0
T-2	$ 2,368,000		$0	$0	$0	$0	$0	$0	$0
ST-1	$ 267,000		$0	$0	$0	$0	$0	$0	$0
R&R of Existing System									
Unused			$0	$0	$0	$0	$0	$0	$0
Bond Revenue									
				$0	$0	$0	$0	$0	$0
				$0	$0	$0	$0	$0	$0
				$146,149	$9,189	$135,887	$138,585	$101,034	$163,100
Total Capital Outlays			**$0**	**$146,149**	**$138,618**	**$135,887**	**$138,585**	**$147,405**	**$163,100**
Gross Revenue Requirements			**$5,994,062**	**$6,388,318**	**$6,640,882**	**$6,910,840**	**$7,199,463**	**$7,508,118**	**$7,838,270**
LESS:									
Operations Non-Rate Revenue			$902,502	$3,567,083	$3,603,867	$3,642,954	$3,684,491	$3,728,633	$3,775,544
Expansion Non-Rate Revenue			$34,989	$138,035	$153,045	$168,123	$183,270	$198,489	$213,783
Net Revenue Requirements			**$ 5,056,571**	**$ 2,683,200**	**$ 2,883,970**	**$ 3,099,763**	**$ 3,331,702**	**$ 3,580,996**	**$ 3,848,944**

Table B-12
Jordanell Special Service District - Water Rate Study
Cost Allocation Percentages to Service Characteristics

Item	Average Demand	Peak Day	Billing & Collection	Meters & Services	Total
O&M					
Travel	60%	10%	15%	15%	100%
Training/Conferences	60%	10%	15%	15%	100%
Utilities	60%	15%	10%	15%	100%
Water Only Utilities	75%	25%	0%	0%	100%
Phones	60%	10%	15%	15%	100%
Employee Wages/Benefits	50%	10%	20%	20%	100%
Legal Fees	60%	10%	15%	15%	100%
JSSD Water	70%	30%	0%	0%	100%
Bank Charges	60%	10%	15%	15%	100%
Miscellaneous Expense	60%	10%	15%	15%	100%
Supplies	60%	10%	15%	15%	100%
Water Only Supplies	60%	10%	15%	15%	100%
Postage	0%	0%	100%	0%	100%
Equipment and maintenance	60%	10%	15%	15%	100%
Services	60%	10%	15%	15%	100%
Heber Valley Treatment Costs	60%	10%	15%	15%	100%
Insurance-Liability	60%	10%	15%	15%	100%
Vehicle Expense	60%	10%	15%	15%	100%
Depreciation Expense	60%	10%	15%	15%	100%
Debt Service Fees	60%	10%	15%	15%	100%

Table B-13
Jordanell Special Service District - Water Rate Study
Fixed Assets Allocations to Service Characteristics

	Percent						*Allocated Amount*				
Item	Assets	Average Demand	Peak Day	Billing & Collection	Meters & Services	Total	Average Demand	Peak Day	Billing & Collection	Meters & Services	Total
Construction in Progress	$0	70.0%	10.0%	5.0%	15.0%	100%	$0	$0	$0	$0	$0
Land\Easements	$0	70.0%	10.0%	5.0%	15.0%	100%	$0	$0	$0	$0	$0
Office Equipment	$97,058	0.0%	0.0%	50.0%	50.0%	100%	$0	$0	$48,529	$48,529	$97,058
Transmission & Distribution	$2,364,556	70.0%	15.0%	0.0%	15.0%	100%	$1,655,189	$354,683	$0	$354,683	$2,364,556
Equipment	$97,058	70.0%	15.0%	0.0%	15.0%	100%	$67,941	$14,559	$0	$14,559	$97,058
Meters	$20,905	0.0%	0.0%	0.0%	100.0%	100%	$0	$0	$0	$20,905	$20,905
Vehicles	$79,788	50.0%	10.0%	15.0%	25.0%	100%	$39,894	$7,979	$11,968	$19,947	$79,788
Red Ledges	$24,275,714	70.0%	15.0%	0.0%	15.0%	100%	$16,993,000	$3,641,357	$0	$3,641,357	$24,275,714
Supply	$2,599,660	70.0%	10.0%	0.0%	20.0%	100%	$1,819,762	$259,966	$0	$519,932	$2,599,660
Unused	$0	70.0%	10.0%	0.0%	20.0%	100%	$0	$0	$0	$0	$0

Table B-14
Jordanell Special Service District - Water Rate Study
Allocation of O&M Costs to Service Characteristics

	2016					2017					2018					2019					2020					2021				
Item	**Average Demand**	**Peak Day**	**Billing & Collection**	**Meters & Services**	**Total**	**Average Demand**	**Peak Day**	**Billing & Collection**	**Meters & Services**	**Total**	**Average Demand**	**Peak Day**	**Billing & Collection**	**Meters & Services**	**Total**	**Average Demand**	**Peak Day**	**Billing & Collection**	**Meters & Services**	**Total**	**Average Demand**	**Peak Day**	**Billing & Collection**	**Meters & Services**	**Total**	**Average Demand**	**Peak Day**	**Billing & Collection**	**Meters & Services**	**Total**
O&M																													
Travel	$13,013	$2,169	$3,253	$3,253	$21,689	$13,621	$2,270	$3,405	$3,405	$22,702	$14,258	$2,376	$3,565	$3,565	$23,763	$14,925	$2,487	$3,731	$3,731	$24,874	$15,622	$2,604	$3,906	$3,906	$26,037	$16,352.37	$2,725	$4,088	$4,088	$27,254
Training/Conferences	$8,943	$1,491	$2,236	$2,236	$14,906	$9,361	$1,560	$2,340	$2,340	$15,602	$9,799	$1,633	$2,450	$2,450	$16,332	$10,257	$1,710	$2,564	$2,564	$17,095	$10,736	$1,789	$2,684	$2,684	$17,894	$11,238.31	$1,873	$2,810	$2,810	$18,731
Utilities	$234,256	$58,564	$39,043	$58,564	$390,427	$249,128	$62,282	$41,521	$62,282	$415,213	$264,944	$66,236	$44,157	$66,236	$441,573	$281,764	$70,441	$46,961	$70,441	$469,607	$299,652	$74,913	$49,942	$74,913	$499,420	$318,675.46	$79,669	$53,113	$79,669	$531,126
Water Only Utilities	$316,174	$105,391	$0	$0	$421,566	$336,247	$112,082	$0	$0	$448,329	$357,593	$119,198	$0	$0	$476,791	$380,295	$126,765	$0	$0	$507,061	$404,439	$134,813	$0	$0	$539,252	$430,114.64	$143,372	$0	$0	$573,486
Phones	$16,078	$2,680	$4,019	$4,019	$26,797	$16,829	$2,805	$4,207	$4,207	$28,049	$17,616	$2,936	$4,404	$4,404	$29,360	$18,440	$3,073	$4,610	$4,610	$30,733	$19,301	$3,217	$4,825	$4,825	$32,169	$20,203.70	$3,367	$5,051	$5,051	$33,673
Employee Wages/Benefits	$866,494	$173,299	$346,597	$346,597	$1,732,987	$906,996	$181,399	$362,798	$362,798	$1,813,992	$949,391	$189,878	$379,757	$379,757	$1,898,783	$993,769	$198,754	$397,507	$397,507	$1,987,537	$1,040,220	$208,044	$416,088	$416,088	$2,080,440	$1,088,842.67	$217,769	$435,537	$435,537	$2,177,685
Legal Fees	$301,462	$50,244	$75,365	$75,365	$502,437	$315,553	$52,592	$78,888	$78,888	$525,922	$330,303	$55,050	$82,576	$82,576	$550,505	$345,742	$57,624	$86,436	$86,436	$576,237	$361,903	$60,317	$90,476	$90,476	$603,172	$378,819.39	$63,137	$94,705	$94,705	$631,366
JSSD Water	$1,000,532	$428,799	$0	$0	$1,429,331	$1,030,548	$441,663	$0	$0	$1,472,211	$1,061,464	$454,913	$0	$0	$1,516,377	$1,093,308	$468,561	$0	$0	$1,561,869	$1,126,107	$482,617	$0	$0	$1,608,725	$1,159,890.46	$497,096	$0	$0	$1,656,986
Bank Charges	$5,272	$879	$1,318	$1,318	$8,786	$5,676	$946	$1,419	$1,419	$9,460	$6,112	$1,019	$1,528	$1,528	$10,187	$6,581	$1,097	$1,645	$1,645	$10,968	$7,086	$1,181	$1,771	$1,771	$11,810	$7,629.80	$1,272	$1,907	$1,907	$12,716
Miscellaneous Expense	$2,010	$335	$502	$502	$3,350	$2,104	$351	$526	$526	$3,506	$2,202	$367	$551	$551	$3,670	$2,305	$384	$576	$576	$3,842	$2,413	$402	$603	$603	$4,021	$2,525.46	$421	$631	$631	$4,209
Supplies	$73,758	$12,293	$18,439	$18,439	$122,929	$77,205	$12,868	$19,301	$19,301	$128,676	$80,814	$13,469	$20,204	$20,204	$134,690	$84,592	$14,099	$21,148	$21,148	$140,986	$88,546	$14,758	$22,136	$22,136	$147,576	$92,684.48	$15,447	$23,171	$23,171	$154,474
Water Only Supplies	$253,165	$42,194	$63,291	$63,291	$421,942	$264,999	$44,166	$66,250	$66,250	$441,665	$277,386	$46,231	$69,346	$69,346	$462,309	$290,351	$48,392	$72,588	$72,588	$483,919	$303,923	$50,654	$75,981	$75,981	$506,539	$318,129.36	$53,022	$79,532	$79,532	$530,216
Postage	$0	$0	$1,005	$0	$1,005	$0	$0	$1,052	$0	$1,052	$0	$0	$1,101	$0	$1,101	$0	$0	$1,152	$0	$1,152	$0	$0	$1,206	$0	$1,206	$0.00	$0	$1,263	$0	$1,263
Equipment and maintenance	$43,511	$7,252	$10,878	$10,878	$72,518	$45,545	$7,591	$11,386	$11,386	$75,908	$47,674	$7,946	$11,918	$11,918	$79,456	$49,902	$8,317	$12,476	$12,476	$83,170	$52,235	$8,706	$13,059	$13,059	$87,058	$54,676.26	$9,113	$13,669	$13,669	$91,127
Services	$153,591	$25,599	$38,398	$38,398	$255,985	$163,342	$27,224	$40,835	$40,835	$272,237	$173,712	$28,952	$43,428	$43,428	$289,520	$184,740	$30,790	$46,185	$46,185	$307,900	$196,468	$32,745	$49,117	$49,117	$327,447	$208,941.10	$34,824	$52,235	$52,235	$348,235
Heber Valley Treatment Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.00	$0	$0	$0	$0
Insurance-Liability	$96,870	$16,145	$24,217	$24,217	$161,450	$101,398	$16,900	$25,349	$25,349	$168,996	$106,137	$17,690	$26,534	$26,534	$176,896	$111,098	$18,516	$27,775	$27,775	$185,164	$116,292	$19,382	$29,073	$29,073	$193,819	$121,727.30	$20,288	$30,432	$30,432	$202,879
Vehicle Expense	$44,968	$7,495	$11,242	$11,242	$74,947	$47,070	$7,845	$11,767	$11,767	$78,450	$49,270	$8,212	$12,318	$12,318	$82,117	$51,573	$8,596	$12,893	$12,893	$85,955	$53,984	$8,997	$13,496	$13,496	$89,973	$56,507.23	$9,418	$14,127	$14,127	$94,179
Depreciation Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.00	$0	$0	$0	$0
Debt Service Fees	$15,073	$2,512	$3,768	$3,768	$25,122	$15,778	$2,630	$3,944	$3,944	$26,296	$16,515	$2,753	$4,129	$4,129	$27,525	$17,287	$2,881	$4,322	$4,322	$28,812	$18,095	$3,016	$4,524	$4,524	$30,159	$18,940.97	$3,157	$4,735	$4,735	$31,568
Total	**$3,445,169**	**$937,339**	**$643,573**	**$662,090**	**$5,688,172**	**$3,601,400**	**$977,174**	**$674,992**	**$694,701**	**$5,948,266**	**$3,765,191**	**$1,018,858**	**$707,964**	**$728,942**	**$6,220,955**	**$3,936,929**	**$1,062,486**	**$742,569**	**$764,897**	**$6,506,880**	**$4,117,022**	**$1,108,155**	**$778,887**	**$802,652**	**$6,806,716**	**$4,305,899**	**$1,155,967**	**$817,006**	**$842,300**	**$7,121,173**
Percent	**60.6%**	**16.5%**	**11.3%**	**11.6%**	**100.0%**	**60.5%**	**16.4%**	**11.3%**	**11.7%**	**100.0%**	**60.5%**	**16.4%**	**11.4%**	**11.7%**	**100.0%**	**60.5%**	**16.3%**	**11.4%**	**11.8%**	**100.0%**	**60.5%**	**16.3%**	**11.4%**	**11.8%**	**100.0%**	**60.5%**	**16.2%**	**11.5%**	**11.8%**	**100.0%**

Table B-15
Jordanell Special Service District - Water Rate Study
Revenue Requirements by Service Characteristics

	2016					2017					2018					2019					2020					2021				
Item	**Average Demand**	**Peak Day**	**Billing & Collection**	**Meters & Services**	**Total**	**Average Demand**	**Peak Day**	**Billing & Collection**	**Meters & Services**	**Total**	**Average Demand**	**Peak Day**	**Billing & Collection**	**Meters & Services**	**Total**	**Average Demand**	**Peak Day**	**Billing & Collection**	**Meters & Services**	**Total**	**Average Demand**	**Peak Day**	**Billing & Collection**	**Meters & Services**	**Total**	**Average Demand**	**Peak Day**	**Billing & Collection**	**Meters & Services**	**Total**
O&M	$3,445,169	$937,339	$643,573	$662,090	$5,688,172	$3,601,400	$977,174	$674,992	$694,701	$5,948,266	$3,765,191	$1,018,858	$707,964	$728,942	$6,220,955	$3,936,929	$1,062,486	$742,569	$764,897	$6,506,880	$4,117,022	$1,108,155	$778,887	$802,652	$6,806,716	$4,305,899	$1,155,967	$817,006	$842,300	$7,121,173
Debt Service	$385,950	$80,255	$1,135	$86,658	$553,998	$385,950	$80,255	$1,135	$86,658	$553,998	$385,950	$80,255	$1,135	$86,658	$553,998	$385,950	$80,255	$1,135	$86,658	$553,998	$385,950	$80,255	$1,135	$86,658	$553,998	$385,950.24	$80,254.78	$1,134.78	$86,658.00	$553,998
Capital Outlays	$101,817	$21,172	$299	$22,861	$146,149	$96,570	$20,081	$284	$21,683	$138,618	$94,667	$19,685	$278	$21,256	$135,887	$96,547	$20,076	$284	$21,678	$138,585	$102,691	$21,354	$302	$23,057	$147,405	$113,626	$23,627	$334	$25,513	$163,100
Less: Operations Non-Rate Revenue	$2,160,484	$587,810	$403,588	$415,200	$3,567,083	$2,181,974	$592,039	$408,956	$420,897	$3,603,867	$2,204,873	$596,637	$414,580	$426,864	$3,642,954	$2,229,268	$601,628	$420,476	$433,119	$3,684,491	$2,255,252	$607,033	$426,665	$439,683	$3,728,633	$2,282,926	$612,877	$433,165	$446,575	$3,775,544
Less: Expansion Non-Rate Revenue	$96,164	$19,996	$283	$21,592	$138,035	$106,621	$22,171	$313	$23,940	$153,045	$117,125	$24,355	$344.37	$26,298	$168,123	$127,678	$26,549	$375	$28,668	$183,270	$138,280	$28,754	$407	$31,048	$198,489	$148,934.68	$30,969.59	$437.90	$33,440.53	$213,783
Total	**$1,676,288**	**$430,959**	**$241,136**	**$334,817**	**$2,683,200**	**$1,795,325**	**$463,300**	**$267,141**	**$358,205**	**$2,883,970**	**$1,923,810**	**$497,806**	**$294,453**	**$383,693**	**$3,099,763**	**$2,062,481**	**$534,640**	**$323,136**	**$411,446**	**$3,331,702**	**$2,212,131**	**$573,976**	**$353,253**	**$441,637**	**$3,580,996**	**$2,373,614**	**$616,003**	**$384,872**	**$474,455**	**$3,848,944**

Table B-16
Jordanell Special Service District - Water Rate Study
Cost Allocations to Customer Classes

	2016					2017					2018					2019					2020					2021				
	Average Demand	**Peak Day**	**Billing & Collection**	**Meters & Services**	**Total**	**Average Demand**	**Peak Day**	**Billing & Collection**	**Meters & Services**	**Total**	**Average Demand**	**Peak Day**	**Billing & Collection**	**Meters & Services**	**Total**	**Average Demand**	**Peak Day**	**Billing & Collection**	**Meters & Services**	**Total**	**Average Demand**	**Peak Day**	**Billing & Collection**	**Meters & Services**	**Total**	**Average Demand**	**Peak Day**	**Billing & Collection**	**Meters & Services**	**Total**
All Customers	$1,676,288	$430,959	$241,136	$334,817	$2,683,200	$1,795,325	$463,300	$267,141	$358,205	$2,883,970	$1,923,810	$497,806	$294,453	$383,693	$3,099,763	$2,062,481	$534,640	$323,136	$411,446	$3,331,702	$2,212,131	$573,976	$353,253	$441,637	$3,580,996	$2,373,614	616,002.71	$384,872	$474,455	$3,848,944
Water Reserve	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	-	$0	$0	$0
Total	**$1,676,288**	**$430,959**	**$241,136**	**$334,817**	**$2,683,200**	**$1,795,325**	**$463,300**	**$267,141**	**$358,205**	**$2,883,970**	**$1,923,810**	**$497,806**	**$294,453**	**$383,693**	**$3,099,763**	**$2,062,481**	**$534,640**	**$323,136**	**$411,446**	**$3,331,702**	**$2,212,131**	**$573,976**	**$353,253**	**$441,637**	**$3,580,996**	**$2,373,614**	**$616,003**	**$384,872**	**$474,455**	**$3,848,944**
Allocation Basis	**Avg. Demand**	**Pk. Demand**	**Accounts**	**Equiv. Meter**		**Avg. Demand**	**Pk. Demand**	**Accounts**	**Equiv. Meter**		**Avg. Demand**	**Pk. Demand**	**Accounts**	**Equiv. Meter**		**Avg. Demand**	**Pk. Demand**	**Accounts**	**Equiv. Meter**		**Avg. Demand**	**Pk. Demand**	**Accounts**	**Equiv. Meter**		**Avg. Demand**	**Pk. Demand**	**Accounts**	**Equiv. Meter**	

Table B-17
Jordanell Special Service District - Water Rate Study

Existing Rates

Projected Revenue

Meter Size	Existing		2016	2017	2018	2019	2020	2021
All Customers								
1 and Smaller	$ 37.01		$ 576,493	$ 595,798	$ 615,748	$ 636,367	$ 657,676	$ 679,698
1 1/2	$ 44.65		$ -	$ -	$ -	$ -	$ -	$ -
2	$ 71.96		$ -	$ -	$ -	$ -	$ -	$ -
3	$ 71.96		$ -	$ -	$ -	$ -	$ -	$ -
4	$ 347.37		$ -	$ -	$ -	$ -	$ -	$ -
6	$ 521.09		$ -	$ -	$ -	$ -	$ -	$ -
8	$ 521.09		$ -	$ -	$ -	$ -	$ -	$ -
10	$ 521.09		$ -	$ -	$ -	$ -	$ -	$ -
12	$ 521.09		$ -	$ -	$ -	$ -	$ -	$ -

Block Volume Rates ($/kgal)

Block Volume Rates ($/kgal)

	2016		2016	2017	2018	2019	2020	2021
Block 1 Rate (10,000 gal allowance)								
All Customers	$ -		$ -	$ -	$ -	$ -	$ -	$ -
Water Reserve	$ -		$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ -		$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ -		$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ -		$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ -		$ -	$ -	$ -	$ -	$ -	$ -
Block 2 Rate								
All Customers	$ 3.50		$ 983,507	$ 1,016,440	$ 1,050,476	$ 1,085,651	$ 1,122,005	$ 1,159,576
Water Reserve	$ 15.00		$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ 15.00		$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ 2.50		$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ 2.50		$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ -		$ -	$ -	$ -	$ -	$ -	$ -

Table B-18
Jordanell Special Service District - Water Rate Study
Calculated Rates

Meter Size	2016	2017	2018	2019	2020	2021
1 and Smaller	$36.98	$38.85	$40.77	$42.73	$44.74	$46.80
1 1/2	$58.48	$61.10	$63.83	$66.66	$69.59	$72.63
2	$84.27	$87.80	$91.50	$95.37	$99.41	$103.63
3	$144.45	$150.11	$156.08	$162.37	$169.00	$175.97
4	$230.43	$239.11	$248.33	$258.09	$268.41	$279.31
6	$445.38	$461.62	$478.95	$497.38	$516.94	$537.65
8	$703.32	$728.63	$755.69	$784.53	$815.17	$847.66
10	$1,004.24	$1,040.15	$1,078.56	$1,119.53	$1,163.10	$1,209.34
12	$1,663.42	$1,722.52	$1,785.80	$1,853.35	$1,925.25	$2,001.60

Block Volume Rates ($/kgal)

	2016	2017	2018	2019	2020	2021
Block 1 Rate (Currently in Allowance)						
All Customers	$4.37	$4.53	$4.70	$4.87	$5.06	$5.25
Block 2 Rate						
All Customers	$5.91	$6.13	$6.36	$6.60	$6.86	$7.11

Table B-19
Jordanell Special Service District - Water Rate Study
Recommended Rates

Meter Size	2016	2017	2018	2019	2020	2021
1 and Smaller	$65.81	$68.74	$71.78	$74.86	$78.12	$81.44
1 1/2	$87.31	$90.99	$94.84	$98.79	$102.97	$107.27
2	$113.10	$117.69	$122.51	$127.50	$132.79	$138.27
3	$173.28	$180.00	$187.09	$194.50	$202.38	$210.61
4	$259.26	$269.00	$279.34	$290.22	$301.79	$313.95
6	$474.21	$491.51	$509.96	$529.51	$550.32	$572.29
8	$732.15	$758.52	$786.70	$816.66	$848.55	$882.30
10	$1,033.07	$1,070.04	$1,109.57	$1,151.66	$1,196.48	$1,243.98
12	$1,692.25	$1,752.41	$1,816.81	$1,885.48	$1,958.63	$2,036.24

Block Volume Rates ($/kgal)

	2016	2017	2018	2019	2020	2021
All use over 10,000 gallons/month						
All Customers	$5.91	$6.13	$6.36	$6.60	$6.86	$7.11

APPENDIX C

DETAILED SEWER RATE MODEL TABLES

Table C-1
Jordanelle Special Service District - Sewer Rate Study
Estimated Indoor Water Use
(kgal)

	FYE 2013			*FYE 2014*			*FYE 2015*				
Customer Class	**Use**	**ERUs**	**Use per ERUs**	**Use**	**ERUs**	**Use per ERUs**	**Use**	**ERUs**	**Use per ERUs**	**Planning Use/ERU**	**Use/ERU (kgal/month)**
All customers	143,178	1,207	118.6	146,085	1,231	118.6	148,993	1,256	118.6	118.6	9.9
Unused	0	0	0.0	0	0	0.0	0	0	0.0	0.0	0.0
Unused	0	0	0.0	0	0	0.0	0	0	0.0	0.0	0.0
Unused	0	0	0.0	0	0	0.0	0	0	0.0	0.0	0.0
Unused	0	0	0.0	0	0	0.0	0	0	0.0	0.0	0.0
Unused	0	0	0.0	0	0	0.0	0	0	0.0	0.0	0.0
Total	**143,178**	**1,207**	**118.6**	**146,085**	**1,231**	**118.6**	**148,993**	**1,256**	**118.6**	**118.6**	**9.9**

Table C-2
Jordanelle Special Service District - Sewer Rate Study
Projected ERUs

		Number							
Customer Class		**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**	**FYE 2022**	**FYE 2023**
	% Growth	**3.35%**	**3.46%**	**3.25%**	**3.12%**	**3.05%**	**3.12%**	**3.16%**	**2.91%**
All customers		1,298	1,343	1,387	1,430	1,473	1,519	1,567	1,613
Unused		0	0	0	0	0	0	0	0
Unused		0	0	0	0	0	0	0	0
Unused		0	0	0	0	0	0	0	0
Unused		0	0	0	0	0	0	0	0
Unused		0	0	0	0	0	0	0	0
Total		**1,298**	**1,343**	**1,387**	**1,430**	**1,473**	**1,519**	**1,567**	**1,613**

Table C-3
Jordanelle Special Service District - Sewer Rate Study
Projected Annual Indoor Water Use

		Amount (kgal)							
Customer Class	**Use/ERU.**	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**	**FYE 2022**	**FYE 2023**
All customers	118.6	153,975	159,313	164,533	169,634	174,735	180,191	185,885	191,342
Unused	0.0	0	0	0	0	0	0	0	0
Unused	0.0	0	0	0	0	0	0	0	0
Total		**153,975**	**159,313**	**164,533**	**169,634**	**174,735**	**180,191**	**185,885**	**191,342**

Table C-4
Jordanelle Special Service District - Sewer Rate Study
Projected Total Wastewater Flow

	FYE 2015
Total Flow at Treatment Plant (mgd)=	**0.4270**

		Amount (mgd)					
Customer Class		**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
All customers		0.44	0.46	0.47	0.49	0.50	0.52
Unused		0.00	0.00	0.00	0.00	0.00	0.00
Unused		0.00	0.00	0.00	0.00	0.00	0.00
Total		**0.44**	**0.46**	**0.47**	**0.49**	**0.50**	**0.52**

Table C-5
Jordanelle Special Service District - Sewer Rate Study
Peaking Factors

Customer Class	**Est. Peak Hour Factor**
All customers	2.50
Unused	2.50
Unused	2.50
Unused	2.50
Unused	2.50
Unused	2.50

Table C-6
Jordanelle Special Service District - Sewer Rate Study
Projected Flow Peaking Characteristics

	Estimated Peak Hour (mgd)					
Customer Class	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
All customers	1.10	1.14	1.18	1.22	1.25	1.29
Unused	-	-	-	-	-	-
Unused	-	-	-	-	-	-
Unused	-	-	-	-	-	-
Unused	-	-	-	-	-	-
Unused	-	-	-	-	-	-
Total	**1.10**	**1.14**	**1.18**	**1.22**	**1.25**	**1.29**

	Excess Over Average Day (mgd)					
Customer Class	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
All customers	0.66	0.68	0.71	0.73	0.75	0.77
Unused	-	-	-	-	-	-
Unused	-	-	-	-	-	-
Total	**0.66**	**0.68**	**0.71**	**0.73**	**0.75**	**0.77**

Table C-7
Jordanelle Special Service District - Sewer Rate Study
Strength

Customer Class	BOD (mg/L)	TSS (mg/L)
All customers	250	250
Unused	-	-
Unused	-	-
Unused	-	-
Unused	-	-
Unused	-	-
Approximate Cost Division	50%	50%

Table C-8
Jordanelle Special Service District - Sewer Rate Study
Projected Strength Characteristics

	BOD (lbs/year)					
Customer Class	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
All customers	335,856	347,499	358,884	370,010	381,137	393,039
Unused	-	-	-	-	-	-
Unused	-	-	-	-	-	-
Total	**335,856**	**347,499**	**358,884**	**370,010**	**381,137**	**393,039**

	TSS (lbs/year)					
Customer Class	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
All customers	335,856	347,499	358,884	370,010	381,137	393,039
Unused	-	-	-	-	-	-
Unused	-	-	-	-	-	-
Total	**335,856**	**347,499**	**358,884**	**370,010**	**381,137**	**393,039**

	Weighted Average (lbs/year)					
Customer Class	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
All customers	335,856	347,499	358,884	370,010	381,137	393,039
Unused	-	-	-	-	-	-
Unused	-	-	-	-	-	-
Total	**335,856**	**347,499**	**358,884**	**370,010**	**381,137**	**393,039**

Table C-9
Jordanelle Special Service District - Sewer Rate Study
Connection Fee Revenue

Size of Meter	Impact Fee ($/ERU)	Budgeted FYE 2015	Projected FYE 2016	Projected FYE 2017	Projected FYE 2018	Projected FYE 2019	Projected FYE 2020	Projected FYE 2021
Per ERU	$ 4,691.22		$197,031	$211,105	$206,414	$201,722	$201,722	$215,796
Total Impact Fee Revenue		**$114,989**	**$197,031**	**$211,105**	**$206,414**	**$201,722**	**$201,722**	**$215,796**

Table C-10
Jordanelle Special Service District - Sewer Rate Study
Non-Rate Revenue (Including Connection Fees)

Assumed Inflation Rate = 3.0%

Item		Projected FYE 2015	Projected FYE 2016	Projected FYE 2017	Projected FYE 2018	Projected FYE 2019	Projected FYE 2020	Projected FYE 2021
Operations								
Penalty Revenue	**74000**	$14,800	$15,740	$16,756	$17,803	$18,893	$20,036	$21,262
Interest Revenue	**72000**	$14,400	$15,073	$15,786	$16,516	$17,269	$18,050	$18,873
TCSSD Maintenance Revenue		$138,552	$147,348	$156,866	$166,670	$176,869	$187,566	$199,044
NVSSD Maintenance Revenue		$74,037	$78,737	$83,823	$89,062	$94,512	$100,228	$106,362
SLSSD Maintenance Revenue		$6,232	$6,419	$6,612	$6,810	$7,014	$7,225	$7,441
Hookup Fees	**26400**	$5,280	$5,615	$5,978	$6,352	$6,740	$7,148	$7,585
Laboratory Fees	**0**	$0	$0	$0	$0	$0	$0	$0
Shared Employee	**39300**	$7,860	$8,096	$8,339	$8,589	$8,846	$9,112	$9,385
Inspection Fees	**8000**	$1,600	$1,648	$1,697	$1,748	$1,801	$1,855	$1,910
Total Operations Non-Rate Revenue		$262,761	$278,676	$295,857	$313,550	$331,946	$351,219	$371,863
Expansion and Replacement								
Connection Fees (Impact Fee)		$114,989	$197,031	$211,105	$206,414	$201,722	$201,722	$215,796
NVSSD Treatment Impact Fees		$ -	$ 140,737	$ 164,193	$ 187,649	$ 211,105	$ 234,561	$ 258,017
Total Expansion Non-Rate Revenue		$114,989	$337,768	$375,298	$394,062	$412,827	$436,283	$473,813
Total Non-Rate Revenue		**$377,750**	**$616,444**	**$671,154**	**$707,612**	**$744,773**	**$787,503**	**$845,676**

Table C-11
Jordanelle Special Service District - Sewer Rate Study
Revenue Requirements
Cash Basis

Percent attributed to Sewer =	20%

Item	Total Expense	FYE 2015	Projected FYE 2016	Projected FYE 2017	Projected FYE 2018	Projected FYE 2019	Projected FYE 2020	Projected FYE 2021
O&M								
Travel	$25,900.00	$5,180	$5,422	$5,679	$5,941	$6,212	$6,493	$6,789
Training/Conferences	$17,800.00	$3,560	$3,726	$3,903	$4,083	$4,269	$4,462	$4,666
Utilities	$458,900.00	$91,780	$97,607	$103,911	$110,406	$117,162	$124,248	$131,851
Sewer Only Utilities	$36,400.00	$36,400	$38,711	$41,211	$43,787	$46,467	$49,277	$52,292
Phones	$32,000.00	$6,400	$6,699	$7,016	$7,340	$7,675	$8,022	$8,388
Employee Wages/Benefits	$2,069,500.00	$413,900	$433,247	$453,738	$474,723	$496,370	$518,825	$542,481
Legal Fees	$600,000.00	$120,000	$125,609	$131,550	$137,634	$143,910	$150,420	$157,279
Bank Charges	$10,200.00	$2,040	$2,170	$2,310	$2,454	$2,604	$2,762	$2,931
Miscellaneous Expense	$4,000.00	$800	$837	$877	$918	$959	$1,003	$1,049
Supplies	$146,800.00	$29,360	$30,732	$32,186	$33,674	$35,210	$36,803	$38,481
Postage	$1,200.00	$240	$251	$263	$275	$288	$301	$315
Equipment and maintenance	$86,600.00	$17,320	$18,130	$18,987	$19,865	$20,771	$21,711	$22,701
Services	$300,880.00	$60,176	$63,996	$68,130	$72,388	$76,818	$81,464	$86,449
Heber Valley Treatment Costs	$196,120.00	$196,120	$208,571	$222,043	$235,920	$250,358	$265,499	$281,746
Insurance-Liability	$192,800.00	$38,560	$40,362	$42,271	$44,226	$46,243	$48,335	$50,539
Vehicle Expense	$89,500.00	$17,900	$18,737	$19,623	$20,530	$21,467	$22,438	$23,461
Depreciation Expense	$0.00	$0	$0	$0	$0	$0	$0	$0
Debt Service Fees	$30,000.00	$6,000	$6,280	$6,578	$6,882	$7,196	$7,521	$7,864
Total O&M		**$1,045,736**	**$1,101,088**	**$1,160,276**	**$1,221,048**	**$1,283,980**	**$1,349,583**	**$1,419,281**
Debt Service								
Cert of Part 2003 AB	317,466.00	$63,493	$63,493	63,493.20	63,493.20	63,493.20	63,493.20	63,493.20
Potential Bond				$0.00	$0.00	$0.00	$0.00	$0.00
Total Debt Service	**317,466**	**$63,493**	**63,493.20**	**$63,493**	**$63,493**	**$63,493**	**$63,493**	**$63,493**

Expansion and Replacement		FYE 2015	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
P-1	$ 3,499,693							
P-2	$ 1,039,737							
LS-1	$ 2,166,803							
LS-2	$ 898,369							
Master Plan Update	$ 40,000						$ 46,371	$ -
Rehabilitation and Replacement Budget	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Bond Proceeds								
Transfer to/(from) Reserve Fund		$ (359,180)	$ 140,322	$ 195,329	$ 203,244	$ 209,703	$ 173,256	$ 243,213
Total Capital Outlays		**$ (359,180)**	**$140,322**	**$195,329**	**$203,244**	**$209,703**	**$219,627**	**$243,213**
Total Revenue Requirements		**$ 750,050**	**$1,304,903**	**$1,419,098**	**$1,487,785**	**$1,557,176**	**$1,632,703**	**$1,725,987**
LESS:								
Operations Non-Rate Revenue		$262,761	$278,676	$295,857	$313,550	$331,946	$351,219	$371,863
Expansion Non-Rate Revenue		$114,989	$337,768	$375,298	$394,062	$412,827	$436,283	$473,813
Net Revenue Requirements		**$ 372,300**	**$ 688,459**	**$ 747,944**	**$ 780,173**	**$ 812,403**	**$ 845,200**	**$ 880,311**

Table C-12
Jordanelle Special Service District - Sewer Rate Study
Cost Allocation Percentages to Service Characteristics

Item	Volume	Capacity	Strength	Customer	Total
O&M					
Travel	0%	0%	0%	100%	100%
Training/Conferences	0%	0%	0%	100%	100%
Utilities	35%	0%	0%	65%	100%
Sewer Only Utilities	50%	0%	0%	50%	100%
Phones	0%	0%	0%	100%	100%
Employee Wages/Benefits	10%	0%	0%	90%	100%
Legal Fees	0%	0%	0%	100%	100%
Bank Charges	0%	0%	0%	100%	100%
Miscellaneous Expense	0%	0%	0%	100%	100%
Supplies	0%	0%	0%	100%	100%
Postage	0%	0%	0%	100%	100%
Equipment and maintenance	0%	0%	0%	100%	100%
Services	0%	0%	0%	100%	100%
Heber Valley Treatment Costs	20%	0%	20%	60%	100%
Insurance-Liability	0%	0%	0%	100%	100%
Vehicle Expense	0%	0%	0%	100%	100%
Depreciation Expense	0%	0%	0%	100%	100%
Debt Service Fees	0%	0%	0%	100%	100%

Table C-13
Jordanelle Special Service District - Sewer Rate Study
Fixed Assets Allocations to Service Characteristics

	Percent						*Allocated Amount*				
Item	**Assets**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**
Easements	$28,217	0%	0%	0%	100%	100%	$0	$0	$0	$28,217	$28,217
Land	$9,547	0%	0%	0%	100%	100%	$0	$0	$0	$9,547	$9,547
Bond Issuance Cost	$42,420	0%	0%	0%	100%	100%	$0	$0	$0	$42,420	$42,420
Sewer System	$2,518,758	0%	0%	0%	100%	100%	$0	$0	$0	$2,518,758	$2,518,758
Total	**$2,598,943**						**$0**	**$0**	**$0**	**$2,598,943**	**$2,598,943**
Percent							**0.0%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**

Table C-14
Jordanelle Special Service District - Sewer Rate Study
Allocation of O&M Costs to Service Characteristics

	FYE 2016					FYE 2017					FYE 2018					FYE 2019					FYE 2020					FYE 2021				
Item	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**
O&M																														
Travel	$0	$0	$0	$5,422	$5,422	$0	$0	$0	$5,679	$5,679	$0	$0	$0	$5,941	$5,941	$0	$0	$0	$6,212	$6,212	$0	$0	$0	$6,493	$6,493	$0	$0	$0	$6,789	$6,789
Training/Conferences	$0	$0	$0	$3,726	$3,726	$0	$0	$0	$3,903	$3,903	$0	$0	$0	$4,083	$4,083	$0	$0	$0	$4,269	$4,269	$0	$0	$0	$4,462	$4,462	$0	$0	$0	$4,666	$4,666
Utilities	$34,162	$0	$0	$63,444	$97,607	$36,369	$0	$0	$67,542	$103,911	$38,642	$0	$0	$71,764	$110,406	$41,007	$0	$0	$76,156	$117,162	$43,487	$0	$0	$80,761	$124,248	$46,148	$0	$0	$85,703	$131,851
Sewer Only Utilities	$19,355	$0	$0	$19,355	$38,711	$20,606	$0	$0	$20,606	$41,211	$21,893	$0	$0	$21,893	$43,787	$23,233	$0	$0	$23,233	$46,467	$24,638	$0	$0	$24,638	$49,277	$26,146	$0	$0	$26,146	$52,292
Phones	$0	$0	$0	$6,699	$6,699	$0	$0	$0	$7,016	$7,016	$0	$0	$0	$7,340	$7,340	$0	$0	$0	$7,675	$7,675	$0	$0	$0	$8,022	$8,022	$0	$0	$0	$8,388	$8,388
Employee Wages/Benefits	$43,325	$0	$0	$389,922	$433,247	$45,374	$0	$0	$408,364	$453,738	$47,472	$0	$0	$427,251	$474,723	$49,637	$0	$0	$446,733	$496,370	$51,882	$0	$0	$466,942	$518,825	$54,248	$0	$0	$488,233	$542,481
Legal Fees	$0	$0	$0	$125,609	$125,609	$0	$0	$0	$131,550	$131,550	$0	$0	$0	$137,634	$137,634	$0	$0	$0	$143,910	$143,910	$0	$0	$0	$150,420	$150,420	$0	$0	$0	$157,279	$157,279
Bank Charges	$0	$0	$0	$2,170	$2,170	$0	$0	$0	$2,310	$2,310	$0	$0	$0	$2,454	$2,454	$0	$0	$0	$2,604	$2,604	$0	$0	$0	$2,762	$2,762	$0	$0	$0	$2,931	$2,931
Miscellaneous Expense	$0	$0	$0	$837	$837	$0	$0	$0	$877	$877	$0	$0	$0	$918	$918	$0	$0	$0	$959	$959	$0	$0	$0	$1,003	$1,003	$0	$0	$0	$1,049	$1,049
Supplies	$0	$0	$0	$30,732	$30,732	$0	$0	$0	$32,186	$32,186	$0	$0	$0	$33,674	$33,674	$0	$0	$0	$35,210	$35,210	$0	$0	$0	$36,803	$36,803	$0	$0	$0	$38,481	$38,481
Postage	$0	$0	$0	$251	$251	$0	$0	$0	$263	$263	$0	$0	$0	$275	$275	$0	$0	$0	$288	$288	$0	$0	$0	$301	$301	$0	$0	$0	$315	$315
Equipment and maintenance	$0	$0	$0	$18,130	$18,130	$0	$0	$0	$18,987	$18,987	$0	$0	$0	$19,865	$19,865	$0	$0	$0	$20,771	$20,771	$0	$0	$0	$21,711	$21,711	$0	$0	$0	$22,701	$22,701
Services	$0	$0	$0	$63,996	$63,996	$0	$0	$0	$68,130	$68,130	$0	$0	$0	$72,388	$72,388	$0	$0	$0	$76,818	$76,818	$0	$0	$0	$81,464	$81,464	$0	$0	$0	$86,449	$86,449
Heber Valley Treatment Costs	$41,714	$0	$41,714	$125,142	$208,571	$44,409	$0	$44,409	$133,226	$222,043	$47,184	$0	$47,184	$141,552	$235,920	$50,072	$0	$50,072	$150,215	$250,358	$53,100	$0	$53,100	$159,299	$265,499	$56,349	$0	$56,349	$169,048	$281,746
Insurance-Liability	$0	$0	$0	$40,362	$40,362	$0	$0	$0	$42,271	$42,271	$0	$0	$0	$44,226	$44,226	$0	$0	$0	$46,243	$46,243	$0	$0	$0	$48,335	$48,335	$0	$0	$0	$50,539	$50,539
Vehicle Expense	$0	$0	$0	$18,737	$18,737	$0	$0	$0	$19,623	$19,623	$0	$0	$0	$20,530	$20,530	$0	$0	$0	$21,467	$21,467	$0	$0	$0	$22,438	$22,438	$0	$0	$0	$23,461	$23,461
Depreciation Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Debt Service Fees	$0	$0	$0	$6,280	$6,280	$0	$0	$0	$6,578	$6,578	$0	$0	$0	$6,882	$6,882	$0	$0	$0	$7,196	$7,196	$0	$0	$0	$7,521	$7,521	$0	$0	$0	$7,864	$7,864
Total	**$138,557**	**$0**	**$41,714**	**$920,817**	**$1,101,088**	**$146,757**	**$0**	**$44,409**	**$969,110**	**$1,160,276**	**$155,192**	**$0**	**$47,184**	**$1,018,672**	**$1,221,048**	**$163,949**	**$0**	**$50,072**	**$1,069,959**	**$1,283,980**	**$173,107**	**$0**	**$53,100**	**$1,123,376**	**$1,349,583**	**$182,891**	**$0**	**$56,349**	**$1,180,040**	**$1,419,281**
Percent	**12.6%**	**0.0%**	**3.8%**	**83.6%**	**100.0%**	**12.6%**	**0.0%**	**3.8%**	**83.5%**	**100.0%**	**12.7%**	**0.0%**	**3.9%**	**83.4%**	**100.0%**	**12.8%**	**0.0%**	**3.9%**	**83.3%**	**100.0%**	**12.8%**	**0.0%**	**3.9%**	**83.2%**	**100.0%**	**12.9%**	**0.0%**	**4.0%**	**83.1%**	**100.0%**

Table C-15
Jordanelle Special Service District - Sewer Rate Study
Revenue Requirements by Service Characteristics

	FYE 2016					FYE 2017					FYE 2018					FYE 2019					FYE 2020					FYE 2021				
Item	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**
O&M	$138,557	$0	$41,714	$920,817	$1,101,088	$146,757	$0	$44,409	$969,110	$1,160,276	$155,192	$0	$47,184	$1,018,672	$1,221,048	$163,949	$0	$50,072	$1,069,959	$1,283,980	$173,107	$0	$53,100	$1,123,376	$1,349,583	$182,891	$0	$56,349	$1,180,040	$1,419,281
Debt Service	$0	$0	$0	$63,493	$63,493	$0	$0	$0	$63,493	$63,493	$0	$0	$0	$63,493	$63,493	$0	$0	$0	$63,493	$63,493	$0	$0	$0	$63,493	$63,493	$0.00	$0.00	$0.00	$63,493.20	$63,493
Capital Outlays	$0	$0	$0	$140,322	$140,322	$0	$0	$0	$195,329	$195,329	$0	$0	$0	$203,244	$203,244	$0	$0	$0	$209,703	$209,703	$0	$0	$0	$219,627	$219,627	$0	$0	$0	$243,213	$243,213
Less: Operations Non-Rate Revenue	$35,067	$0	$10,557	$233,051	$278,676	$37,421	$0	$11,324	$247,112	$295,857	$39,851	$0	$12,116	$261,582	$313,550	$42,386	$0	$12,945	$276,615	$331,946	$45,050	$0	$13,819	$292,350	$351,219	$47,919	$0	$14,764	$309,180	$371,863
Less: Expansion Non-Rate Revenue	$0	$0	$0	$337,768	$337,768	$0	$0	$0	$375,298	$375,298	$0	$0	$0.00	$394,062	$394,062	$0	$0	$0	$412,827	$412,827	$0	$0	$0	$436,283	$436,283	$0.00	$0.00	$0.00	$473,813.22	$473,813
Total	**$103,489**	**$0**	**$31,157**	**$553,813**	**$688,459**	**$109,336**	**$0**	**$33,085**	**$605,523**	**$747,944**	**$115,341**	**$0**	**$35,068**	**$629,764**	**$780,173**	**$121,563**	**$0**	**$37,127**	**$653,713**	**$812,403**	**$128,057**	**$0**	**$39,281**	**$677,862**	**$845,200**	**$134,972**	**$0**	**$41,585**	**$703,753**	**$880,311**

Table C-16
Jordanelle Special Service District - Sewer Rate Study
Cost Allocations to Customer Classes

	FYE 2016					FYE 2017					FYE 2018					FYE 2019					FYE 2020					FYE 2021				
	Volume	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**
All customers	$103,489	$0	$31,157	$553,813	$688,459	$109,336	$0	$33,085	$605,523	$747,944	$115,341	$0	$35,068	$629,764	$780,173	$121,563	$0	$37,127	$653,713	$812,403	$128,057	$0	$39,281	$677,862	$845,200	$134,972.35	$0	$41,585	$703,753	$880,311
Total	**$103,489**	**$0**	**$31,157**	**$553,813**	**$688,459**	**$109,336**	**$0**	**$33,085**	**$605,523**	**$747,944**	**$115,341**	**$0**	**$35,068**	**$629,764**	**$780,173**	**$121,563**	**$0**	**$37,127**	**$653,713**	**$812,403**	**$128,057**	**$0**	**$39,281**	**$677,862**	**$845,200**	**$134,972**	**$0**	**$41,585**	**$703,753**	**$880,311**
Allocation Basis	Avg. Demand	Pk. Demand	Strength	Account		Avg. Demand	Pk. Demand	Strength	Account		Avg. Demand	Pk. Demand	Strength	Account		Avg. Demand	Pk. Demand	Strength	Account		Avg. Demand	Pk. Demand	Strength	Account		Avg. Demand	Pk. Demand	Strength	Account	

Table C-17
Jordanelle Special Service District - Sewer Rate Study
Existing Rates and Projected Revenue

Base Rate	Existing	Meter Size	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
All customers	$26.00	All customer	$404,976	$419,016	$432,744	$446,160	$459,576	$473,928

Volume Rate	Existing		FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
All customers	$0.00	All customer	$0	$0	$0	$0	$0	$0

Revenue - Existing Rates	Revenue	$404,976	$419,016	$432,744	$446,160	$459,576	$473,928
Revenue Required	Revenue Req	$688,459	$747,944	$780,173	$812,403	$845,200	$880,311
Surplus/(Shortfall)		($283,483)	($328,928)	($347,429)	($366,243)	($385,624)	($406,383)

Table C-18
Jordanelle Special Service District - Sewer Rate Study
Calculated Rates

Monthly Base Rate	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
All customers	$35.56	$37.57	$37.84	$38.10	$38.35	$38.61

Volume Rate	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
Volume Component						
All customers	*$1.11*	*$1.13*	*$1.16*	*$1.18*	*$1.21*	*$1.24*
Capacity Component						
All customers	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$0.00*
Strength Component						
All customers	*$0.33*	*$0.34*	*$0.35*	*$0.36*	*$0.37*	*$0.38*
Total Volume Rate						
All customers	$1.44	$1.48	$1.51	$1.54	$1.58	$1.62

Industrial Surcharges	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
Volume Surcharge ($/kgal)	$1.11	$1.13	$1.16	$1.18	$1.21	$1.24
Capacity Surcharge ($/gpd)	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000
BOD Surcharge ($/lb)	$0.0801	$0.0822	$0.0843	$0.0866	$0.0890	$0.0913
TSS Surcharge($/lb)	$0.0801	$0.0822	$0.0843	$0.0866	$0.0890	$0.0913

Table C-19
Jordanelle Special Service District - Sewer Rate Study
Recommended Rates

Monthly Base Rate	Current Sewer Rate	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
All customers	$26.00	$44.20	$46.41	$46.87	$47.34	$47.82	$48.29
Total Volume Rate							
All customers	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Monthly Rate							
All customers	**$26.00**	**$44.20**	**$46.41**	**$46.87**	**$47.34**	**$47.82**	**$48.29**
Percent Increase		70%	5%	1%	1%	1%	1%

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