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:

North Village Special Service District

WATER AND SEWER MASTER PLAN

June 2015

Project No. 056-15-02

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CHAPTER 1
INTRODUCTION

INTRODUCTION

In 2015, North Village Special Service District (NVSSD 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 NVSSD to maintain a viable and efficient water delivery system and a sewer collection 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

NVSSD has relatively new water and sewer distribution systems, and has experienced significant growth over the past fifteen years. Since the economic downturn of 2008, development has slowed. However, over the next 10 ten years, development is anticipated to increase significantly, and NVSSD 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 NVSSD 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 NVSSD 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

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 guaranteed capacity in the District facilities for which the bonds were issued.

Some of the water transmission facilities and sewer collection facilities in the District were paid for using bonds. The agreement associated with those bonds included 2,610 ERUs of capacity in the water distribution system and sewer collection system. To account for this issue, the sections of this report that discuss the water distribution system and sewer collection system consider two demand scenarios. First, projected demands based on existing development only will be identified. Second, potential demand associated with sold capacity will be modeled to identify how the District's existing commitments will affect its need for capacity in the long run. It is important to note that water storage, water treatment, water sources, and sewer treatment have not been paid for with bonds. As a result, sold capacity associated with the bonds will not affect these components of the system.

DEMAND PROJECTION METHODOLOGY

There are several methods that can be used to estimate future water needs. This study develops demand projections based on data from Wasatch County. The methodology used in this study is as follows:

1. Define the service area
2. Project the growth of the number of equivalent residential units (ERUs) for the study area through build-out based on Wasatch County projections
3. Convert projections of system-wide growth to a water system production requirement and a sewer system capacity requirement
4. Consider the effect of State Water Conservation Goals on future demands

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

SERVICE AREA

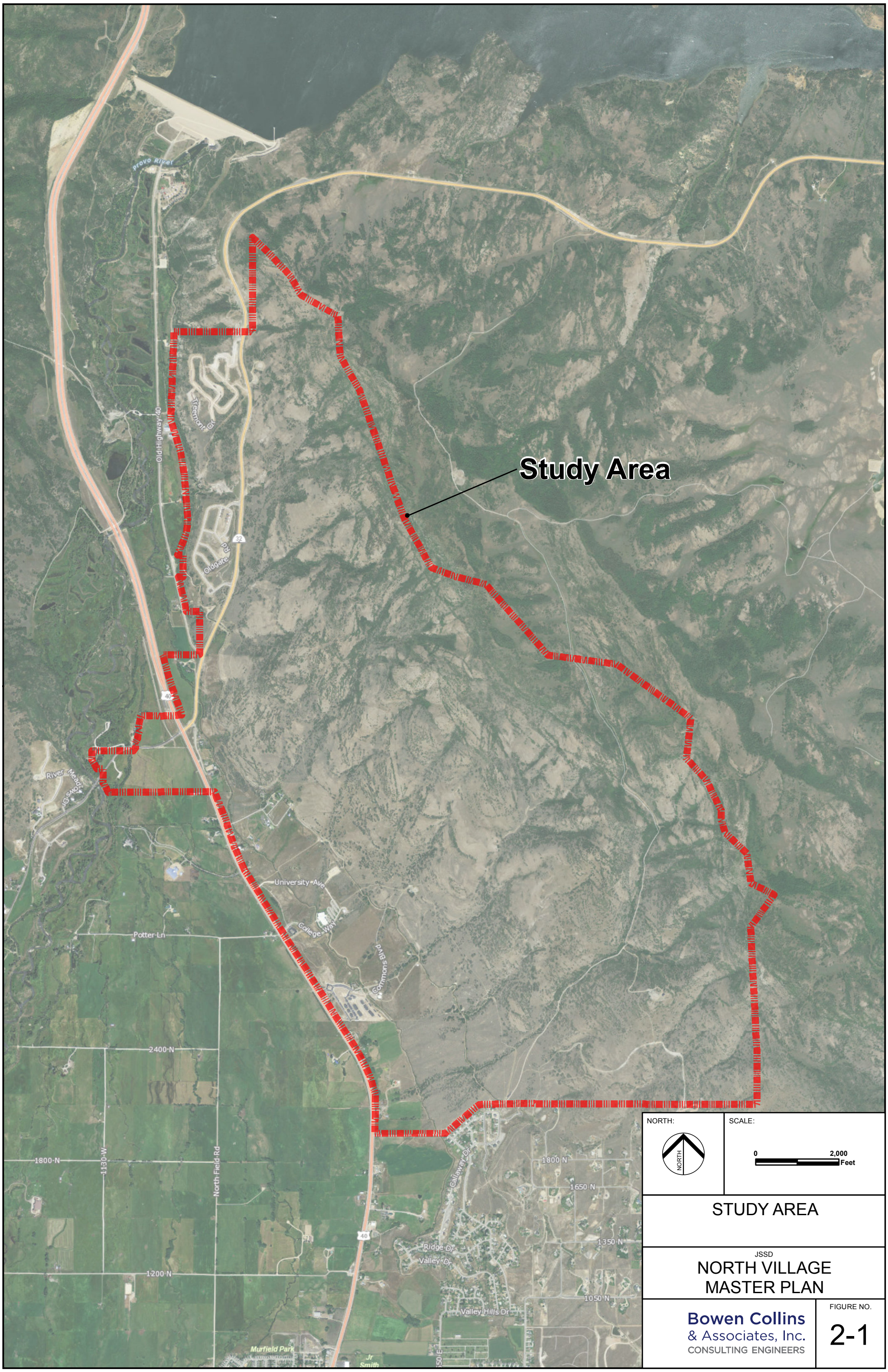
The existing NVSSD service area is shown in Figure 2-1. This includes the current and future developments to the north east of Heber City located in Wasatch County, UT.

SYSTEM GROWTH

System growth was estimated using data provided by Wasatch County and the District. The following conditions and projections were included in the system growth curve.

- **Existing Conditions:** There are approximately 165 Equivalent Residential Units (ERUs) being serviced by NVSSD in the year 2015.
- **2025 Population:** The population of NVSSD is anticipated to grow significantly over the next 10 years. Based on projections from the District and the Governor's Office of Planning and Budget (GOPB), it is anticipated that NVSSD will grow to approximately 665 ERUs by the year 2025.
- **2055 Population:** A master plan for NVSSD was developed by Sowby and Berg in 2002. That master plan identified that the growth associated with all currently planned developments. For the purposes of this report, it has been assumed that NVSSD will reach 2,370 ERUs by the end of the planning window of this study (approximately 2055). Figure 2-2 shows the densities based on the currently planned developments.
- **Build-out:** While current plans do not exist for development beyond 2,370 ERUs, Wasatch County allowable development densities in NVSSD could result in a build-out population of approximately 5,340 ERUs.

Using the conditions described above, a projected system growth curve for NVSSD was developed. The growth curve was based on the target values above and growth curves for surrounding areas in Wasatch County. Figure 2-3 shows the projected growth curve for NVSSD and Table 2-1 summarizes the growth projections for the study area.



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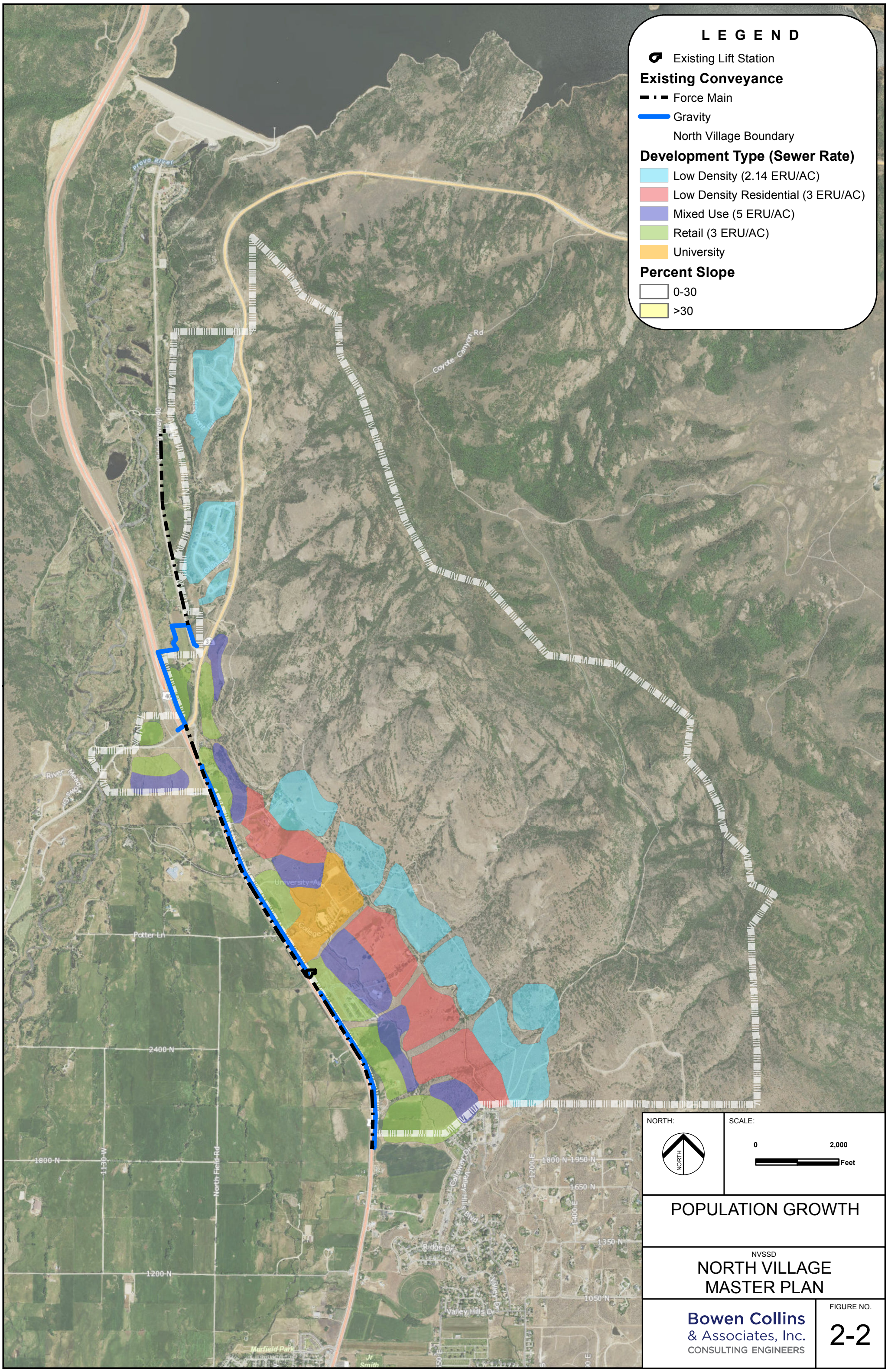

POPULATION GROWTH

NVSSD

NORTH VILLAGE MASTER PLAN

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FIGURE NO.
2-2

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Figure 2-3
NVSSD Growth Projections

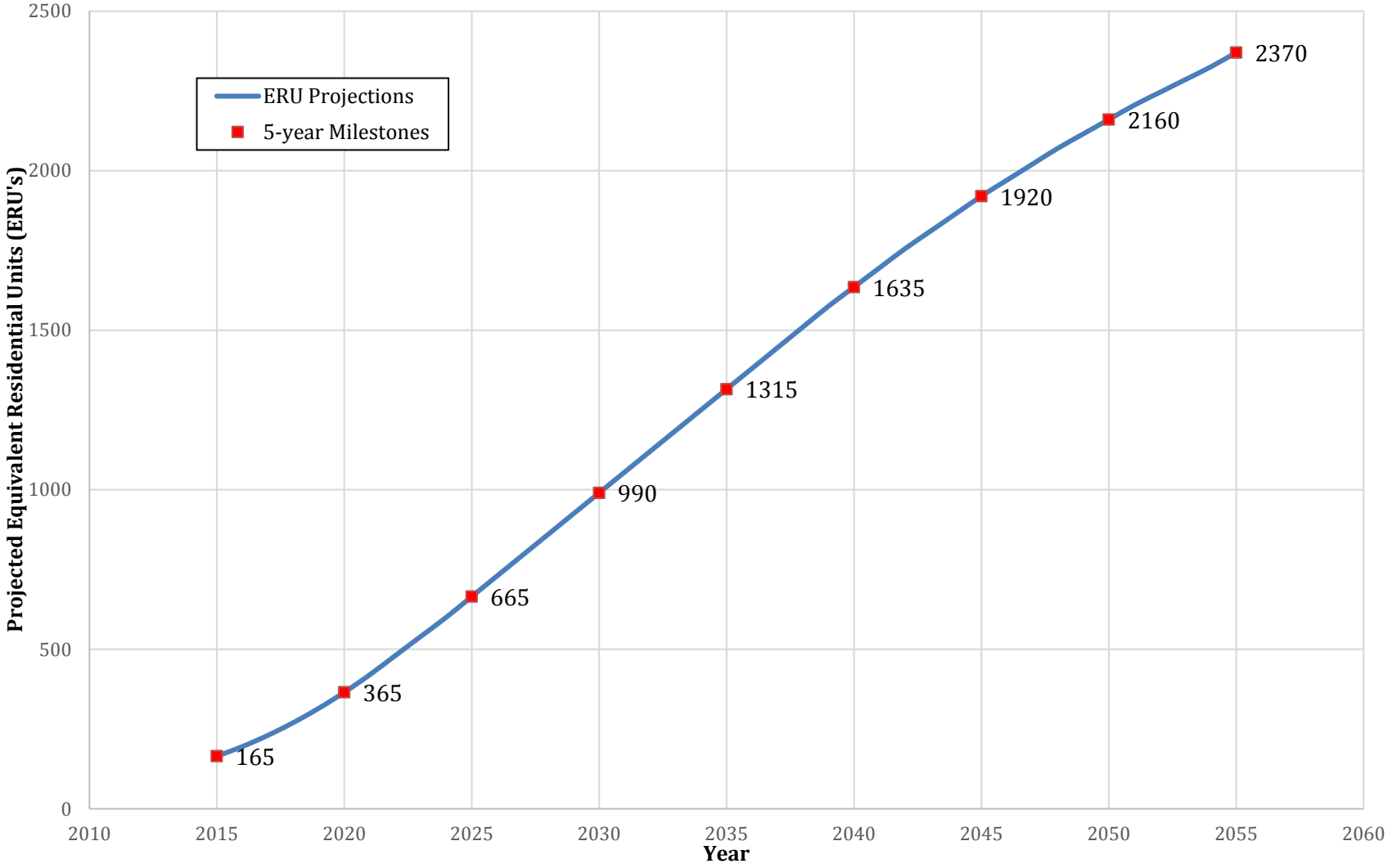

Table 2-1
Summary of Growth Projections for NVSSD

	ERUs	Average Annual Growth
2015	165	-
2020	365	17%
2025	665	13%
2030	990	8%
2035	1315	6%
2040	1635	4%
2045	1920	3%
2050	2160	2%
2055	2370	2%

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 NVSSD 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, consistent with the values used for dedicating capacity during the initial construction District facilities. This equates to 892 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 567 GPD per ERU for outdoor use. These values are consistent with other master plans for systems of similar size and nature to NVSSD.

  The actual water use in the District will vary over time. As a result, it is important that NVSSD 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 NVSSD 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, 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 2.1. This is consistent with other master plans for systems of similar size and nature to NVSSD.

- **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 NVSSD 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	165	147,180	164	56,100
2020	365	325,580	364	124,100
2025	665	593,180	663	226,100
2030	990	883,080	987	336,600
2035	1,315	1,172,980	1,310	447,100
2040	1,635	1,458,420	1,629	555,900
2045	1,920	1,712,640	1,913	652,800
2050	2,160	1,926,720	2,153	734,400
2055	2,370	2,114,040	2,362	805,800

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 NVSSD water system is a relatively new system, there is no reliable data for the NVSSD 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 NVSSD use the current demand numbers without further conservation for planning purposes. In future years, NVSSD 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.

CHAPTER 3
WATER SUPPLY EVALUATION

INTRODUCTION

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

WATER SOURCES

NVSSD currently relies on the Keetley Water Treatment Plant (Keetley WTP) as its only water source. However, NVSSD does not have any purchased capacity in the Keetley WTP; the capacity NVSSD is using in the Keetley WTP is on loan from JSSD. Furthermore, the capacity in the Keetley WTP has been committed to other developments in the JSSD system. Though JSSD does not need the committed water for other developments yet, it will be necessary for NVSSD to procure its own water source in the long term. As an alternative to the Keetley WTP, NVSSD plans to purchase the Best Ranches Well (which is currently owned by JSSD) and use it as the main source for the District. Best Ranches Well has a capacity of 600 GPM which could serve up to 480 ERUs.

Water Rights

A detailed analysis of the water rights and actual availability of water to the Best Ranches Well or other potential sources of supply 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 Best Ranches Well and other future sources be completed as part the JSSD water rights study. Following the completion of a water rights study, 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.

Comparison of Source Yield to Projected Demand

Source yield is compared to projected demand in Figure 3-1. The projected actual peak demand for NVSSD through 2055 (as calculated in Chapter 2) is shown on Figure 3-1. Also shown in the figure is the needed future water supply to provide water for the NVSSD system over the next 40 years.

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

- Though NVSSD currently relies on the capacity in the Keetley WTP, that capacity is on loan to NVSSD, and NVSSD needs to procure its own water source. The District's plan

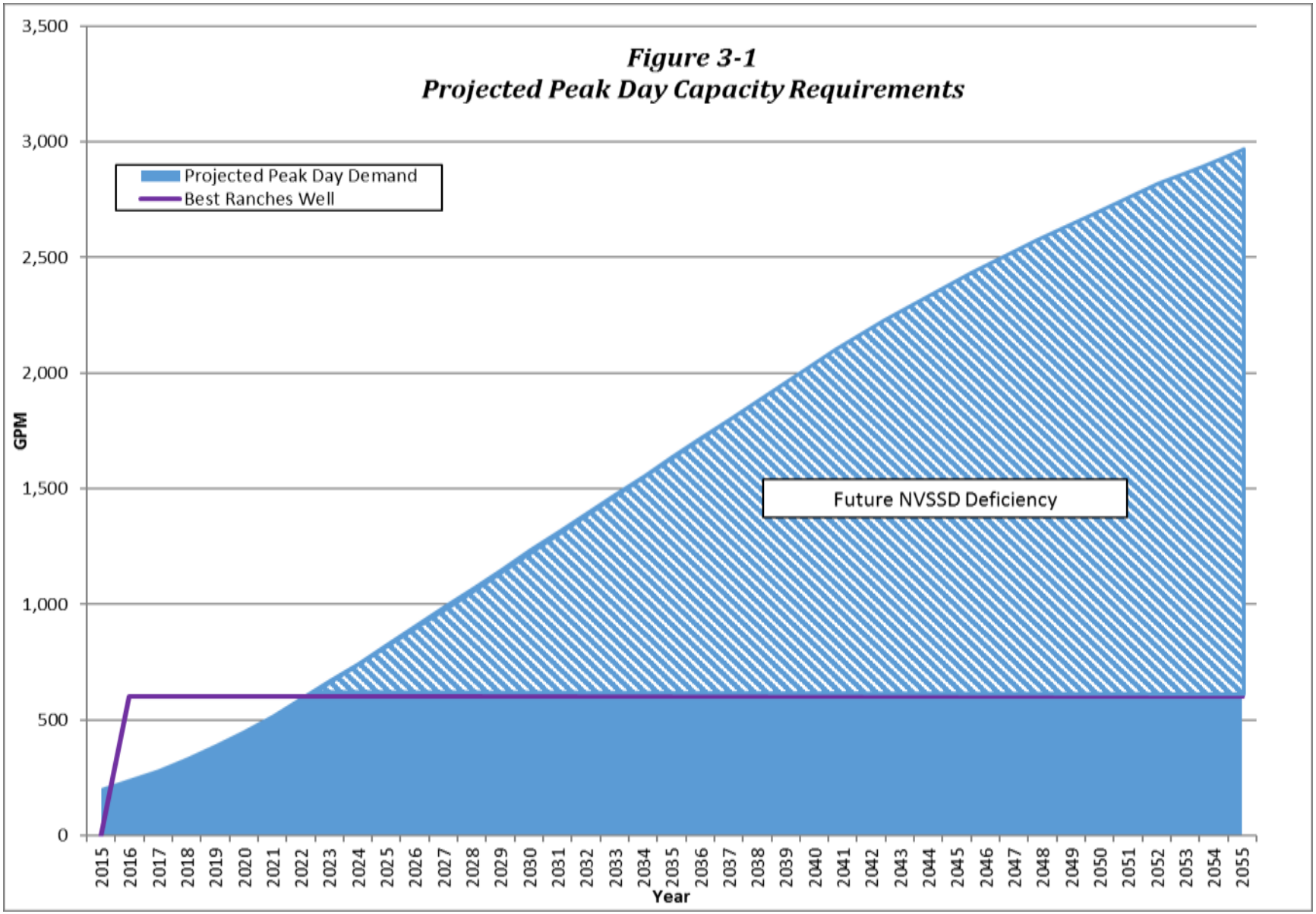
Figure 3-1
Projected Peak Day Capacity Requirements
Projected Peak Day Demand
Best Ranches Well
Future NVSSD Deficiency
GPM
Year
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
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2055

is to purchase the Best Ranches Well from JSSD. The Best Ranches Well will serve up to 480 NVSSD customers, which should meet demand through the year 2022.

- Another source will need to be developed for the NVSSD system between 2020 and 2025 depending on development. Because the JSSD and NVSSD water systems are interconnected, the future source could be developed in partnership with JSSD. The JSSD master plan shows that the Keetley WTP will need to be expanded, and also that a new WTP will need to be constructed to meet future JSSD water needs. Either of those projects could be pursued as a partnership between JSSD and NVSSD.

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–2 – Best Ranches Well –** NVSSD will need its own water source as soon as feasible. It is recommended that NVSSD purchase the Best Ranches Well from JSSD and utilizing it as the main water source for the next years.
- **SP–3 – Future Source with JSSD –** It is expected that JSSD will be expanding its water sources over the next several years. Because the JSSD and NVSSD water systems are interconnected, it is recommended NVSSD contribute to either the Keetley WTP expansion or a future treatment plant. The future source would then be available to meet NVSSD and JSSD water source needs.

CHAPTER 4
EXISTING WATER DISTRIBUTION FACILITIES

INTRODUCTION

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

PIPELINES

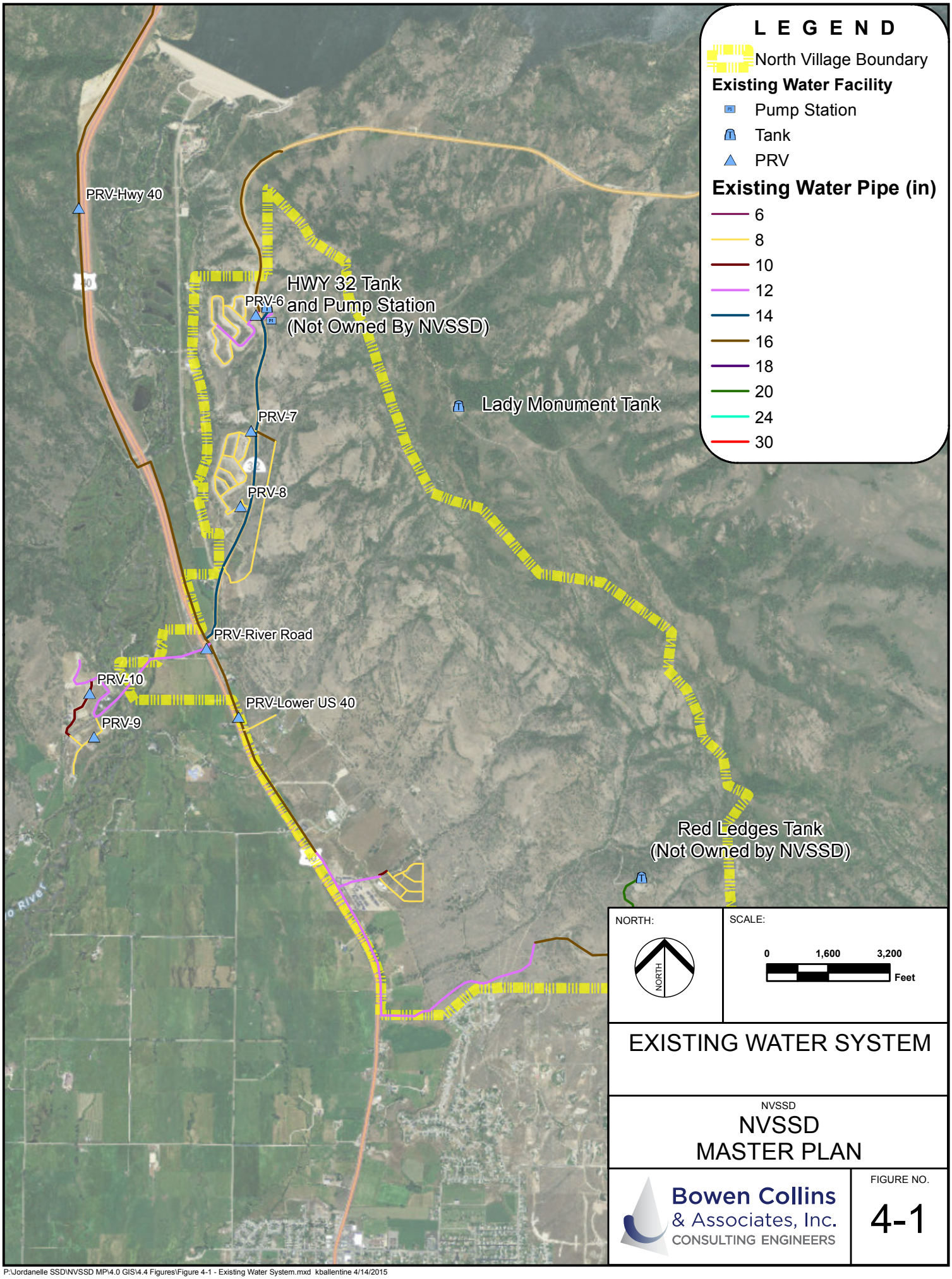
The NVSSD distribution system is composed of distribution and transmission pipelines up to 16 inches in diameter. Figure 4-1 shows the distribution piping and Table 4-1 summarizes the total length of pipe in the system. Based on data provided in the GIS database, most of the pipelines are made of ductile iron.

Table 4-1
Summary of Pipeline Data

Pipe Diameter (inches)	Total Length (feet)	Total Length (miles)	Percentage of Network
8	27,801	5.27	27.7%
10	1975	0.37	2.0%
12	19,438	3.68	19.3%
14	9030	1.71	9.0%
16	40,682	7.71	40.5%
Totals	**98,927**	**18.7**	**100%**

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 4-2 shows a summary of the PRVs and their settings.



EXISTING WATER SYSTEM

NVSSD

NVSSD MASTER PLAN

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FIGURE NO.

4-1

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Table 4-2
Summary of PRVs

Identifier	From Static HGL (ft)	To HGL (ft)	Elevation (ft)
PRV-Lower US 40	6318	6190	5708
PRV-River Road	6318	6200	5712
PRV-9	6174	5934	5667
PRV-10	6174	5902	5811
PRV-8	6318	6139	5908
PRV-7	6318	6139	6020
PRV-6	6789	6318	6233
PRV-Hwy 40	6500	6318	6114

OTHER FACILITIES

NVSSD currently does not own any treatment plants, storage facilities, booster stations, or wells.

CHAPTER 5
STORAGE CAPACITY EVALUATION

INTRODUCTION

The purpose of this chapter is to evaluate the NVSSD storage capacity. As part of this evaluation, a storage analysis was completed to determine NVSSD needs to meet equalization, emergency and fire flow storage requirements adequately.

EXISTING SYSTEM CHARACTERISTICS

Currently, NVSSD does not own a water storage tank. It is using temporary surplus storage capacity in the JSSD system. To meet its long-term needs, the District will need to either purchase permanent capacity in JSSD storage reservoirs or construct tanks of its own.

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 NVSSD 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. A severe water supply emergency relative to storage analysis would be an extended power outage that prevents the water being treated at the Keetley WTP or being pumped from the Best Ranches Well. 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 NVSSD 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. For master planning purposes, the fire suppression storage volume is 3,500 gpm for 3 hours (630,000 gallons).

ESTIMATED EXISTING AND FUTURE STORAGE REQUIREMENTS

An evaluation of the NVSSD water storage facilities for projected demands was completed. Figure 5-1 shows the needed storage requirements for the NVSSD through 2055. As can be seen in the figure, NVSSD will need almost 3 million gallons of storage to meet projected demands within the planning window.

Historically, the District has been able to use surplus storage in the JSSD system. If an agreement could be worked out between JSSD and NVSSD to secure permanent storage capacity in the JSSD system, then NVSSD's storage needs could be met for the next 10 to 15 years. Hydraulically, NVSSD could potentially use capacity from either the East Park or HWY 32 Tanks. Based on projections from the JSSD Water Master Plan, there are approximately 1,500,000 gallons of surplus storage available in these tanks (at the end of the planning window) that could potentially be used by NVSSD.

New storage will need to be constructed for any demands beyond what can be satisfied through a purchase from JSSD. To meet the storage requirements in 2055, NVSSD will need to construct an additional 1.5 million gallons of storage, as shown on Figure 5-1.

RECOMMENDATIONS

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

- **ST-1 – Purchase Storage Capacity from JSSD** – It is recommended that NVSSD purchase capacity from JSSD to meet their storage needs. It appears that JSSD will have approximately 1.5 million gallons of surplus capacity that could be sold to NVSSD. If an agreement can be secured for this storage, it will be adequate to satisfy the projected needs of the NVSSD service area through approximately 2030.
- **ST-2 – Future Tank –** Beyond what can be purchased from JSSD, an additional tank will need to be constructed to serve the NVSSD area. Based on information provided by developers in NVSSD, the tank could be built on the hillside above NVSSD. This tank was identified in the previous master plan as the Wasatch Commons Tank.

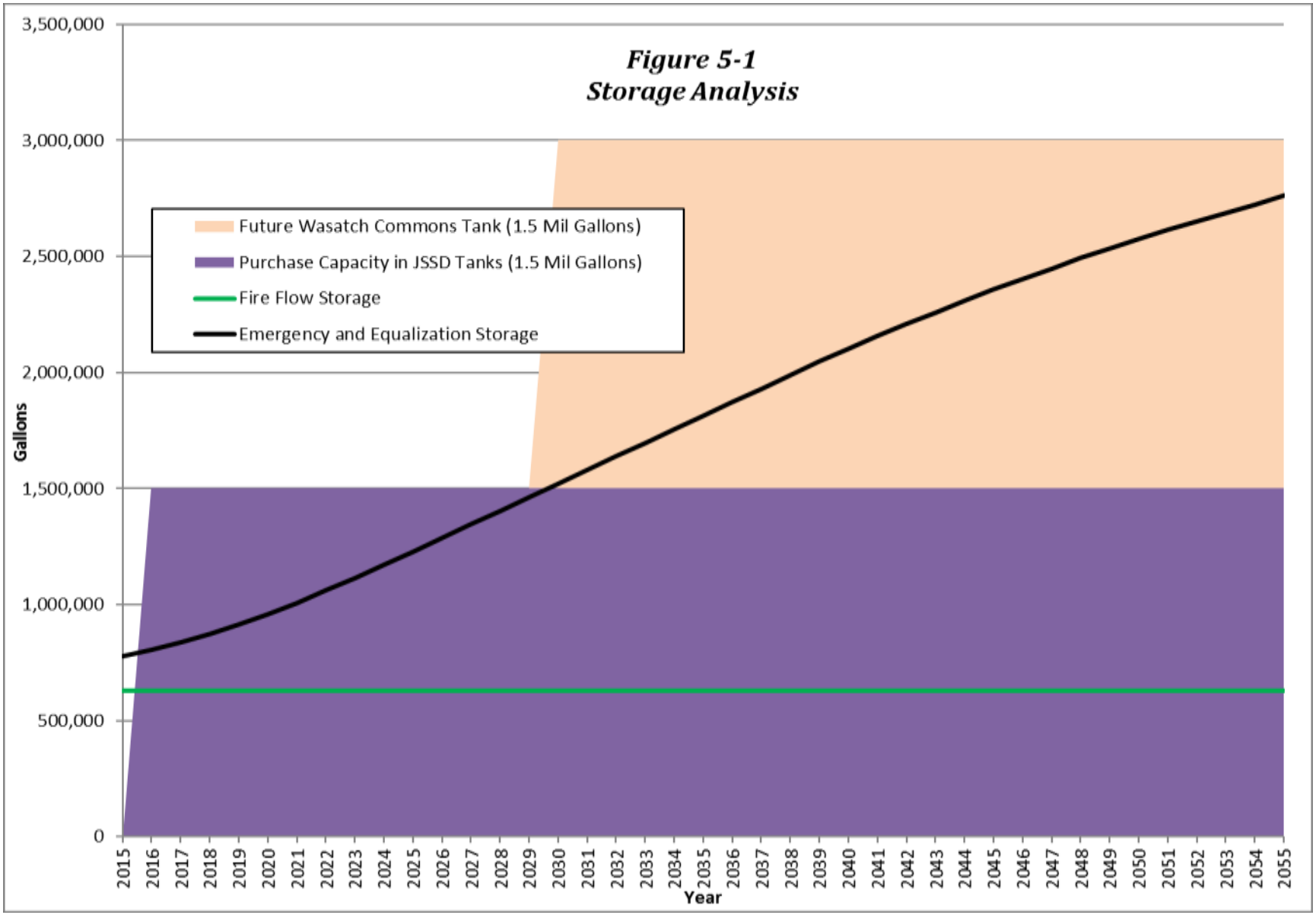
Figure 5-1
Storage Analysis
Future Wasatch Commons Tank (1.5 Mil Gallons)
Purchase Capacity in JSSD Tanks (1.5 Mil Gallons)
Fire Flow Storage
Emergency and Equalization Storage
Gallons
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
2015
2016
2017
2018
2019
2020
2021
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2055
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CHAPTER 6
DISTRIBUTION SYSTEM EVALUATION

INTRODUCTION

In order to evaluate the ability of the NVSSD water distribution system to serve the needs of its existing and future customers, a hydraulic model was created using NVSSD Geographic Information System (GIS) data, information provided by NVSSD 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 NVSSD 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 coefficient of 110 for all sizes of pipe.

Source Connections.

- The Best Ranches Well and the potential future treatment plant 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.

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 with sold capacity. 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 NVSSD area.

- **Total Production Requirement –** Demand projections for the NVSSD service area have been presented in detail in Chapter 2.
- **Distribution of Demand –** Demand was distributed through the NVSSD area based on current development distribution and projected development patterns. Since not every individual connection can be represented in the model, nodes must represent the demand for a number of connections. For existing demands, the total demand for the node varies based on the number of connections it represents, and was approximated based a recent digital aerial photo. As defined in Chapter 2, future demand was estimated based on development area projections.

- **Distribution of Demand Considering Sold Capacity –** It is necessary to consider the effect of sold capacity in the water transmission and distribution system. A demand

scenario that considered sold capacity was also entered into the model. The total number of sold units is 2,610 ERUs. For evaluation purposes, it was estimated that approximately 90 percent of all units developed in NVSSD during the planning window will come from properties that participated in the bonds for the initial construction of the transmission facilities.

Supply

Each of the years modeled had the following supply scenarios:

1. **Existing** – The only source available in the existing model is the existing Best Ranches Well.
2. **2055** – The sources available in 2055 will be the Best Ranches Well and the Keetley WTP or a future treatment plant source.

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

Recommended Future Model Improvements

The model prepared for this report has been developed using the best available data from NVSSD. 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.
- **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 NVSSD 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. **System Pressures** – The system meets the recommended system criteria of 60 psi during peak hour production.
4. **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, two improvements have been identified.

- **T-1 - System Loop Transmission Pipeline** – This improvement is needed to create a redundant loop for the main transmission pipe. Because the pipe that loops the system will service multiple developments, it is being considered a system improvement.

- **T-2 – Tank Connection Transmission Pipeline –** A pipe will be needed to connect the main system to the future tank (see Improvement ST-2 in Chapter 5). The connection will service multiple developments, and is considered a system improvement.

CHAPTER 7
CAPITAL FACILITIES PLAN – WATER

INTRODUCTION

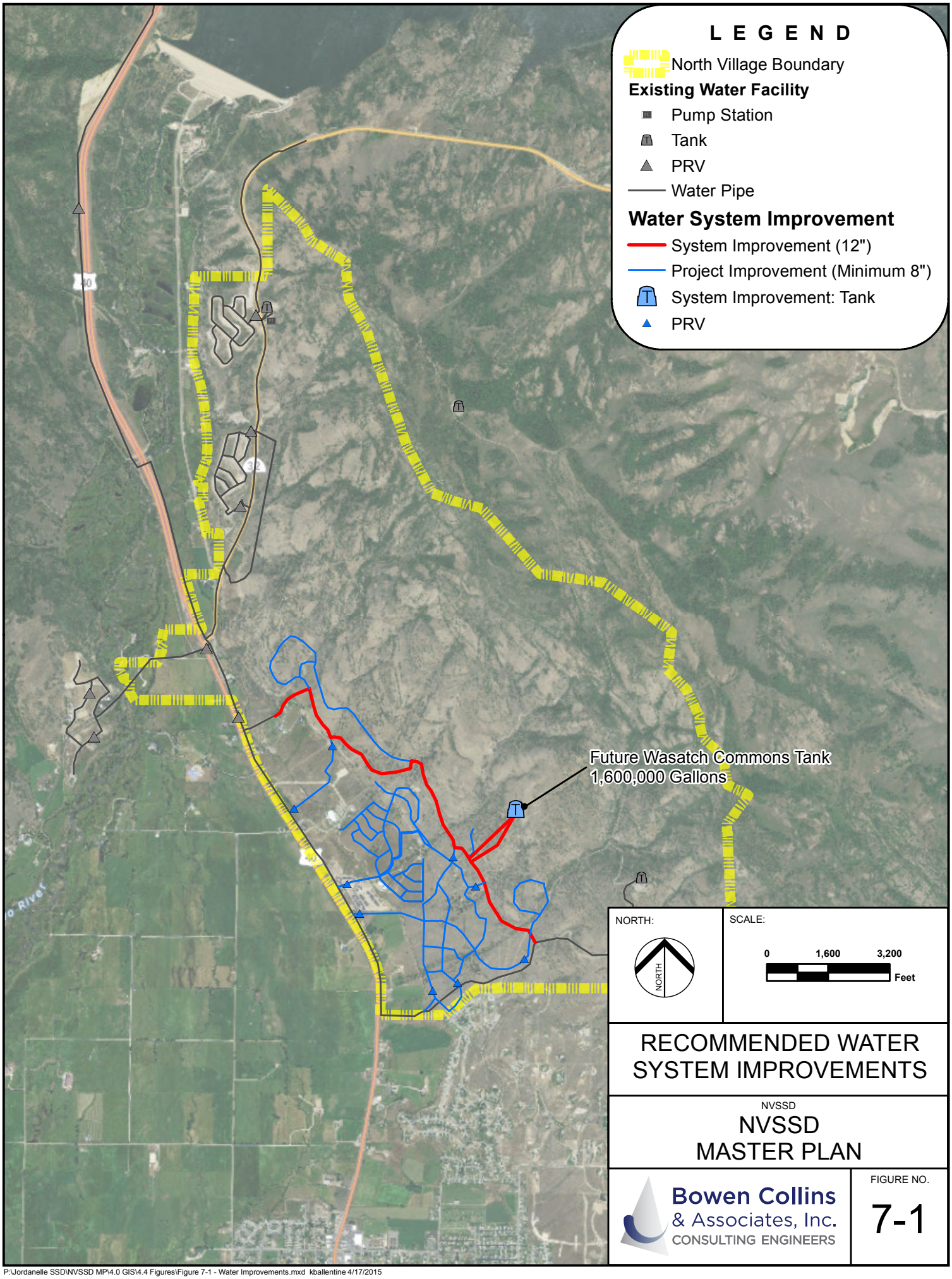
Recommended capital improvements pertaining to water supply, storage facilities, and distribution system facilities were identified in Chapters 3, 5, and 6, respectively. The purpose of this chapter is to summarize those recommended improvements and present a cost estimate for those recommended improvements.

CAPITAL IMPROVEMENT PLAN SUMMARY

The recommended capital improvements for NVSSD 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 NVSSD 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	**Updated IFFP**	1	LS	$30,000	-	-	$30,000
SP-2	**Best Ranches Well**	1	LS	$650,000	-	-	$650,000
SP-3	**Future Source**	1	LS	$4,158,000	$4,158,000	$624,000	$4,782,000
SUPPLY IMPROVEMENT PROJECTS							**$5,462,000**



RECOMMENDED WATER SYSTEM IMPROVEMENTS

NVSSD

NVSSD 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	**Purchase JSSD Storage**[1]	1,500,000	Gal	-	$993,153	$148,973	$1,142,126
ST-2	**Future Tank**	1,500,000	Gal	$0.81	$1,220,000	$183,000	$1,403,000
TOTAL STORAGE IMPROVEMENTS							**$2,545,126**

[1] Existing Facility. Total cost represents actual construction costs with associated engineering fees.

Table 7-3
Conveyance and Distribution Improvements

Project	Description	Quantity	Unit	Unit Cost	Construction Cost	Engineering (15%)	Total Project Cost
CONVEYANCE AND DISTRIBUTION IMPROVEMENTS							
T-1	**System Loop Transmission Pipeline**	11,200	LF	$132	$1,478,000	$222,000	$1,700,000
T-2	**Tank Connection Transmission Pipeline**	3,120	LF	$132	$412,000	$62,000	$474,000
CONVEYANCE AND DISTRIBUTION IMPROVEMENTS							**$2,174,000**

The transmission pipeline that loops the system will need to be constructed in the next 10 years. The transmission pipeline that connects the system to the future tank will need to be built after the Future Tank (ST-2) is constructed, which is anticipated to be more than 10 years from now.

IMPLEMENTATION PLAN

Project prioritization, implementation, and a 10-yr budget plan for water system improvements are discussed in Chapter 14.

CHAPTER 8
WATER SYSTEM RENEWAL

INTRODUCTION

In addition to the capacity related improvements described in previous chapters, it is recommended that NVSSD 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 NVSSD expect. To maintain the water system in good operating condition, it is recommended that the NVSSD 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 NVSSD water system is estimated to be $14 million. This estimate has been prepared using the NVSSD GIS database and includes the value of NVSSD pipelines and PRVs.
- **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 NVSSD system is between 50 and 100 years.

Based on these estimates, the annual capital improvements budget for NVSSD could be set at somewhere between $140,000 and $280,000. Because the system is relatively new, and because the existing distribution piping has capacity to meet demands through the year 2055, the initial NVSSD system renewal budget should be approximately $35,000. As the number of users increases this should be increased until the estimated budget is reached.

CHAPTER 9
EXISTING SEWER FACILITIES

INTRODUCTION

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

COLLECTION SYSTEM

NVSSD's sewer collection system consists of a single area along Highway 42 as shown in Figure 9-1. Currently, the system can be classified in two sections. The North section consists of facilities that collect flows from development north of the Highway 32 and Highway 40 Interchange, while the South section collects flows south of the interchange. These two sections currently combine at the interchange 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. Unfortunately the location of these lines has not been collected for mapping purposes and are not shown. 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 modeled pipelines in the NVSSD sewer collection system that were modeled in this master plan. This is separated into gravity pipes and force mains. In addition, there is approximately 18,500 linear feet of 8" sewer collection lines. Collection lines have not been inventoried for mapping purposes and were estimated based on street lengths in developed areas.

L E G E N D

- JSSD WWTP
- Purchased Lift Station
- Existing Lift Statioin
- 8" Gravity
- 10" Gravity
- 12" Gravity
- 15" Gravity
- 18" Gravity
- 8" Force Main
- Parallel 12" Force Main

STP

GS0

GS1

GS2

GS3

GS4

GS5

GS6

GS7

FM1

FM2a

To Heber Valley
Reclamation Facility

Old Highway 40

Treemont Dr

Oldgate Rd

River Meadows Dr

University Ave

College Way

Commons Blvd

Callaway Dr

Ridge Dr

Valley Dr

Potter Ln

2400 N

1800 N

1130 W

North Field Rd

32

40

NORTH:

NORTH

SCALE:

0 750 1,500 Feet

EXISTING SEWER COLLECTION FACILITIES

NVSSD

WATER AND SEWER MASTER PLAN

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

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"	3,567	0.7	26.2%
10"	1,868	0.4	13.7%
12"	1,582	0.3	11.6%
15"	5,684	1.1	41.7%
18"	917	0.2	6.7%
Total	13,618	2.6	
Force Mains			
Pipe Diameter	**Length (ft)**	**Length (mi)**	**% of Total**
8"	11,398	2.2	54.0%
12"	9,699	1.8	46.0%
Total	21,097	4.0	

[1] Does not include collection pipelines outside the District's main trunk lines.

LIFT STATIONS

NVSSD currently has 1 sewer lift stations, but a second packaged lift station has been purchased and is planned to be installed near the intersection of Highway 40 and Coyote Lane. Figure 9-1 shows both lift stations, while Table 9-2 summarizes the capacity of the lift stations.

Table 9-2
Summary of Major District Lift Stations

Lift Stations	Capacity (gpm)
University Lift Station	450
Purchased Coyote Lane Lift Station Skid	510

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 its wastewater. 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. Based on NVSSD's previous master plan it has historically been planned that NVSSD send wastewater to JSSD's WWTP in the future. However, NVSSD does not have any

reserved capacity at the existing WWTP for future growth and all capacity at the existing plant has been sold to other users. This means that all future connections will need to purchase capacity in the next expansion of the JSSD WWTP.

CHAPTER 10
COLLECTION SYSTEM EVALUATION

INTRODUCTION

In order to evaluate the ability of the NVSSD sewer collection system to serve the needs of its existing and future customers, a hydraulic model was created using Microsoft Excel, 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 NVSSD personnel.

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 NVSSD 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 as-build drawings and field data collection provided by NVSSD personnel. The data included pipe diameter, length, location, rim elevations, and measure down depths/invert elevations.

Modeled Lift Stations

One existing lift stations was included in the model of the NVSSD system along with a purchased lift station that is planned to be installed in the near future. The two lift stations (University and Coyote Lane) 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 9 discharge points as shown on Figure 10-1. 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. It has been estimated that 10% of the growth within North Village will come from properties outside of those that have already purchased capacity.

In addition to conveying flow from NVSSD, it is expected that the existing facilities may be used to convey flow from the Red Ledges development. Current plans call for Red Ledges to build a pipeline from its development to the University Lift Station. Red Ledges will then participate in any improvements required to convey its flow from the lift station to the JSSD WWTP. As a result of this plan, projected flows from Red Ledges (as developed in the Twin Creeks SSD Master Plan) have been added to the conveyance model.

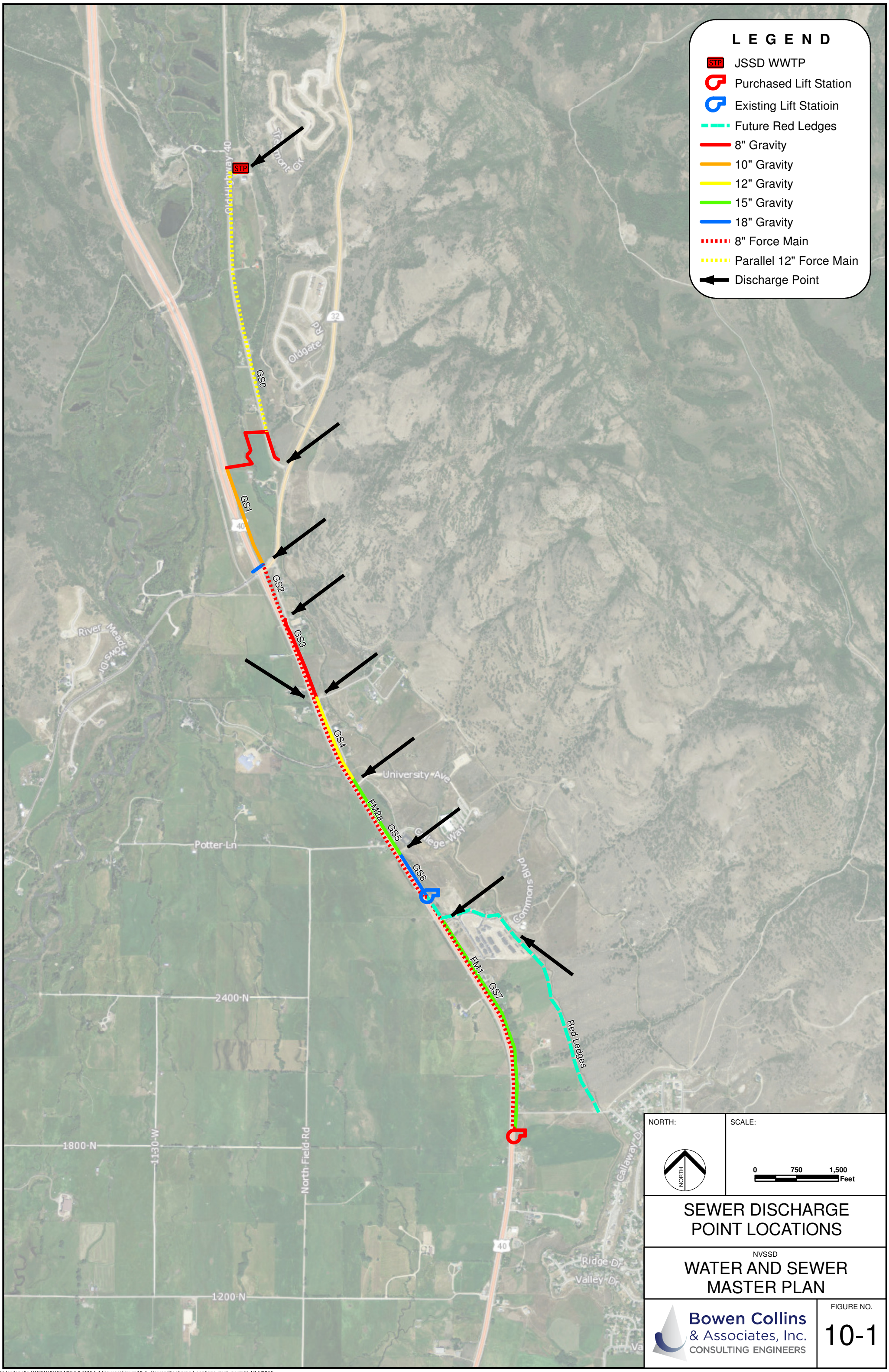

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Table 10-1
Projected Upstream Development by Pipe – Actual Connections (ERUs)

Label	2015 ERU's	2025 ERU's	2055 ERU's
GS0 (FM3)	50	0 (95)[1]	0 (95)[1]
GS1	120	100	100
GS2	0	127	225
GS3	0	154	350
GS4	0	225	676
GS5	0	270	886
GS6	45	322	1127
GS7	0	248	1148
FM1	0	248	1148
FM2a	45	823	3485
FM2B	0	823	3485
FM3	0	823	3485
Total NVSSD ERU's	165	665	2370
Total Red Ledges ERU's	0 (97)[2]	253	1210

1 Force Main 3 is currently operated as a gravity pipeline (referred to as GS0 in table). Flows currently conveyed by gravity in this pipeline will be diverted to the JSSD WWTP and FM3 will be turned back into a force main.

2 Currently Red Ledges sends sewage to Heber Valley Reclamation Facility, but flows are planned to be taken to JSSD for treatment in the future.

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

Label	2015 Peak Hour Flows	2025 Peak Hour Flows	2055 Peak Hour Flows
GS0 (FM3)	30	0 (56)[1]	0 (56)[1]
GS1	71	59	59
GS2	0	75	133
GS3	0	91	207
GS4	0	133	399
GS5	0	159	523
GS6	27	190	665
GS7	0	146	678
FM1	0	146	678
FM2a	27	486	2057
FM2B	0	486	2057
FM3	0	486	2057
Total NVSSD Flows	97	393	1399
Total Red Ledges Flows	0 (57)[2]	149	714

1 Force Main 3 is currently operated as a gravity pipeline (referred to as GS0 in table). Flows currently conveyed by gravity in this pipeline will be diverted to the JSSD WWTP and FM3 will be turned back into a force main.

2 Currently Red Ledges sends sewage to Heber Valley Reclamation Facility, but flows are planned to be taken to JSSD for treatment in the future.

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

Label	2015 ERU's	2025 ERU's	2055 ERU's
GS0 (FM3)	110	0 (115)[1]	0 (115)[1]
GS1	118	121	121
GS2	248	259	273
GS3	385	399	424
GS4	744	761	819
GS5	976	1005	1073
GS6	1246	1277	1365
GS7	1264	1292	1391
FM1	1264	1292	1391
FM2a	2607	2821	3966
FM2B	2607	2821	3966
FM3	2607	2821	3966
Total NVSSD ERU's	2620	2684	2871
Total Red Ledges ERU's	0 (97)[2]	253	1210

1 Force Main 3 is currently operated as a gravity pipeline (referred to as GS0 in table). Flows currently conveyed by gravity in this pipeline will be diverted to the JSSD WWTP and FM3 will be turned back into a force main.

2 Currently Red Ledges sends sewage to Heber Valley Reclamation Facility, but flows are planned to be taken to JSSD for treatment in the future.

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

Label	2015 Peak Hour Flow (gpm)	2025 Peak Hour Flow (gpm)	2055 Peak Hour Flow (gpm)
GS0 (FM3)	65	0 (68)[1]	0 (68)[1]
GS1	70	72	72
GS2	146	153	161
GS3	228	236	250
GS4	439	449	483
GS5	576	593	634
GS6	736	754	806
GS7	746	762	821
FM1	746	762	821
FM2a	1539	1665	2341
FM2B	1539	1665	2341
FM3	1539	1665	2341
Total NVSSD ERU's	1546	1584	1694
Total Red Ledges ERU's	0 (57)[2]	149	714

1 Force Main 3 is currently operated as a gravity pipeline (referred to as GS0 in table). Flows currently conveyed by gravity in this pipeline will be diverted to the JSSD WWTP and FM3 will be turned back into a force main.

2 Currently Red Ledges sends sewage to Heber Valley Reclamation Facility, but flows are planned to be taken to JSSD for treatment in the future.

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. It should also be noted that Red Ledges has purchased 1,210 ERU's capacity in JSSD's WWTP and currently plans to convey this flow through NVSSD. With all potential flow from Red Ledges and sold capacity in NVSSD included, a few deficiencies were found with the existing system.

Deficiencies

- **FM2a –** FM2a has less capacity than sold capacity for the system. This is by design as Lift Stations are designed to operate for a specific flow range. The District has planned to put a parallel line in as future flows approach existing pipe capacity.
- **FM2b –** FM2b does not currently exist, but was planned by the district once JSSD's new WWTP was operational. This project will connect NVSSD to JSSD's WWTP and eliminate the need for treating flows at the Heber Valley Reclamation Facility.
- **GS2 –** Once the transition is made to treat NVSSD flows at JSSD's new WWTP, a new 8" gravity line will be required to connect the pipelines north of the Hwy 40 and Hwy 32 interchange to the rest of the NVSSD system. This pipe will allow for flows to reach the University Lift Station and be lifted to JSSD's WWTP.
- **Lift Stations -** The University and Coyote Lane Lift Stations both 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 as actual developed flows in the system increase.

Along with the deficiencies in the existing system, the Jordanelle Ridge Platt B area will need to be diverted to JSSD's WWTP once the plant is operational.

FUTURE SYSTEM ANALYSIS

Most of demand associated with future growth is already represented in the existing system analysis as sold capacity. However, there is also a limited amount of future growth expected through 2055 that does not have purchased capacity and will further add to demands. It has been estimated that 10 percent of growth will be the result of development outside of areas that have already purchased capacity. With this small amount of additional projected growth, no additional deficiencies were identified beyond those listed above. 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.

CONCLUSIONS AND RECOMMENDATIONS

As stated earlier, much of the existing NVSSD 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.

- **LS1** – The district has already purchased a package pump skid to operate a lift station at the end of GS7. This lift station will need to be installed prior to any development along GS7. This lift station has a capacity of 600 gpm and would be installed as Phase 1 with capacity in the building to add additional capacity. Phase 2 would consist of installing an additional 400 gpm capacity for a total of 1,000 gpm, which is approximately 75 HP. Based on the districts standard of 85 percent pump efficiency it would give a design capacity of 850 gpm which exceeds the 2055 projected flows of 820 gpm.
- **LS2 –** With the planned connection to JSSD's new WWTP, a new pump will need to be installed to overcome the added head to pump flow to the new WWTP. Phase 1 consists of installing a lift station with capacity for 1,100 gpm or approximately 137 HP. Phase 2 consists of adding additional capacity for a total of 2,750 gpm or approximately 210 HP.
- **FM2a –** With the added flows from Red Ledges plus the anticipated growth in North Village, a new parallel 12" force main will be required to meet these flows. It is estimated that this additional pipe will be required by the year 2036.
- **FM2b –** This project is necessary to connect the NVSSD system to WWTP and will be necessary along with LS2 to allow NVSSD to convey flows to JSSD's WWTP.
- **GS2 –** A connection between the system north of the Hwy 40 and Hwy 32 Interchange and the area to the south will need to be made. An 8" gravity line is proposed to connect these two systems so only one lift station will be required to lift waste to the new JSSD WWTP.

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 for future NVSSD flows. Although this study does not contain a capacity study it refers to other studies to show the ability of JSSD's WWTP to treat sewage from North Village.

HEBER VALLEY RECLAMATION FACILITY

NVSSD currently sends all its wastewater to Heber Valley's Reclamation Facility for treatment. NVSSD 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 NVSSD'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 NVSSD to pursue longer-term alternatives for treatment. The existing pipeline that conveys flows from NVSSD to the Heber Valley Reclamation Facility is a shared facility with JSSD and has capacity to service demands for approximately 8-9 years, based on current projections. 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 in their district. Based on JSSD's master plan, the capacity in the plant has already been sold. However, there may be an opportunity to loan capacity to existing users with the intent of building new facilities as development occurs in areas who have already purchased capacity. If this type of agreement can be reached and the projections stated in the JSSD master plan are accurate, the WWTP will have capacity for approximately 10 years before an expansion would be required.

RECOMMENDATION

To provide treatment for NVSSD, it is recommended that NVSSD seek an agreement to borrow capacity in the JSSD WWTP on an interim basis. During this period, NVSSD will need to collect and set aside funds to purchase its own capacity in a future expansion of the plant. As JSSD grows and requires its purchased capacity, the flows from NVSSD can be displaced from the plant and moved into expanded treatment capacity to be constructed by JSSD.

Specific tasks required to follow this recommendation include:

- **Develop Agreement with JSSD –** NVSSD needs to work with JSSD to develop an agreement that allows NVSSD to use sold capacity in the WWTP today on an interim basis until expanded capacity is required.
- **System Improvements**

- Construct a force main to connect to north and south areas of NVSSD (FM2b see Chapter 10).
- Construct a gravity line to connect north and south areas of NVSSD (GS2 see Chapter 10).
- Upgrade University Lift Station to meet added head requirements (LS2 see Chapter 10).

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.

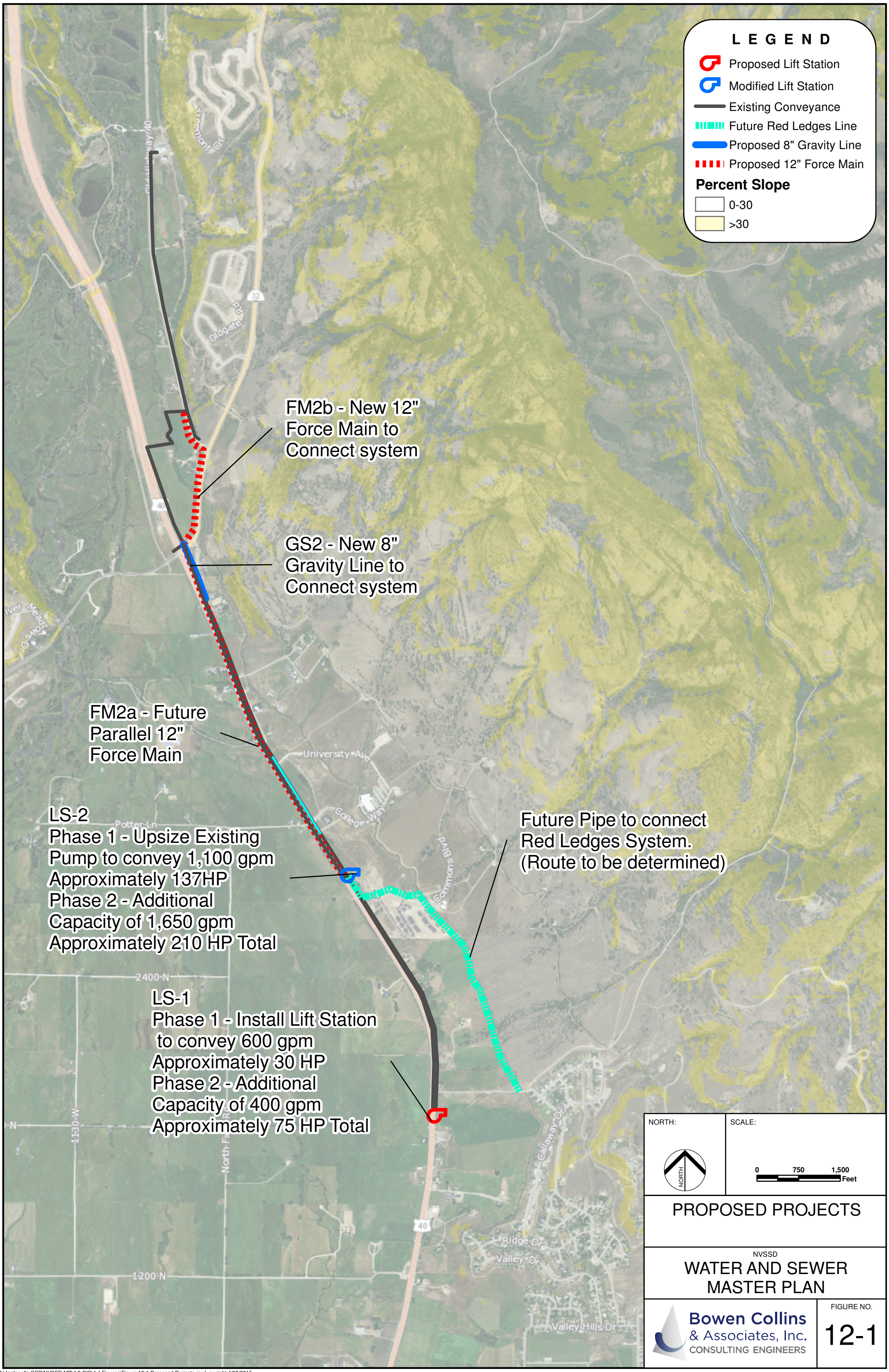
CAPITAL IMPROVEMENT PLAN SUMMARY

The recommended capital improvements for NVSSD have been summarized in Tables 12-1 and 12-2. 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 NVSSD 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
GS2	New 8” gravity line to connect two systems	$204,000	$31,000	$235,000
FM2a	Parallel 12” force main to convey future flows	$521,000	$78,000	$599,000
FM2b	New 12” force main to connect two systems	$201,000	$30,000	$231,000



PROPOSED PROJECTS

NVSSD

WATER AND SEWER MASTER PLAN

Bowen Collins & Associates, Inc. CONSULTING ENGINEERS

FIGURE NO. 12-1

P:\Jordanelle SSD\NVSSD MP\4.0 GIS\4.4 Figures\Figure 12-1 Proposed Projects.mxd nwright 4/30/2015

Table 12-2
Lift Station Improvements

Project	Description	Construction Costs (2014 Dollars)	Engineering (15%)	Total Project Cost
LS-1 Phase 1	Install Purchased Package Lift Station with capacity of 600 gpm	$266,000	$40,000	$306,000
LS-1 Phase 2	Install additional 400 gpm capacity.	$133,000	$20,000	$153,000
LS-2 Phase 1	Install New Lift Station with capacity of 1,100gpm	$572,000	$86,000	$658,000
LS-2 Phase 2	Expand Lift Station to provide additional 1,650 gpm of capacity (2,750 gpm total)	$781,000	$117,000	$898,000

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 NVSSD to be able to continue to provide reliable wastewater services to their customers for the foreseeable future.

It should also be noted that no improvements have been shown relative to treatment. It has been assumed that treatment will be on a contract basis with JSSD and that no separate capital improvements will be required from NVSSD for this purpose.

CHAPTER 13
SEWER SYSTEM RENEWAL

INTRODUCTION

In addition to the capacity related improvements described in previous chapters, it is recommended that NVSSD 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, NVSSD 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

NVSSD 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 NVSSD 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, NVSSD 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 NVSSD should be budgeting for the purpose of system renewal.

System Pipes

The total cost to replace all of the pipes in NVSSD's Collection system would be approximately $11.9 million based on 2015 construction costs. For the purposes of this evaluation, BC&A recommends that NVSSD 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 $120,000/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 $60,000/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 NVSSD 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 (2015 Dollars)[1]
Replacement of 100 percent of system components	$120,000
Rehabilitation of 100 percent of components	$60,000
50 percent replacement 50 percent rehabilitation	$90,000

[1] ENR=8566

Based on the table, BC&A would recommend that NVSSD budget an average of $90,000 annually (based on 2015 dollars) for system renewal. However, since most of NVSSD'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 $90,000 (adjusted for inflation).

As PACP coding results of NVSSD'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 NVSSD'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 NVSSD's lift station is estimated at approximately $375,000. 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, NVSSD should be spending approximately $10,000/year on lift station rehabilitation. This may include wet well rehabilitation, pump replacement, or control repairs.

Based on these estimates for both system pipes and lift stations, the annual capital improvements budget for NVSSD could be set somewhere around $100,000. However, because the system is relatively new, and because the existing system generally has capacity through the year 2055, increasing the annual budget to $100,000 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 NVSSD have a system renewal goal of at least $25,000. 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 NVSSD personnel in identifying pipes that are most critical based on their relative importance in NVSSD'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
10-YEAR BUDGET PLAN

INTRODUCTION

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

10 YEAR BUDGET PLAN

Table 14-1 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.

Table 14-1
10-Year Budget Plan for NVSSD's Water System

		Estimated 2015 Total Cost	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
T-1	Tank Connection	$ 1,700,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 688,570	$ -	$ 730,504	$ -	$ 774,992
SP-1	Water Master Plan	$ 30,000	$ -	$ -	$ -	$ -	$ -	$ 34,778	$ -	$ -	$ -	$ -	$ -

Table 14-2
10-Year Budget Plan for NVSSD's Sewer System

	Project Description	Estimated 2015 Total Cost*	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
GS-2	New 8" Gravity Line to connect North and South Sections	$ 235,000	$ -		$ 249,312	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
FM2B	New 12" Force Main to connect North and South Sections	$ 12,329	$ -	$ -	$ 13,079	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
LS-1 (Phase 1)	Coyote Ln Lift Station	$ 306,000	$ -	$ -	$ 324,635	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
LS-2 (Phase 1)	University Lift Station Upgrade	$ 35,118	$ -	$ -	$ 37,257	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Master Plan Update	Sewer Master Plan	$ 40,000	$ -	$ -	$ -	$ -	$ -	$ 46,371	$ -	$ -	$ -	$ -	$ -

* Inflation rate of 3.0% applied to capital costs in future year

WATER IMPACT FEE FACILITIES PLAN

June 2015

Project No. 056-15-02

Prepared for:

North Village Special Service District

Prepared by:

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

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EXECUTIVE SUMMARY

INTRODUCTION

North Village Special Service District (NVSSD 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 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 water 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 Master Plan. Table ES-1 provides a summary of the demands under existing and 10 year growth conditions.

Table ES-1
NVSSD Service Area

Item	Existing	10-Year Projected	Existing Including Sold Capacity	10-Year Projected Including Sold Capacity
Equivalent Residential Units (ERUs)	165	665	2,620	2,684
Average Day Flow (gpm)	102	412	1,623	1,663
Peak Day Flow (gpm)	206	831	3,275	3,355
Peak Hour Flow (gpm)	309	1,247	4,912	5,033
Flows per ERU				
Average Day Flow (gpd/ERU)	892	892	892	892
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 conveyance improvement projects to serve 10-year growth are summarized in Table ES-2 and ES-3.

Table ES-2
Project Costs Allocated to Projected Development with Bonded Credits, 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 Non-bonded Growth Beyond 10-years
T-1	System Loop Transmission Pipeline	$ 1,700,000	0%	0%	3%	0%	97%	$ -	$ -	$ 51,668.86	$ -	$ 1,678,331.14

SECTION 1
INTRODUCTION

North Village Special Service District (NVSSD or the District) has retained Bowen Collins & Associates (BC&A) to prepare an impact fee facility plan (IFFP) for water delivery 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 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 following sections of this report have been organized to address each of these requirements.

SOLD CAPACITY

NVSSD 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 bond that was 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 existing demands and committed future demands from those who participated in the infrastructure bond.

For discussion purposes, 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:

- **Treatment Facilities** – NVSSD currently relies on the Keetley Water Treatment Plant (Keetley WTP) as its only water source. However, NVSSD does not have any purchased capacity in the Keetley WTP; the capacity NVSSD is using in the Keetley WTP is on loan from JSSD. Furthermore, the capacity in the Keetley WTP has been committed to other developments in the JSSD system. Though JSSD does not need the committed water for other developments yet, it will be necessary for NVSSD to procure its own water source in the long term.

- **Storage Facilities** – Currently, NVSSD does not own any water storage capacity. It is using temporary surplus storage capacity in the JSSD system. To meet its long-term needs, the District will need to either purchase permanent capacity in JSSD storage reservoirs or construct tanks of its own.

- **Conveyance Facilities** – Some of the major conveyance facilities in NVSSD 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 two 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.

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
NVSSD Service Area

Item	Existing	Existing Plus Remaining Sold Capacity
Equivalent Residential Units (ERUs)	165	2,620
Average Day Flow (gpm)	102	1,623
Peak Day Flow (gpm)	206	3,275
Peak Hour Flow (gpm)	309	4,912
Flows per ERU		
Average Day Flow (gpd/ERU)	892	892
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 NVSSD 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 NVSSD study area has been estimated based on the current zoning. For master planning purposes, the fire suppression storage volume 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 NVSSD 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 2-2 summarizes the existing level of for the NVSSD system for each component.

Table 2-2
Summary of Level of Service

Criteria	Value
Average Day Demand	892 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 section, 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
NVSSD Service Area Projected 10-year

Item	10-Year Projected	10-Year Projected Plus Remaining Sold Capacity
Equivalent Residential Units (ERUs)	665	2,684
Average Day Flow (gpm)	412	1,663
Peak Day Flow (gpm)	831	3,355
Peak Hour Flow (gpm)	1,247	5,033
Flows per ERU		
Average Day Flow (gpd/ERU)	892	892
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 the 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

As stated earlier, the district uses the Keetley WTP as its only water source. However, the capacity in the Keetley WTP is on loan from JSSD. Furthermore, the capacity in the Keetley WTP has been committed to other developers. Therefore, there is no excess capacity in the Keetley WTP for use by future users. While the Keetley WTP does not have capacity for NVSSD, JSSD does have a well which could be used to meet existing and future demands. The Best Ranches Well is in an ideal location to serve NVSSD customers, and has capacity for 480 ERUs. Of the capacity for 480 ERUs, 165 ERUs are existing and 315 ERUs will be future ERUs.

STORAGE

Currently, NVSSD does not own any water storage capacity. It is using temporary surplus storage capacity in the JSSD system. Therefore, there is no excess capacity in the NVSSD storage system that can be used by future users. Similar to the Production/Treatment situation, JSSD does had a tank which could be used to meet existing and future demands. The HWY 32 tank is in an ideal location to serve NVSSD customers, and has capacity for 967 ERUs. Of the capacity for 967 ERUs, 165 ERUs are existing and 802 ERUs will be future ERUs.

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 water demand 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
NVSSD Service Area ERU Projections

	Projected ERUs	Average Annual Growth	Projected ERUs Plus Remaining Sold Capacity	Average Annual Growth
2015	165		2,620	
2016	195	18.2%	2,626	0.24%
2017	230	17.9%	2,633	0.24%
2018	270	17.4%	2,639	0.24%
2019	315	16.7%	2,645	0.24%
2020	365	15.9%	2,652	0.24%
2021	420	15.1%	2,658	0.24%
2022	480	14.3%	2,665	0.24%
2023	540	12.5%	2,671	0.24%
2024	600	11.1%	2,678	0.24%
2025	665	10.8%	2,684	0.24%
2035	1,315	7.1%	2,755	0.26%
2045	1,920	3.9%	2,821	0.24%
2055	2,370	2.1%	2,871	0.18%

As can be seen in Table 5-1, there be will approximately 500 additional ERUs in the NVSSD area. Of those ERUs, about 436 will have bonded for capacity in the NVSSD transmission system and approximately 64 ERUs will not have bonded.

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 NVSSD Master Plan.

- **Existing Demand** – The demand existing development places on the NVSSD 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 NVSSD 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.

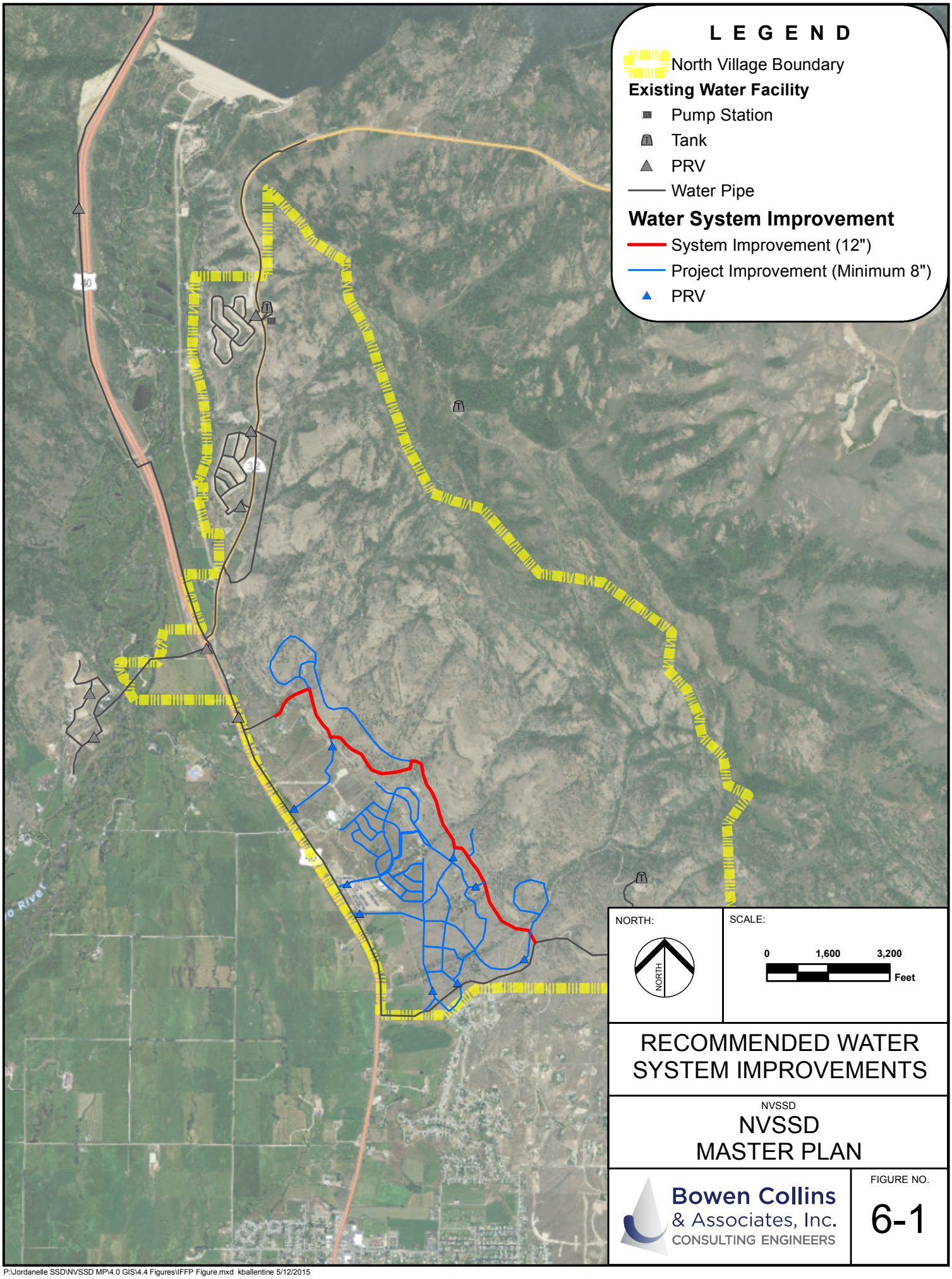
The steps listed above describe the "demands placed upon existing public facilities by new development activity at the proposed level of service; and… the means by which the political subdivision or private entity will meet those growth demands" (Section 11-36a-302-1.a of the Utah Code). Defining the capacity in terms of a single 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 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 the projects is based on projected flows plus sold capacity. If the District can reach an agreement with bonded users to temporarily use sold



RECOMMENDED WATER SYSTEM IMPROVEMENTS

NVSSD

NVSSD MASTER PLAN

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

FIGURE NO.

6-1

P:\Jordanelle SSD\NVSSD MP\4.0 GIS\4.4 Figures\IFFP Figure.mxd kballentine 5/12/2015

Table 6-1
Project Costs Allocated to Projected Development with Bonded Credits, 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 Non-bonded Growth Beyond 10-years
T-1	System Loop Transmission Pipeline	$ 1,700,000	0%	0%	3%	0%	97%	$ -	$ -	$ 51,668.86	$ -	$ 1,678,331.14

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.

Project Cost Attributable to Future Growth

To satisfy the requirements of state law, Table 6-1 and 6-2 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, costs have been divided proportionally between existing and future users based on their needs in the facility.

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 demands beyond the 10-year growth window. As summarized in the tables, the total cost of future projects in the impact fee facility plan that are attributable to future growth is approximately $1.7 million. Of these costs, approximately $52,000 is attributable to growth in the next ten years.

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 NVSSD will be using capacity in facilities constructed by bonded users. To properly credit bonded users, 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/PRODUCTION

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

- **SP-1: Best Ranches Well –** The Best Ranches well will be purchased from JSSD as the main source for the NVSSD system. That well will cost approximately $650,000. Of the total cost, 34.0 percent (approximately $221,000) is attributable to existing users and 66.0 percent (approximately $429,000) is attributable to future users in the next 10 years.

- **SP-2: Keetley WTP Expansion –** The Best Ranches well will serve NVSSD demands for approximately the 6 years, and other project will be required before within the 10 year window. As stated earlier in this report, the project will be the Keetley WTP expansion, which will be shared project with JSSD. The total cost for the Keetley WTP expansion will be $6,740,314 and is all attributable to future developments. Of the total cost of the Keetley WTP expansion, 4.2 percent (approximately $280,566) is attributable to growth in the next 10 years, and 95.8 percent (approximately $6,459,748) is attributable to growth after 10 years.

STORAGE

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

- **ST-1: HWY 32 Tank –** As stated earlier, NVSSD will be purchasing capacity in the HWY 32 tank. The cost of that capacity will be $1,142,126. Of that cost, 17.1 percent (approximately $194,949) is attributable to existing users, 51.7 percent (approximately $590,755) is attributable to future growth in the next 10 years and 31.2 percent (approximately $356,422) is attributable to growth after 10 years. The HWY 32 Tank will serve the storage needs of NVSSD for more than 10 years.

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. This report and the associated recommendations should also be updated at least every five years. The estimated cost to update the IFFP is $30,000 with all the cost attributable to growth within the next 10 years.

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. 056-15-02

Prepared for:

North Village Special Service District

Prepared by:

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

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EXECUTIVE SUMMARY

INTRODUCTION

North Village Special Service District (NVSSD or District) has retained Bowen Collins & Associates (BC&A) to prepare an impact fee facility plans (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. Table ES-1 provides a summary of the demands under existing and 10 year growth conditions.

Table ES-1
NVSSD 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)	165	665	2,620	2,684
Domestic Wastewater Production (gpd)	48,675	196,175	772,900	791,780
Infiltration, Maximum Month (gpd)	7,425	29,925	117,900	120,780
Average Day, Maximum Month Flow (mgd)	56,100	226,100	890,800	912,560
Peak Hour Production (gpd)	140,250	565,250	2,227,000	2,281,400
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. Additional costs will also be required for treatment in NVSSD facilities as stated in NVSSD's Water and Sewer Master Plan.

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

Project	Description	Estimated 2015 Construction Cost	Estimated Cost Less Red Ledges Contribution**	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
GS-2	Install new 8" Gravity Line to North and South Sections	$ 235,000	$ 235,000	20.5%	54.2%	13.9%	9.8%	1.6%	$ 48,230	$ 127,443	$ 32,666	$ 22,950	$ 3,712
FM2b	Install New 12" Force Main to Connect South Portion to WWTP	$ 231,000	$ 12,329	20.5%	54.2%	13.9%	9.8%	1.6%	$ 2,530	$ 6,686	$ 1,714	$ 1,204	$ 195
LS-1	Install previously purchased Skid Lift Station to connect flows from Coyote Lane to NVSSD System.	$ 306,000	$ 306,000	20.5%	54.2%	13.9%	9.8%	1.6%	$ 62,801	$ 165,947	$ 42,535	$ 29,884	$ 4,833
LS-2 (Phase 1)	Install new lift station with 1,100 gpm capacity as Phase 1 of upgrade	$ 658,000	$ 35,117.97	20.5%	54.2%	13.9%	9.8%	1.6%	$ 7,207	$ 19,045	$ 4,882	$ 3,430	$ 555
-	Impact Fee Facility Plan and Impact Fee Analysis Update	$ 40,000	$ 40,000	0%	87%	13%	0%	0%	$ -	$ 34,880	$ 5,120	$ -	$ -
	Total Capital Costs	$ 1,470,000	$ 628,447						$ 120,768	$ 354,000	$ 86,917	$ 57,467	$ 9,294

* 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.

** Red Ledges to pay a portion of projects which will be used by their Users.

SECTION 1
INTRODUCTION

North Village Special Service District (NVSSD 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 NVSSD Water and 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.

NVSSD does not currently treat its own wastewater. All wastewater collected by NVSSD is treated at the Heber Valley Reclamation Facility. However, Jordanelle Special Service District (JSSD) has recently constructed a sewer treatment plant that has existing capacity. It is planned that NVSSD can reach an agreement to treat sewer demands at the JSSD treatment plant in the future.

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

SOLD CAPACITY

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

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.

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.

- **Pipeline Capacity:** The recommended level of service provided by the NVSSD 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 NVSSD 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
NVSSD Service Area Historic Flows

Item	Existing Flows	Existing Flows Plus Remaining Sold Capacity
Equivalent Residential Units (ERUs)	165	2,620
Domestic Wastewater Production (gpd)	48,675	772,900
Infiltration, Maximum Month (gpd)	7,425	117,900
Average Day, Maximum Month Flow (mgd)	56,100	890,800
Peak Hour Production (gpd)	140,250	2,227,000
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 rates 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
NVSSD Service Area Projected 10-year Flows

Item	10-Year Projected Flows	10-Year Projected Flow Plus Remaining Sold Capacity
Equivalent Residential Units (ERUs)	665	2,684
Domestic Wastewater Production (gpd)	196,175	791,780
Infiltration, Maximum Month (gpd)	29,925	120,780
Average Day, Maximum Month Flow (mgd)	226,100	912,560
Peak Hour Production (gpd)	565,250	2,281,400
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. Defining existing 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). The purpose of this breakdown is to consider the available capacity for each component individually. Excess capacity in 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

The District does not have the means to treat wastewater produced by its users. The District has no future plans to construct a WWTP, rather the district plans to purchase capacity within JSSD Treatment facilities.

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
NVSSD Service Area ERU Projections

	Projected ERUs	Average Annual Growth	Projected ERUs Plus Remaining Sold Capacity	Average Annual Growth
2015	165		2,620	
2016	195	18.2%	2,626	0.24%
2017	230	17.9%	2,633	0.24%
2018	270	17.4%	2,639	0.24%
2019	315	16.7%	2,645	0.24%
2020	365	15.9%	2,652	0.24%
2021	420	15.1%	2,658	0.24%
2022	480	14.3%	2,665	0.24%
2023	540	12.5%	2,671	0.24%
2024	600	11.1%	2,678	0.24%
2025	665	10.8%	2,684	0.24%
2035	1,315	7.1%	2,755	0.26%
2045	1,920	3.9%	2,821	0.24%
2055	2,370	2.1%	2,871	0.18%

As can be calculated from the table, projected growth for the next 10 years is 500 ERUs. Of this, 436 ERUs are expected to be associated with bonded properties and 64 ERUs are expected to be associated with unbonded properties.

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 NVSSD Master Plan.

- **Existing Demand** – The demand existing development places on the NVSSD 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 NVSSD 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).

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.

LEGEND

- Proposed Lift Station
- Modified Lift Station
- Existing Conveyance
- Future Red Ledges Line
- Proposed 8" Gravity Line
- Proposed 12" Force Main
- North Village Boundary

FM2b - New 12" Force Main to Connect system

GS2 - New 8" Gravity Line to Connect system

Future Pipe to connect Red Ledges System. (Route to be determined)

LS-2
Phase 1 - Upsize Existing Pump to convey 1100 gpm
Approximately 137 HP

LS-1
Phase 1 -Install Lift Station to convey 600 gpm
Approximately 30 HP

NORTH:

SCALE: 0 750 1,500 Feet

PROPOSED IFFP PROJECTS

NVSSD
IMPACT FEE FACILITY PLAN

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

FIGURE NO. 6-1

P:\Jordanelle SSD\NVSSD MP\6.0 Reports and Memos\6.2 Draft Report\Sewer IFFP\Figures\Figure 6-1 Proposed IFFP Projects.mxd nwright 4/30/2015

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

Project	Description	Estimated 2015 Construction Cost	Estimated Cost Less Red Ledges Contribution**	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
GS-2	Install new 8" Gravity Line to North and South Sections	$ 235,000	$ 235,000	20.5%	54.2%	13.9%	9.8%	1.6%	$ 48,230	$ 127,443	$ 32,666	$ 22,950	$ 3,712
FM2b	Install New 12" Force Main to Connect South Portion to WWTP	$ 231,000	$ 12,329	20.5%	54.2%	13.9%	9.8%	1.6%	$ 2,530	$ 6,686	$ 1,714	$ 1,204	$ 195
LS-1	Install previously purchased Skid Lift Station to connect flows from Coyote Lane to NVSSD System.	$ 306,000	$ 306,000	20.5%	54.2%	13.9%	9.8%	1.6%	$ 62,801	$ 165,947	$ 42,535	$ 29,884	$ 4,833
LS-2 (Phase 1)	Install new lift station with 1,100 gpm capacity as Phase 1 of upgrade	$ 658,000	$ 35,117.97	20.5%	54.2%	13.9%	9.8%	1.6%	$ 7,207	$ 19,045	$ 4,882	$ 3,430	$ 555
-	Impact Fee Facility Plan and Impact Fee Analysis Update	$ 40,000	$ 40,000	0%	87%	13%	0%	0%	$ -	$ 34,880	$ 5,120	$ -	$ -
	Total Capital Costs	$ 1,470,000	$ 628,447						$ 120,768	$ 354,000	$ 86,917	$ 57,467	$ 9,294

* 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.

** Red Ledges to pay a portion of projects which will be used by their Users.

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 that are attributable to future growth is approximately $630,000. Of these costs, about $121,000 is attributed to existing flows, while $441,000 is attributable to growth in the next ten years.

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 North Village will be using capacity in facilities constructed by bonded users. To properly credit bonded users, 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.

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.

TREATMENT

As stated previously, the District does not have the means to treat wastewater produced by its users. The District has no future plans to construct a WWTP, rather the district plans to purchase capacity within JSSD Treatment facilities.

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)

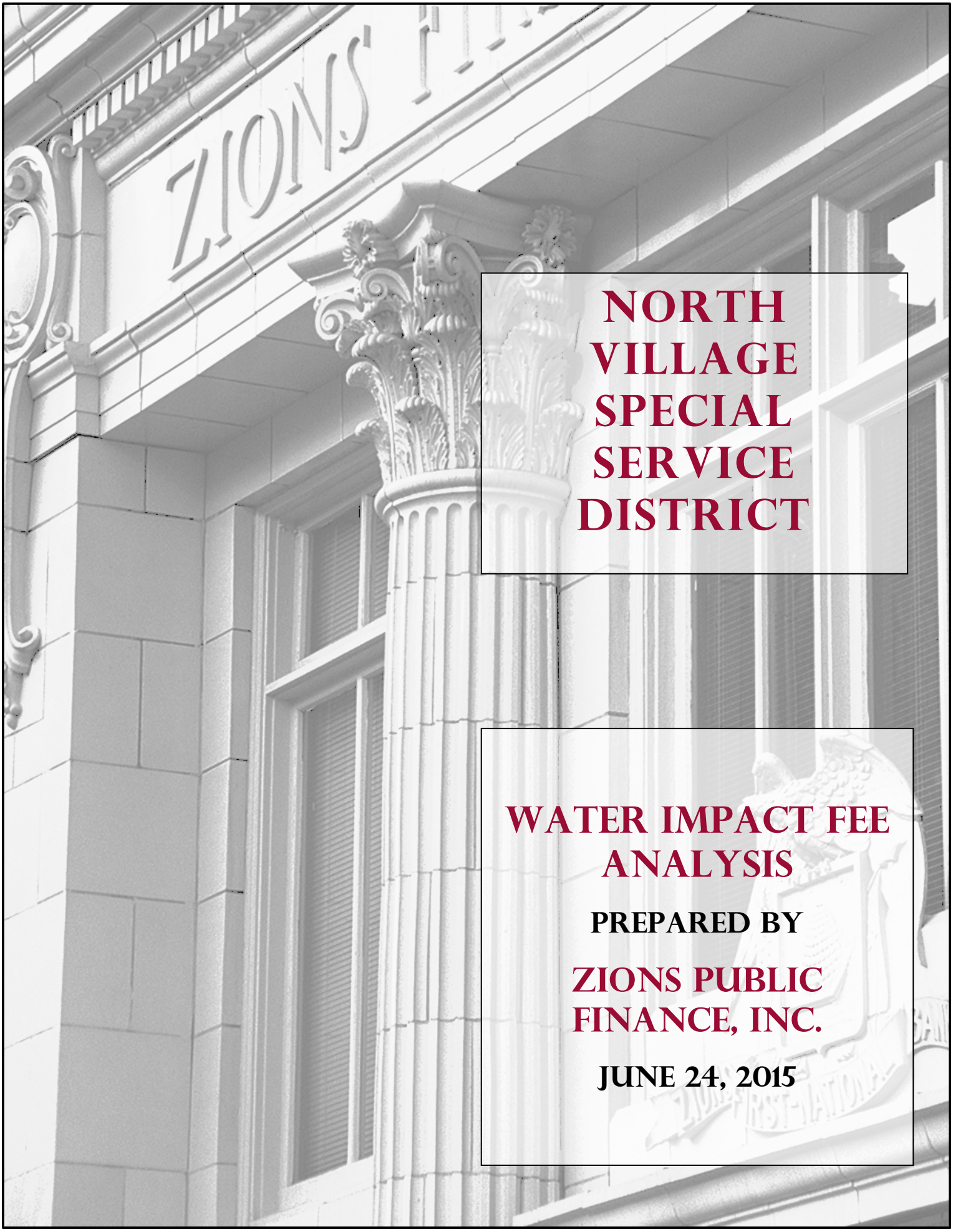
The Impact Fees Act requires that entities must publish a notice of intent to prepare or modify any IFFP. If an entity prepares an independent IFFP rather than include a capital facilities element in the general plan, the actual IFFP must be adopted by enactment. Before the IFFP can be adopted, a reasonable 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.



NORTH VILLAGE SPECIAL SERVICE DISTRICT

WATER IMPACT FEE ANALYSIS

PREPARED BY

ZIONS PUBLIC FINANCE, INC.

JUNE 24, 2015

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EXECUTIVE SUMMARY

North Village Special Service District, Utah (the District, NVSSD) 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 *NVSSD Water Impact Fee Facilities Plan* (IFFP) dated June 2015.

NVSSD Culinary Water System

The water system serves indoor water use and outdoor watering demand for all retail water service within North Village 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 165 equivalent residential units (ERUs) and is expected to grow to 665 ERUs by 2025. The level of service or demand per ERU is 892 gallons per average day in the peak month.

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 $4,444,163 (FV) in the next ten years that will include participation with Jordanelle Special Service District in the expansion to the existing Keetley Water Treatment Plant, system loop transmission line and purchase of capacity in Jordanelle Special Service District (JSSD)'s Best Ranches Well and HWY 32 storage tank. 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 water 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

NVSSD Water Service Areas

The construction of the District's water 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 culinary water impact fee will be assessed to multiple service areas based upon whether or not the user has participated in the bonds that funded improvements within their service area (referred to as a "bonded" user) or if they have not (an "unbonded" user). NVSSD has one geographic area where service is provided which is then divided into bonded or unbonded users which totals two impact fee service areas. The 500 future ERUs anticipated in the next ten years include 436 bonded future users and 64 unbonded future users.

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 Area. 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 culinary water impact fee that the District can assess per ERU in each service area . 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

COMPONENT	BONDED USERS	UNBONDED USERS
Production Facilities	$ 1,419	$ 1,419
Storage Facilities	1,181	1,181
Transmission and Distribution Facilities	-	1,088
Credits	(758)	(758)
Professional Expenses	80	80
Cost per ERU	**$ 1,922**	**$ 3,010**

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 water for each of the 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 USERS NON-STANDARD FORMULA
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $2.15 per Gallon
UNBONDED USERS NON-STANDARD FORMULA
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $3.37 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.

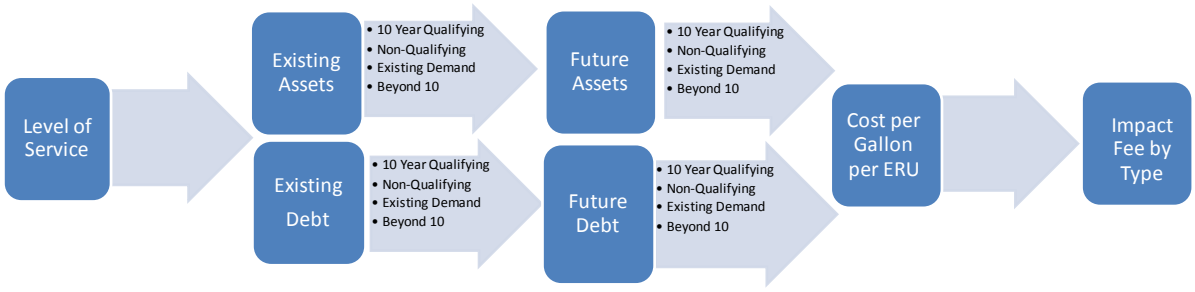
In the next ten years the District anticipates purchasing Best Ranches Well from Jordanelle Special Service District, continuing construction on the Keetley Water Treatment Plant expansion which is currently ongoing, purchasing storage capacity in the HWY 32 tank, and completing a system loop transmission pipeline. The District does not anticipate issuing any impact fee qualifying bonds to help fund the culinary water projects.

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. The cost per ERU is then multiplied by the

estimated demand of an individual home, business or other non-residential user expressed in terms of an ERU or 892 gallons 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 NVSSD. The construction of the District's water system has been funded largely through bonds that were paid by developers in exchange for future commitment to system capacity. Therefore, the impact fee will be assessed to various service areas based upon 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).

Projected Demand

The system has been sized to provide an ERU with 892 gallons per day (gpd) on an average day, 1,800 gpd on a peak day (peaking factor of 2.02), and 2,700 gpd at the peak instantaneous demand (peaking factor is 3.03). The primary measurement used for water demand and improvement sizing and capacity evaluations in this analysis is and ERU which is equal to 892 gallons per day.

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 165 ERUs and the 2025 count for the service area is estimated to be 665. 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. Of the 500 ERUs added by 2025, 436 are projected to be bonded users and 64 unbonded. Figure 2.1 shows the growth in peak day demand through 2025.

FIGURE 2.1: PROJECTED GROWTH IN DEMAND (GPM)

Year	ERUS	Average Annual Growth	Projected ERUs Remaining Sold Capacity	Average Annual Growth	Current ERUs	10 Year Demand in ERUs	10 year Growth Bonded Users	10 Year Growth Unbonded Users
2015	**165**		**2,620**		**165**			
2016	195	18.2%	2,626	0.23%				
2017	230	17.9%	2,633	0.27%				
2018	270	17.4%	2,639	0.23%				
2019	315	16.7%	2,645	0.23%				
2020	365	15.9%	2,652	0.26%				
2021	420	15.1%	2,658	0.23%				
2022	480	14.3%	2,665	0.26%				
2023	540	12.5%	2,671	0.23%				
2024	600	11.1%	2,678	0.26%				
2025	**665**	**10.8%**	**2,684**	**0.22%**		**500**	**436**	**64**
2035	1,315	7.1%	2,755	7.10%				
2045	1,920	3.9%	2,821	3.90%				
2055	2,370	2.1%	2,871	2.10%				

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 it is anticipated that this level of service per ERU will be perpetuated into the future. However, the District has the right to increase the 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 any 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 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 892 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 NVSSD 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 in future years through revenue bonds. A portion of future projects may also be constructed by developers in development or pioneering agreements.

Capacities of Water System 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 District uses the existing Keetley Water Treatment Plant as its only water source. Currently there is a large portion of unused capacity; however, this latent capacity is already purchased. The facility do not have capacity to serve any developments that have not already paid for capacity. Therefore, there is no excess capacity in the existing Keetley WTP for use by future users. While the existing Keetley WTP does not have capacity for NVSSD, Jordanelle Special Service District (JSSD) has an expansion project for the Keetley WTP. The expanded Keetley WTP will be shared among all of the service areas in JSSD 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 NVSSD. The Best Ranches Well is an existing well to be purchased from JSSD to serve NVSSD customers and has capacity for 480 ERUs. Of the 480 ERUs, 165 ERUs are existing ERUs and 315 will be future ERUs. The cost for the Best Ranches tank is $650,000 with $429,000 benefitting ten year growth. Of that $429,000, 58% benefits bonded users and 8% benefits unbonded users.

Storage Costs and Capacities

NVSSD does not own any water storage capacity. The District is using temporary surplus storage capacity in the JSSD system. Therefore, there is no excess capacity in the NVSSD storage system that can be used by future users. JSSD has a HWY 32 tank which is anticipated to be used to meet existing and future demands within NVSSD. The HWY 32 tank is in a good location to serve NVSSD customers, and has capacity for 967 ERUs. Of the capacity for 967 ERUs, 165 are existing ERUs and 802 will be future ERUs. The full cost of the tank, $1,142,126, will benefit NVSSD users and has been included in the impact fee.

Transmission

NVSSD's transmission system has excess capacity beyond the sold capacity to serve new development. During the ten year planning horizon the District will complete a system loop transmission pipeline to continue to meet demands.

FIGURE 3.1: FUTURE CAPITAL PROJECT COSTS

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
Production System								
Best Ranches Well	34%	58%	8%			2015	$ 650,000	$ 650,000
Keetley WTP Expansion NVSSD Portion	0.0%	87.2%	12.8%	0.0%	0.0%	2015	280,594	280,594
							-	-
Production System Subtotal							**$ 930,594**	**$ 930,594**
Storage Facilities								
HWY 32 Tank	17.1%	45.1%	6.6%	27.2%	4.0%	2015	$ 1,142,126	$ 1,142,126
								-
Storage Facilities Subtotal							**$ 1,142,126**	**$ 1,142,126**
Transmission and Distribution Facilities								
System Loop Transmission Pipeline	0.0%	0.0%	3.0%	0.0%	97.0%	2023	$ 1,730,000	$ 2,331,444
								-
Transmission Facilities Subtotal							**$ 1,730,000**	**$ 2,331,444**
Miscellaneous								
Impact Fee Facility Plan and Impact Fee Analysis Update	0.0%	87.2%	12.8%	0.0%	0.0%	2017	40,000	40,000
							$ 40,000	**$ 40,000**
Ten Year Culinary Water							**$ 3,842,720**	**$ 4,444,163**

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

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 w 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). $1,409,705 or about 31% of the total 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	Bonded Impact Fee Qualifying Beyond 10 Years	Bonded Impact Fee Qualifying Beyond 10 Years	Non Impact Fee Qualifying
Production System								
Best Ranches Well	2015	$ 650,000	$ 650,000	$ 374,088	$ 54,912	$ -	$ -	$ 221,000
Keetley WTP Expansion NVSSD Portion	2015	280,594	280,594	244,678	35,916	-	-	-
		-	-	-	-	-	-	-
Production System Subtotal		**$ 930,594**	**$ 930,594**	**$ 618,766**	**$ 90,828**	**$ -**	**$ -**	**$ 221,000**
Storage Facilities								
HWY 32 Tank	2015	$ 1,142,126	$ 1,142,126	$ 514,898	$ 75,581	$ 310,731	$ 20,563	$ 194,882
			-	-	-	-	-	-
Storage Facilities Subtotal		**$ 1,142,126**	**$ 1,142,126**	**$ 514,898**	**$ 75,581**	**$ 310,731**	**$ 20,563**	**$ 194,882**
Transmission and Distribution Facilities								
System Loop Transmission Pipeline	2023	$ 1,730,000	$ 2,331,444	$ -	$ 69,632	$ -	$ 2,261,812	$ -
			-	-	-	-	-	-
Transmission Facilities Subtotal		**$ 1,730,000**	**$ 2,331,444**	**$ -**	**$ 69,632**	**$ -**	**$ 2,261,812**	**$ -**
Miscellaneous								
Impact Fee Facility Plan and Impact Fee Analysis Update	2017	40,000	40,000	34,880	5,120	-	-	-
		$ 40,000	**$ 40,000**	**$ 34,880**	**$ 5,120**	**$ -**	**$ -**	**$ -**
Ten Year Culinary Water		**$ 3,842,720**	**$ 4,444,163**	**$ 1,168,543**	**$ 241,161**	**$ 310,731**	**$ 2,282,375**	**$ 415,882**

**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 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 Figure 4.1 that the proposed impact fee 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 rely solely upon water impact fees and possibly 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 is 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 production and storage 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 Per ERU

As shown in Figures 4.1 and 4.2, the maximum legal impact fee per ERU is calculated to be $1,922.05 for bonded users and $3,010.05 for unbonded users. These fees are 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-BONDED USERS

BONDED USERS	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					**436**	
Future 10 Year Capital Projects	$ 930,594	0.00%	$ 618,766	$ 618,766	436	$ 1,419.19
Future Production Related Bonds	-	0.00%	-	-	436	-
Existing Production Projects	-	0.00%	-	-	436	-
Existing Production Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	436	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(403)
Subtotal	**$ 930,594**		**$ 618,766**	**$ 618,766**		**$ 1,016.34**
Storage Facilities						
Future 10 Year Capital Projects	$ 1,142,126	0.00%	$ 514,898	$ 514,898	436	$ 1,180.96
Future Storage Related Bonds	-	0.00%	-	-	436	-
Existing Storage Projects	-	0.00%	-	-	436	-
Existing Storage Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	436	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(355)
Subtotal	**$ 1,142,126**		**$ 514,898**	**$ 514,898**		**$ 825.72**
Transmission and Distribution Facilities						
Future 10 Year Capital Projects	$ 2,331,444	0.00%	$ -	$ -	436	$ -
Future Transmission Related Debt to be Issued	-	0.00%	-	-	436	-
Existing Transmission Projects	-	0.00%	-	-	436	-
Existing Transmission Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	436	-
Subtotal	**$ 2,331,444**		**$ -**	**$ -**		**$ -**
Miscellaneous						
IFFP and Impact Fee Analysis Update	$ 40,000	50%	$ 34,880	$ 34,880	436	$ 80
Unspent Impact Fee Funds	-	0.00%	-	-	436	-
					436	
Subtotal	**$ 40,000**		**$ 34,880**	**$ 34,880**		**$ 80.00**
Total Impact Fee Per ERU	**$ 4,444,163**		**$ 1,168,543**	**$ 1,168,543**		**$ 1,922.05**

FIGURE 4.2: WATER IMPACT FEE CALCULATION-UNBONDED USERS

UNBONDED USERS	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					**64**	
Future 10 Year Capital Projects	$ -	0.00%	$ 90,828	$ 90,828	64	$ 1,419.19
Future Production Related Bonds	-	0.00%	-	-	64	-
Existing Production Projects	-	0.00%	-	-	64	-
Existing Production Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	64	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(403)
Subtotal	**$ -**		**$ 90,828**	**$ 90,828**		**$ 1,016.34**
Storage Facilities						
Future 10 Year Capital Projects	$ -	0.00%	$ 75,581	$ 75,581	64	$ 1,180.96
Future Storage Related Bonds	-	0.00%	-	-	64	-
Existing Storage Projects	-	0.00%	-	-	64	-
Existing Storage Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	64	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(355)
Subtotal	**$ -**		**$ 75,581**	**$ 75,581**		**$ 825.72**
				-		
Transmission and Distribution Facilities	**$ -**					
Future 10 Year Capital Projects	$ -	0.00%	$ 69,632	$ 69,632	64	$ 1,088.00
Future Transmission Related Debt to be Issued	-	0.00%	-		64	-
Existing Transmission Projects	-	0.00%	-	-	64	-
Existing Transmission Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	64	-
Subtotal	**$ -**		**$ 69,632**	**$ 69,632**		**$ 1,088.00**
Miscellaneous						
Unspent Impact Fee Funds	$ -	0.00%	$ -	-	64	$ -
IFFP and Impact Fee Analysis Update	40,000	13%	5,120	5,120	64	80
Subtotal	**$ 40,000**		**$ 5,120**	**$ 5,120**		**$ 80.00**
Total Impact Fee Per ERU	**$ 40,000**		**$ 74,752**			**$ 3,010.05**

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 4.3: Impact Fee per ERU

COMPONENT	BONDED USERS	UNBONDED USERS
Production Facilities	$ 1,419	$ 1,419
Storage Facilities	1,181	1,181
Transmission and Distribution Facilities	-	1,088
Credits	(758)	(758)
Professional Expenses	80	80
Cost per ERU	**$ 1,922**	**$ 3,010**

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 4.4 for a non-standard user is based upon the anticipated annual water demand of that particular user.

FIGURE 4.4: CALCULATION OF NON-STANDARD IMPACT FEE

NON-STANDARD IMPACT FEE CALCULATIONS
BONDED USERS NON-STANDARD FORMULA
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $2.15 per Gallon
UNBONDED USERS NON-STANDARD FORMULA
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development Step 2: Multiply the Demand by $3.37 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 North Village 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

North Village 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	10 year Growth Bonded Users	10 Year Growth Unbonded Users
2015	**165**		**2,620**		**165**			
2016	195	18.2%	2,626	0.23%				
2017	230	17.9%	2,633	0.27%				
2018	270	17.4%	2,639	0.23%				
2019	315	16.7%	2,645	0.23%				
2020	365	15.9%	2,652	0.26%				
2021	420	15.1%	2,658	0.23%				
2022	480	14.3%	2,665	0.26%				
2023	540	12.5%	2,671	0.23%				
2024	600	11.1%	2,678	0.26%				
2025	**665**	**10.8%**	**2,684**	**0.22%**		**500**	**436**	**64**
2035	1,315	7.1%	2,755	7.10%				
2045	1,920	3.9%	2,821	3.90%				
2055	2,370	2.1%	2,871	2.10%				

Table A.2: 10 Year ERUs

	Existing	10 Years	> 10 Years
Bonded		436	
Unbonded		64	

APPENDIX B: CULINARY WATER 10 YEAR CAPITAL PROJECTS

North Village Special Service District - Water

TABLE B.1: WATER 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
Production System													
Best Ranches Well	34%	58%	8%			2015	$ 650,000	$ 650,000	$ 374,088	$ 54,912	$ -	$ -	$ 221,000
Keetley WTP Expansion NVSSD Portion	0.0%	87.2%	12.8%	0.0%	0.0%	2015	280,594	280,594	244,678	35,916	-	-	-
Production System Subtotal							**$ 930,594**	**$ 930,594**	**$ 618,766**	**$ 90,828**	**$ -**	**$ -**	**$ 221,000**
Storage Facilities													
HWY 32 Tank	17.1%	45.1%	6.6%	27.2%	4.0%	2015	$ 1,142,126	$ 1,142,126	$ 514,898	$ 75,581	$ 310,731	$ 20,563	$ 194,882
Storage Facilities Subtotal							**$ 1,142,126**	**$ 1,142,126**	**$ 514,898**	**$ 75,581**	**$ 310,731**	**$ 20,563**	**$ 194,882**
Transmission and Distribution Facilities													
System Loop Transmission Pipeline	0.0%	0.0%	3.0%	0.0%	97.0%	2023	$ 1,730,000	$ 2,331,444	$ -	$ 69,632	$ -	$ 2,261,812	$ -
Transmission Facilities Subtotal							**$ 1,730,000**	**$ 2,331,444**	**$ -**	**$ 69,632**	**$ -**	**$ 2,261,812**	**$ -**
Miscellaneous													
Impact Fee Facility Plan and Impact Fee Analysis Update	0.0%	87.2%	12.8%	0.0%	0.0%	2017	$ 40,000	$ 40,000	$ 34,880	$ 5,120	$ -	$ -	$ -
							$ 40,000	**$ 40,000**	**$ 34,880**	**$ 5,120**	**$ -**	**$ -**	**$ -**
Ten Year Culinary Water							**$ 3,842,720**	**$ 4,444,163**	**$ 1,168,543**	**$ 241,161**	**$ 310,731**	**$ 2,282,375**	**$ 415,882**

*Based on 20 years average cost of inflation using ENR

Appendix C: Impact Fee User Rate Credit

North Village Special Service District - Water

TABLE C.1: CALCULATION OF PRODUCTION USER RATE CREDITS

Year	ERUs	Amortized Production Expense	Annual Cost per ERU	Average PV Cost per ERU
2015	165	$ (11,050)	$ (66.97)	$ (66.97)
2016	195	(11,050)	(56.67)	(54.75)
2017	230	(11,050)	(48.04)	(44.85)
2018	270	(11,050)	(40.93)	(36.91)
2019	315	(11,050)	(35.08)	(30.57)
2020	365	(11,050)	(30.27)	(25.49)
2021	420	(11,050)	(26.31)	(21.40)
2022	480	(11,050)	(23.02)	(18.09)
2023	540	(11,050)	(20.46)	(15.54)
2024	600	(11,050)	(18.42)	(13.51)
2025	665	(11,050)	(16.62)	(11.78)
2026	730	(11,050)	(15.14)	(10.37)
2027	795	(11,050)	(13.90)	(9.20)
2028	860	(11,050)	(12.85)	(8.22)
2029	925	(11,050)	(11.95)	(7.38)
2030	990	(11,050)	(11.16)	(6.66)
2031	1,055	(11,050)	(10.47)	(6.04)
2032	1,120	(11,050)	(9.87)	(5.50)
2033	1,185	(11,050)	(9.32)	(5.02)
2034	1,250	(11,050)	(8.84)	(4.60)
2035	1,315		-	-
2036	1,376		-	-
2037	1,436		-	-
2038	1,497		-	-
2039	1,557		-	-
2040	1,618		-	-
		$ (221,000)	**$ (486.28)**	**$ (402.85)**

TABLE C.2: CALCULATION OF STORAGE USER RATE CREDITS

ERUs	Amortized Storage Expense	Annual Cost per ERU	Average PV Cost per ERU
165	$ (9,744)	$ (59.06)	$ (59.06)
195	(9,744)	(49.97)	(48.28)
230	(9,744)	(42.37)	(39.55)
270	(9,744)	(36.09)	(32.55)
315	(9,744)	(30.93)	(26.96)
365	(9,744)	(26.70)	(22.48)
420	(9,744)	(23.20)	(18.87)
480	(9,744)	(20.30)	(15.96)
540	(9,744)	(18.04)	(13.70)
600	(9,744)	(16.24)	(11.92)
665	(9,744)	(14.65)	(10.39)
730	(9,744)	(13.35)	(9.14)
795	(9,744)	(12.26)	(8.11)
860	(9,744)	(11.33)	(7.24)
925	(9,744)	(10.53)	(6.51)
990	(9,744)	(9.84)	(5.87)
1,055	(9,744)	(9.24)	(5.33)
1,120	(9,744)	(8.70)	(4.85)
1,185	(9,744)	(8.22)	(4.43)
1,250	(9,744)	(7.80)	(4.05)
1,315		-	-
1,376		-	-
1,436		-	-
1,497		-	-
1,557		-	-
1,618		-	-
	$ (194,882)	**$ (428.81)**	**$ (355.24)**

Projects to be bond financed such as treatment are spread over 20 Years with no interest; No interest included in the fee.
Credit will be the same for all users because they will all pay one rate in NVSSD
Credit based upon the capital costs allocated to existing users

APPENDIX D: CALCULATION OF THE IMPACT FEE PER ERU

North Village Special Service District - Water

TABLE D.1: WATER IMPACT FEE CALCULATION BONDED

BONDED USERS	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					**436**	
Future 10 Year Capital Projects	$ 930,594	0.00%	$ 618,766	$ 618,766	436	$ 1,419.19
Future Production Related Bonds	-	0.00%	-	-	436	-
Existing Production Projects	-	0.00%	-	-	436	-
Existing Production Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	436	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(403)
Subtotal	**$ 930,594**		**$ 618,766**	**$ 618,766**		**$ 1,016.34**
Storage Facilities						
Future 10 Year Capital Projects	$ 1,142,126	0.00%	$ 514,898	$ 514,898	436	$ 1,180.96
Future Storage Related Bonds	-	0.00%	-	-	436	-
Existing Storage Projects	-	0.00%	-	-	436	-
Existing Storage Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	436	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(355)
Subtotal	**$ 1,142,126**		**$ 514,898**	**$ 514,898**		**$ 825.72**
Transmission and Distribution Facilities						
Future 10 Year Capital Projects	$ 2,331,444	0.00%	$ -	$ -	436	$ -
Future Transmission Related Debt to be Issued	-	0.00%	-	-	436	-
Existing Transmission Projects	-	0.00%	-	-	436	-
Existing Transmission Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	436	-
Subtotal	**$ 2,331,444**		**$ -**	**$ -**		**$ -**
Miscellaneous						
IFFP and Impact Fee Analysis Update	$ 40,000	50%	$ 34,880	$ 34,880	436	$ 80
Unspent Impact Fee Funds	-	0.00%	-	-	436	-
					436	
Subtotal	**$ 40,000**		**$ 34,880**	**$ 34,880**		**$ 80.00**
Total Impact Fee Per ERU	**$ 4,444,163**		**$ 1,168,543**	**$ 1,168,543**		**$ 1,922.05**

TABLE D.2: WATER IMPACT FEE CALCULATION UNBONDED

UNBONDED USERS	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					**64**	
Future 10 Year Capital Projects	$ -	0.00%	$ 90,828	$ 90,828	64	$ 1,419.19
Future Production Related Bonds	-	0.00%	-	-	64	-
Existing Production Projects	-	0.00%	-	-	64	-
Existing Production Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	64	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(403)
Subtotal	**$ -**		**$ 90,828**	**$ 90,828**		**$ 1,016.34**
Storage Facilities						
Future 10 Year Capital Projects	$ -	0.00%	$ 75,581	$ 75,581	64	$ 1,180.96
Future Storage Related Bonds	-	0.00%	-	-	64	-
Existing Storage Projects	-	0.00%	-	-	64	-
Existing Storage Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	64	-
Credit for Existing Users' and Non-Qualifying Capital Expense						(355)
Subtotal	**$ -**		**$ 75,581**	**$ 75,581**		**$ 825.72**
				-		
Transmission and Distribution Facilities	**$ -**					
Future 10 Year Capital Projects	$ -	0.00%	$ 69,632	$ 69,632	64	$ 1,088.00
Future Transmission Related Debt to be Issued	-	0.00%	-		64	-
Existing Transmission Projects	-	0.00%	-	-	64	-
Existing Transmission Related Debt - OUTSTANDING (Includes Interest)	-	0.00%	-	-	64	-
Subtotal	**$ -**		**$ 69,632**	**$ 69,632**		**$ 1,088.00**
Miscellaneous						
Unspent Impact Fee Funds	$ -	0.00%	$ -	-	64	$ -
IFFP and Impact Fee Analysis Update	40,000	13%	5,120	5,120	64	80
Subtotal	**$ 40,000**		**$ 5,120**	**$ 5,120**		**$ 80.00**
Total Impact Fee Per ERU	**$ 40,000**		**$ 74,752**			**$ 3,010.05**

APPENDIX E: RECOMMENDED IMPACT FEES PER ERU

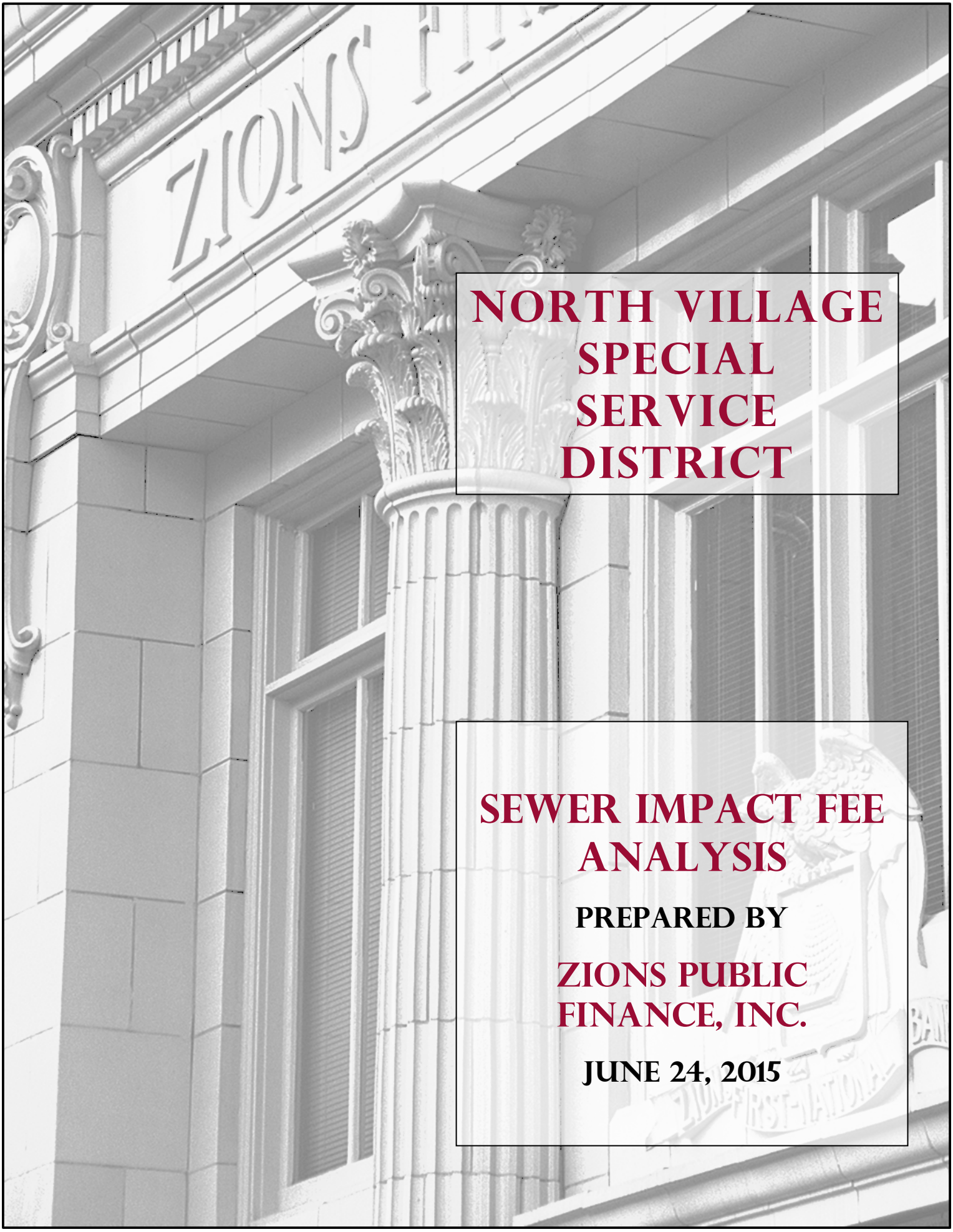
North Village Special Service District- Water

TABLE E.1: SUMMARY OF IMPACT FEE CALCULATION BY SERVICE AREA

	COMPONENT	BONDED USERS	UNBONDED USERS
2	Production Facilities	$ 1,419	$ 1,419
3	Storage Facilities	1,181	1,181
4	Transmission and Distribution Facilities	-	1,088
6	Credits	(758)	(758)
5	Professional Expenses	80	80
7	**Cost per ERU**	**$ 1,922**	**$ 3,010**

TABLE: E.2: NON-STANDARD IMPACT FEE FORMULAS

	NON-STANDARD IMPACT FEE CALCULATIONS
11	**BONDED USERS NON-STANDARD FORMULA**
12	Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development
13	Step 2: Multiply the Demand by $2.15 per Gallon
14	**UNBONDED USERS NON-STANDARD FORMULA**
15	Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development
16	Step 2: Multiply the Demand by $3.37 per Gallon



NORTH VILLAGE SPECIAL SERVICE DISTRICT

SEWER IMPACT FEE ANALYSIS

PREPARED BY

ZIONS PUBLIC FINANCE, INC.

JUNE 24, 2015

TABLE OF CONTENTS

EXECUTIVE SUMMARY

North Village Special Service District, Utah (the District, NVSSD) 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 *NVSSD Sewer Impact Fee Facilities Plan* (IFFP) dated June 2015.

NVSSD Sewer System

The wastewater collection and treatment system serves all connections within NVSSD 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 165 Equivalent Residential Units (ERU) and will add 500 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 $3,796,776 (FV) of sewer projects in the next ten years that will include collection lines, lift stations and an expansion to the existing Jordanelle Special Service District (JSSD) 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.

NVSSD 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 multiple service areas based upon 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). NVSSD has one geographic area where service is provided which is then divided into bonded or unbonded users which totals two impact fee service areas. The 500 future ERUs mentioned above includes 436 bonded future users and 64 unbonded future users.

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 service area . 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 USER	UNBONDED USER
Collection	$ 788	$ 1,377
Treatment	4,691	4,691
Credits	(658)	(658)
Professional Services	86	86
Cost per ERU	**$ 4,907**	**$ 5,496**

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 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 USERS NON-STANDARD FORMULA
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development
Step 2: Multiply the Demand by $14.43 per Gallon
UNBONDED USERS NON-STANDARD FORMULA
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development
Step 2: Multiply the Demand by $16.17 per Gallon

CHAPTER 1: OVERVIEW OF THE NVSSD 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
- Any impact fee qualifying historic costs of existing improvements that will serve new development.

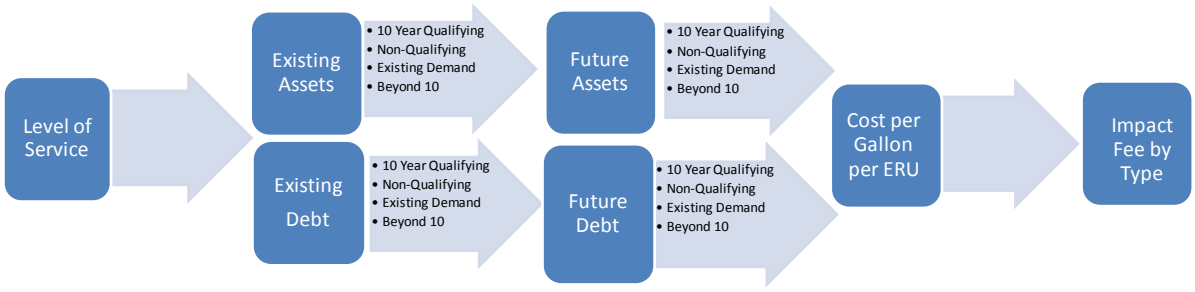
The costs that cannot be included in the impact fee are as follows:

- 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 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 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 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).

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.

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 165 ERUs and by 2025 there will be 665 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. Of the 500 ERUs added by 2025, 436 are projected to be bonded users and 64 unbonded. Figure 2.1 shows the growth in ERUs through 2025.

FIGURE 2.1: PROJECTED GROWTH IN DEMAND (ERUS)

Year	ERUS	Average Annual Growth	Projected ERUs Plus Remaining Sold Capacity	Average Annual Growth	Current ERUs	10 Year Demand in ERUs	10 year Growth Bonded Users	10 Year Growth Unbonded Users
2015	**165**		**2,620**		**165**			
2016	195	18.2%	2,626	0.23%				
2017	230	17.9%	2,633	0.27%				
2018	270	17.4%	2,639	0.23%				
2019	315	16.7%	2,645	0.23%				
2020	365	15.9%	2,652	0.26%				
2021	420	15.1%	2,658	0.23%				
2022	480	14.3%	2,665	0.26%				
2023	540	12.5%	2,671	0.23%				
2024	600	11.1%	2,678	0.26%				
2025	**665**	**10.8%**	**2,684**	**0.22%**		**500**	**436**	**64**
2035	1,315	7.1%	2,755	7.10%				
2045	1,920	3.9%	2,821	3.90%				
2055	2,370	2.1%	2,871	2.10%				

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 it 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 in future years. A portion of future projects may be constructed by developers in development or pioneering agreements.

Capacities of Sewer System 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 3.3 below.

Collection Costs and Capacities

The capacities of existing system collection facilities were estimated using size data provided by NVSSD 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 $677,116 and will provide capacity for 500 ERUS.

Treatment Costs and Capacities

The District currently uses capacity at the Heber Valley Wastewater Treatment Facility. In the near future, it is expected that NVSSD will begin to send its wastewater to JSSD's expanded treatment facilities. NVSSD does not plan to construct its own treatment facilities at this time and intends to continue to use JSSD capacity for all long term treatment needs. There is an expansion planned for the JSSD Wastewater Treatment Plant. The portion of the expansion capacity that will serve NVSSD, $3,119,660 of the total cost of $16,560,000, has been included in the impact fee. The average cost per ERU for the expansion is $4,691.22. The allocation of the treatment plant expansion capacity is detailed in the figure below.

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 3.2 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. $2,820,474 or about 74% of the total $3,796,776 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 Less Red Ledges Contribution	NVSSD Construction Cost with Inflation	10 Year Impact Fee Qualifying Cost	10 Year Impact Fee Qualifying Cost	Impact Fee Qualifying Beyond 10 Years	Impact Fee Qualifying Beyond 10 Years	Non Impact Fee Qualifying
Collection System								
Install New 8" Gravity Line to North and South Sections	2017	$ 235,000	$ 253,199	$ 137,234	$ 35,195	$ 24,814	$ 4,051	$ 51,906
Install New 12" Force Main to Connect South Portion to WWTP	2017	12,329	13,284	7,200	1,846	1,302	213	2,723
Install Previously Purchased Skid Lift Station to Connect Flows From Coyote Lane to NVSSD System	2017	306,000	329,698	178,696	45,828	32,310	5,275	67,588
Install New Lift Station with 600 GPM Capacity as Phase 1 of Upgrade	2017	35,118	37,838	20,508	5,259	3,708	605	7,757
Impact Fee Facility Plan and Impact Fee Analysis Update	2017	40,000	43,098	37,581	5,517	-	-	-
Collection System Subtotal		**$ 628,447**	**$ 677,116**	**$ 381,219**	**$ 93,645**	**$ 62,134**	**$ 10,144**	**$ 129,974**
Treatment Facilities								
JSSD Wastewater Treatment Plant Expansion	2015	$ 3,119,660	$ 3,119,660	$ 2,045,371	$ 300,238	$ -	$ -	$ 774,051
			-	-	-	-	-	-
			-	-	-	-	-	-
Treatment Facilities Subtotal		**$ 3,119,660**	**$ 3,119,660**	**$ 2,045,371**	**$ 300,238**	**$ -**	**$ -**	**$ 774,051**
Ten Year Sanitary Sewer		**$ 3,748,107**	**$ 3,796,776**	**$ 2,426,590**	**$ 393,883**	**$ 62,134**	**$ 10,144**	**$ 904,025**

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 Figure 4.1 and 4.2 that the proposed impact fee 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 rely upon sewer impact fees and possibly 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 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

As shown in Figure 4.1 and Figure 4.2, the maximum legal impact fee per ERU is calculated to be $4,907 for bonded users and $5,496 for unbonded users. 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-BONDED SERVICE AREA

BONDED SERVICE AREA	Total Cost to Component	% that will Serve Ten Year Demand	Cost to Ten Year Demand	Impact Fee Cost	Bonded ERUs to be Served	Cost per ERU
Collection Facilities					**436**	
Future 10 Year Capital Projects	$ 677,116	50.75%	$ 343,638	$ 343,638	436	$ 788
Future Collection Related Debt to be Issued	-	0.00%	-	-	436	-
Existing Collection Projects	-	0.00%	-	-	436	-
Existing Collection Related Debt - OUTSTANDING (Interest Only)	-	0.00%	-	-	436	-
Credit for Existing Users' and Non-Qualifying Capital Expense						$ (237)
Subtotal	**$ 677,116**		**$ 343,638**	**$ 343,638**		**$ 551**
Treatment Plant						
Future 10 Year Capital Projects	$ 3,119,660	0.00%	$ 2,045,371	$ 2,045,371	436	$ 4,691
Future Treatment Related Bonds	-	0.00%	-	-	436	-
Existing Treatment Projects	-	0.00%	-	-	436	-
Existing Treatment Related Debt - OUTSTANDING (Interest Only)	-	0.00%	-	-	436	-
Credit for Existing Users' and Non-Qualifying Capital Expense				-		$ (421)
Subtotal	**$ 3,119,660**		**$ 2,045,371**	**$ 2,045,371**		**$ 4,270**
Miscellaneous						
Unspent Impact Fee Funds	$ -	0.00%	$ -	$ -	436	$ -
Engineering, Planning, Professional	40,000	100%	37,581	37,581	436	86
Subtotal	**40,000**		**37,581**	**37,581**		**$ 86**
Total Impact Fee Per ERU	**$ 3,836,776**		**$ 2,426,590**	**$ 2,426,590**		**$ 4,907**

FIGURE 4.2: SEWER IMPACT FEE CALCULATION-BONDED SERVICE AREA

UNBONDED SERVICE AREA	Total Cost to Component	% that will Serve Ten Year Demand	Cost to Ten Year Demand	Impact Fee Cost	Unbonded ERUs to be Served	Cost per ERU
Collection Facilities					**64**	
Future 10 Year Capital Projects	$ 677,116	13.02%	$ 88,129	$ 88,129	64	$ 1,377
Future Collection Related Debt to be Issued	-	0.00%	-	-	64	-
Existing Collection Projects	-	0.00%	-	-	64	-
Existing Collection Related Debt - OUTSTANDING (Interest Only)	-	0.00%	-	-	64	-
Credit for Existing Users' and Non-Qualifying Capital Expense						$ (237)
Subtotal	**$ 677,116**		**$ 88,129**	**$ 88,129**		**$ 1,140**
Treatment Plant						
Future 10 Year Capital Projects	$ 3,119,660	0.00%	$ 300,238	$ 300,238	64	$ 4,691
Future Treatment Related Bonds	-	0.00%	-	-	64	-
Existing Treatment Projects	-	0.00%	-	-	64	-
Existing Treatment Related Debt - OUTSTANDING (Interest Only)	-	0.00%	-	-	64	-
Credit for Existing Users' and Non-Qualifying Capital Expense						$ (421)
Subtotal	**$ 3,119,660**		**$ 300,238**	**$ 300,238**		**$ 4,270**
Miscellaneous						
Unspent Impact Fee Funds	$ -	0.00%	$ -	$ -	64	$ -
Engineering, Planning, Professional	50,000	100%	5,517	5,517	64	86
Subtotal	**$ 50,000**		**$ 5,517**	**$ 5,517**		**$ 86**
Total Impact Fee Per ERU	**$ 3,846,776**		**$ 393,883**	**$ 393,883**		**$ 5,496**

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 that figure.

FIGURE 4.3: MAXIMUM INDOOR IMPACT FEE SCHEDULE

	BONDED USER	UNBONDED USER
Collection	$ 788	$ 1,377
Treatment	4,691	4,691
Credits	(658)	(658)
Professional Services	86	86
Cost per ERU	**$ 4,907**	**$ 5,496**

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 4.4 for a non-standard user is based upon the anticipated annual sewer demand of that particular user.

FIGURE 4.4: CALCULATION OF NON-STANDARD IMPACT FEE

NON-STANDARD IMPACT FEE CALCULATIONS
BONDED USERS NON-STANDARD FORMULA
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development
Step 2: Multiply the Demand by $14.43 per Gallon
UNBONDED USERS NON-STANDARD FORMULA
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development
Step 2: Multiply the Demand by $16.17 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 North Village 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

North Village Special Service District- Sewer

TABLE A.1: GROWTH IN ERUs

Year	ERUS	Average Annual Growth	Projected ERUs Plus Remaining Sold Capacity	Average Annual Growth	Current ERUs	10 Year Demand in ERUs	10 year Growth Bonded Users	10 Year Growth Unbonded Users
2015	**165**		**2,620**		**165**			
2016	195	18.2%	2,626	0.23%				
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2035	1,315	7.1%	2,755	7.10%				
2045	1,920	3.9%	2,821	3.90%				
2055	2,370	2.1%	2,871	2.10%				

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

North Village 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	
Average Day, Maximum Month Flow (gpd/ERU)	340	Treatment/Collection
Peak Hour Flow (gpd/ERU)	850	
Average Indoor Water Use (gpd/ERU)	325	

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

North Village 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 Less Red Ledges Contribution	NVSSD Construction Cost with Inflation	10 Year Impact Fee Qualifying Cost	10 Year Impact Fee Qualifying Cost	Impact Fee Qualifying Beyond 10 Years	Impact Fee Qualifying Beyond 10 Years	Non Impact Fee Qualifying
Collection System													
Install New 8" Gravity Line to North and South Sections	20.5%	54.2%	13.9%	9.8%	1.6%	2017	$ 235,000	$ 253,199	$ 137,234	$ 35,195	$ 24,814	$ 4,051	$ 51,906
Install New 12" Force Main to Connect South Portion to WWTP	20.5%	54.2%	13.9%	9.8%	1.6%	2017	12,329	13,284	7,200	1,846	1,302	213	2,723
Install Previously Purchased Skid Lift Station to Connect Flows From Coyote Lane to NVSSD System	20.5%	54.2%	13.9%	9.8%	1.6%	2017	306,000	329,698	178,696	45,828	32,310	5,275	67,588
Install New Lift Station with 600 GPM Capacity as Phase 1 of Upgrade	20.5%	54.2%	13.9%	9.8%	1.6%	2017	35,118	37,838	20,508	5,259	3,708	605	7,757
Impact Fee Facility Plan and Impact Fee Analysis Update	0.0%	87.2%	12.8%	0.0%	0.0%	2017	40,000	43,098	37,581	5,517	-	-	-
Collection System Subtotal							**$ 628,447**	**$ 677,116**	**$ 381,219**	**$ 93,645**	**$ 62,134**	**$ 10,144**	**$ 129,974**
Treatment Facilities													
JSSD Wastewater Treatment Plant Expansion	24.8%	65.6%	9.6%	0.0%	0.0%	2015	$ 3,119,660	$ 3,119,660	$ 2,045,371	$ 300,238	$ -	$ -	$ 774,051
Treatment Facilities Subtotal							**$ 3,119,660**	**$ 3,119,660**	**$ 2,045,371**	**$ 300,238**	**$ -**	**$ -**	**$ 774,051**
Ten Year Sanitary Sewer							**$ 3,748,107**	**$ 3,796,776**	**$ 2,426,590**	**$ 393,883**	**$ 62,134**	**$ 10,144**	**$ 904,025**

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

Appendix D: Impact Fee User Rate Credit

North Village Special Service District- Sewer

TABLE D.1: CALCULATION OF COLLECTION USER RATE CREDITS

Year	ERUs	Amortized Collection Expense	Annual Cost per ERU	Average PV Cost per ERU
2015	165	$ (6,499)	$ (39.39)	$ (39.39)
2016	195	(6,499)	(33.33)	(32.20)
2017	230	(6,499)	(28.26)	(26.38)
2018	270	(6,499)	(24.07)	(21.71)
2019	315	(6,499)	(20.63)	(17.98)
2020	365	(6,499)	(17.80)	(14.99)
2021	420	(6,499)	(15.47)	(12.59)
2022	480	(6,499)	(13.54)	(10.64)
2023	540	(6,499)	(12.03)	(9.14)
2024	600	(6,499)	(10.83)	(7.95)
2025	665	(6,499)	(9.77)	(6.93)
2026	730	(6,499)	(8.90)	(6.10)
2027	795	(6,499)	(8.17)	(5.41)
2028	860	(6,499)	(7.56)	(4.83)
2029	925	(6,499)	(7.03)	(4.34)
2030	990	(6,499)	(6.56)	(3.92)
2031	1,055	(6,499)	(6.16)	(3.55)
2032	1,120	(6,499)	(5.80)	(3.23)
2033	1,185	(6,499)	(5.48)	(2.95)
2034	1,250	(6,499)	(5.20)	(2.70)
2035	1,315		-	-
2036	1,376		-	-
2037	1,436		-	-
2038	1,497		-	-
2039	1,557		-	-
2040	1,618		-	-
		$ (129,974)	$ (285.99)	$ (236.92)

TABLE D.2: CALCULATION OF TREATMENT USER RATE CREDITS

ERUs	Amortized Treatment Expense	Annual Cost per ERU	Average PV Cost per ERU
165	$ (11,553)	$ (70.02)	$ (70.02)
195	(11,553)	(59.25)	(57.24)
230	(11,553)	(50.23)	(46.89)
270	(11,553)	(42.79)	(38.59)
315	(11,553)	(36.68)	(31.96)
365	(11,553)	(31.65)	(26.65)
420	(11,553)	(27.51)	(22.38)
480	(11,553)	(24.07)	(18.92)
540	(11,553)	(21.39)	(16.25)
600	(11,553)	(19.25)	(14.13)
665	(11,553)	(17.37)	(12.32)
730	(11,553)	(15.83)	(10.84)
795	(11,553)	(14.53)	(9.62)
860	(11,553)	(13.43)	(8.59)
925	(11,553)	(12.49)	(7.72)
990	(11,553)	(11.67)	(6.97)
1,055	(11,553)	(10.95)	(6.32)
1,120	(11,553)	(10.32)	(5.75)
1,185	(11,553)	(9.75)	(5.25)
1,250	(11,553)	(9.24)	(4.81)
1,315		-	-
1,376		-	-
1,436		-	-
1,497		-	-
1,557		-	-
1,618		-	-
	$ (231,060)	(508.42)	(421.19)

Discount Rate 3.50%

APPENDIX E: CALCULATION OF THE IMPACT FEE PER ERU

North Village Special Service District- Sewer

TABLE E.1: SEWER IMPACT FEE CALCULATION BONDED

BONDED SERVICE AREA	Total Cost to Component	% that will Serve Ten Year Demand	Cost to Ten Year Demand	Impact Fee Cost	Bonded ERUs to be Served	Cost per ERU
Collection Facilities					**436**	
Future 10 Year Capital Projects	$ 677,116	50.75%	$ 343,638	$ 343,638	436	$ 788
Future Collection Related Debt to be Issued	-	0.00%	-	-	436	-
Existing Collection Projects	-	0.00%	-	-	436	-
Existing Collection Related Debt - OUTSTANDING (Interest Only)	-	0.00%	-	-	436	-
Credit for Existing Users' and Non-Qualifying Capital Expense						$ (237)
Subtotal	**$ 677,116**		**$ 343,638**	**$ 343,638**		**$ 551**
Treatment Plant						
Future 10 Year Capital Projects	$ 3,119,660	0.00%	$ 2,045,371	$ 2,045,371	436	$ 4,691
Future Treatment Related Bonds	-	0.00%	-	-	436	-
Existing Treatment Projects	-	0.00%	-	-	436	-
Existing Treatment Related Debt - OUTSTANDING (Interest Only)	-	0.00%	-	-	436	-
Credit for Existing Users' and Non-Qualifying Capital Expense				-		$ (421)
Subtotal	**$ 3,119,660**		**$ 2,045,371**	**$ 2,045,371**		**$ 4,270**
Miscellaneous						
Unspent Impact Fee Funds	$ -	0.00%	$ -	$ -	436	$ -
Engineering, Planning, Professional	40,000	100%	37,581	37,581	436	86
Subtotal	**40,000**		**37,581**	**37,581**		**$ 86**
Total Impact Fee Per ERU	**$ 3,836,776**		**$ 2,426,590**	**$ 2,426,590**		**$ 4,907**

TABLE E.2: SEWER IMPACT FEE CALCULATION UNBONDED

UNBONDED SERVICE AREA	Total Cost to Component	% that will Serve Ten Year Demand	Cost to Ten Year Demand	Impact Fee Cost	Unbonded ERUs to be Served	Cost per ERU
Collection Facilities					**64**	
Future 10 Year Capital Projects	$ 677,116	13.02%	$ 88,129	$ 88,129	64	$ 1,377
Future Collection Related Debt to be Issued	-	0.00%	-	-	64	-
Existing Collection Projects	-	0.00%	-	-	64	-
Existing Collection Related Debt - OUTSTANDING (Interest Only)	-	0.00%	-	-	64	-
Credit for Existing Users' and Non-Qualifying Capital Expense						$ (237)
Subtotal	**$ 677,116**		**$ 88,129**	**$ 88,129**		**$ 1,140**
Treatment Plant						
Future 10 Year Capital Projects	$ 3,119,660	0.00%	$ 300,238	$ 300,238	64	$ 4,691
Future Treatment Related Bonds	-	0.00%	-	-	64	-
Existing Treatment Projects	-	0.00%	-	-	64	-
Existing Treatment Related Debt - OUTSTANDING (Interest Only)	-	0.00%	-	-	64	-
Credit for Existing Users' and Non-Qualifying Capital Expense						$ (421)
Subtotal	**$ 3,119,660**		**$ 300,238**	**$ 300,238**		**$ 4,270**
Miscellaneous						
Unspent Impact Fee Funds	$ -	0.00%	$ -	$ -	64	$ -
Engineering, Planning, Professional	50,000	100%	5,517	5,517	64	86
Subtotal	**$ 50,000**		**$ 5,517**	**$ 5,517**		**$ 86**
Total Impact Fee Per ERU	**$ 3,846,776**		**$ 393,883**	**$ 393,883**		**$ 5,496**

APPENDIX F: RECOMMENDED IMPACT FEES PER ERU

North Village Special Service District- Sewer

Table F.1: Impact Fee Calculation

	BONDED USER	UNBONDED USER
Collection	$ 788	$ 1,377
Treatment	4,691	4,691
Credits	(658)	(658)
Professional Services	86	86
Cost per ERU	**$ 4,907**	**$ 5,496**

Table F.2: Non-Standard Calculation

NON-STANDARD IMPACT FEE CALCULATIONS
BONDED USERS NON-STANDARD FORMULA
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development
Step 2: Multiply the Demand by $14.43 per Gallon
UNBONDED USERS NON-STANDARD FORMULA
Step 1: Identify the Average Daily Demand (Gallons) of the Proposed Development
Step 2: Multiply the Demand by $16.17 per Gallon

WATER AND SEWER RATE STUDY

June 2015

Project No. 056-15-02

Prepared for:

North Village Special Service District

Prepared by:

Bowen Collins & Associates, Inc.
CONSULTING ENGINEERS

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SECTION 1
PROJECTED REVENUE NEEDS

INTRODUCTION

North Village Special Service District (NVSSD) 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 NVSSD 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 - NVSSD Water

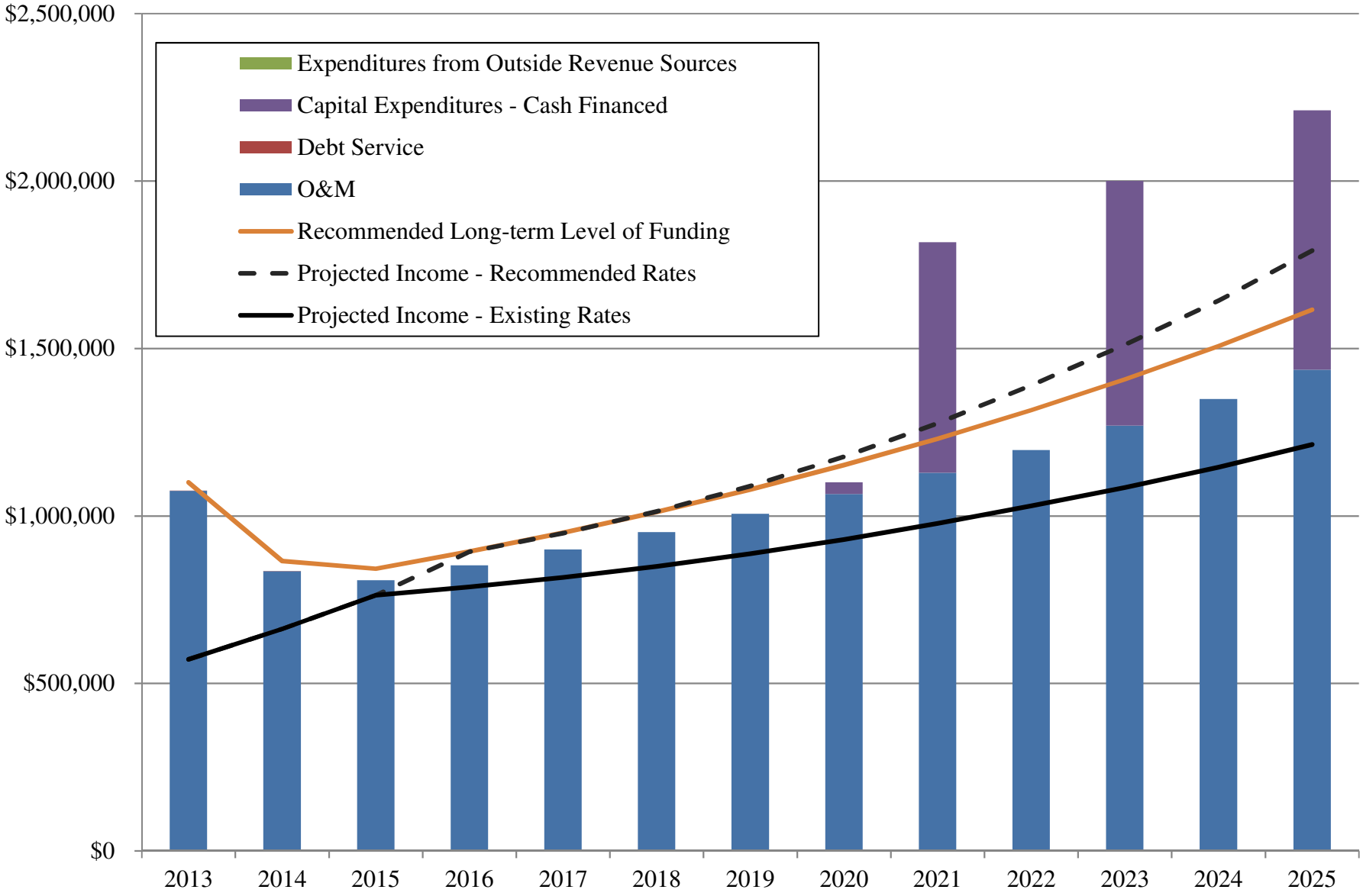
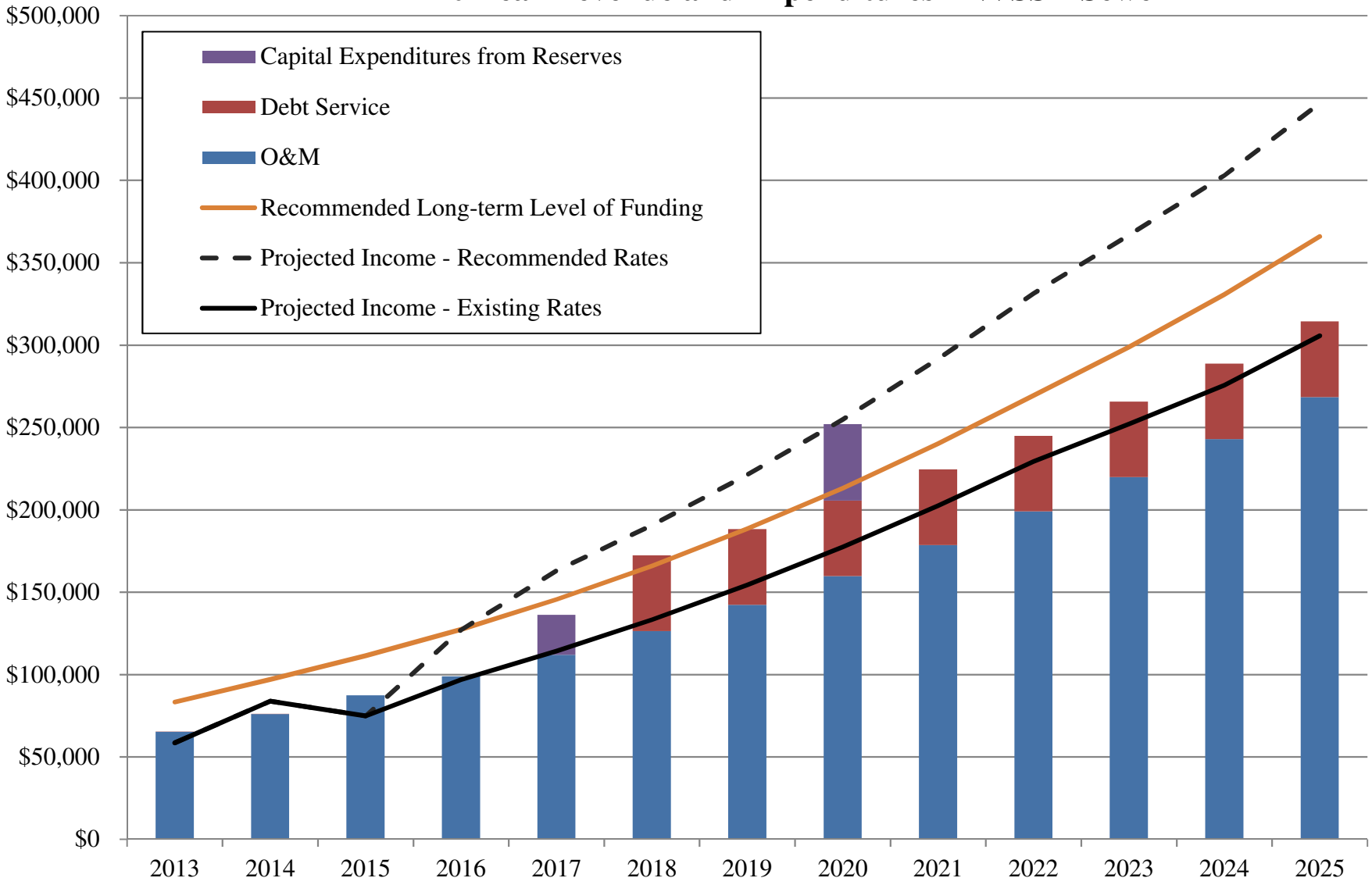


Figure 2
10-Year Revenue and Expenditures - NVSSD Sewer



* Chart shows only actual expenditures from District. Captial expenditures from bond proceeds not shown. This includes $600,000 in 2017 for completion of projects GS-2,FM2B, LS-1 (Phase-1), and LS-2 (Phase-1).

NVSSD's largest O&M cost is for Water Lease. Other significant O&M costs is NVSSD include sewage treatment costs and overhead and management costs:

- NVSSD Water Lease 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.
- NVSSD has historically paid JSSD for sewage treatment. In the future, it is expected that JSSD will continue to treat NVSSD sewage. Similar to water it is anticipated that costs will continue to grow at the rate of inflation.

When compared to other entities serving a similar number of customers, the cost to operate the NVSSD system is higher than average. However, this is not unexpected given the extremely large elevation change throughout the District. 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 the existing 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 system 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 $14 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 $140,000 and $280,000 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 $35,000 has been recommended. 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 $12.3 million. Based on the recommendation of the Sewer Master Plan, the recommended long-term investment goal in the sewer system is $100,000. However, for the same reasons as noted for the water system above, it is recommended that a lower value of $25,000 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 has fallen short over the last three 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	100.0%	50.0%
2016	3.0%	12.5%
2017	3.0%	0.0%
2018	3.0%	0.0%
2019	3.0%	0.0%
2020	3.0%	0.0%
2021	3.0%	0.0%
2022	3.0%	0.0%
2023	3.0%	0.0%
2024	3.0%	0.0%
2025	3.0%	0.0%

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 2017 of the sewer plan. This large project has been identified to build those facilities required to convey sewer from intersection of Hwy 40 and Hwy 32 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 NVSSD 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 NVSSD. 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 12,000 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 NVSSD 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

NVSSD provides water service to almost 170 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 NVSSD 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	48,782	165	295.7
Total	48,782	**165**	**295.7**

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

Projected Accounts

NVSSD 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 between 15 to 18 percent over the next 6 years. Projected growth rates and accounts by customer type are summarized in Table 2-2. 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	**18.2%**	**17.9%**	**17.4%**	**16.7%**	**15.9%**	**15.1%**
Residential	195	230	270	315	365	420
Total	**195**	**230**	**270**	**315**	**365**	**420**
Additional Connections/Year	*30*	*35*	*40*	*45*	*50*	*55*

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	57,652	68,000	79,826	93,130	107,912	124,173
Total		**57,652**	**68,000**	**79,826**	**93,130**	**107,912**	**124,173**

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

NVSSD 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 12,000 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**
12	+	45,544	3,239
Percent Total Use		**93.4%**	**6.6%**

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 NVSSD does not have any outside-District users 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 $78,000 a year to $143,000 a year as summarized in Table 2-5. It should be noted that NVSSD will be transferring impact fees collected to Jordanelle Special Service District (JSSD) 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	18.2%	17.9%	17.4%	16.7%	15.9%	15.07%
Projected NVSSD Impact Fee Revenue	$78,000	$91,000	$104,000	$117,000	$130,000	$143,000
Projected Fees to be paid to JSSD	($78,000)	($91,000)	($104,000)	($117,000)	($130,000)	($143,000)
Projected Total Impact Fee Revenue	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Additional NVSSD ERUs/Year	*30*	*35*	*40*	*45*	*50*	*55*

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	$1,163	$1,407	$1,694	$2,027	$2,410	$2,845
Interest Revenue	$5,380	$6,025	$6,729	$7,492	$8,311	$9,187
Construction Inspection Fees	$9,695	$11,725	$14,116	$16,893	$20,081	$23,709
Administration Fees	$25,206	$30,486	$36,703	$43,921	$52,210	$61,644
O & M Water Revenue	$26,566	$29,747	$33,226	$36,991	$41,037	$45,360
Meter Set Revenue	$39,990	$48,367	$58,230	$69,682	$82,833	$97,800
Hookup Fees	$0	$0	$0	$0	$0	$0
Laboratory Fees	$0	$0	$0	$0	$0	$0
Shared Employee	$0	$0	$0	$0	$0	$0
Water Reservation	$574,542	$564,461	$552,940	$539,978	$525,576	$509,734
Total Operating Non-Rate Revenue	$682,542	$692,218	$703,638	$716,984	$732,458	$750,278
Non-Operating						
NVSSD Impact Fees	$78,000	$91,000	$104,000	$117,000	$130,000	$143,000
NVSSD Impact Fees Transferred to JSSD	$78,000	$91,000	$104,000	$117,000	$130,000	$143,000
Total Non-Operating Non-Rate Revenue	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Total Non-Rate Revenue	**$682,542**	**$692,218**	**$703,638**	**$716,984**	**$732,458**	**$750,278**

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	$852,063	$899,823	$951,323	$1,006,567	$1,065,598	$1,128,496
Debt Services	$0	$0	$0	$0	$0	$0
Capital (Net of bond revenue)	$41,479	$48,733	$62,260	$82,868	$111,378	$148,628
Total Expenditures	**$893,542**	**$948,556**	**$1,013,584**	**$1,089,435**	**$1,176,976**	**$1,277,124**

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 = 18.2%/2 + 3% = 12.1%). However, utilities and services have been assumed to grow at the full system growth rate plus inflation, while 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. It can be seen in the detailed list of all bond payments that is included as part of the rate model in Appendix B that NVSSD currently has no bond payments.

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. T-1 System Loop Improvement). 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 NVSSD 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 NVSSD 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 (5 percent) has been allocated to peak demand to account for the increased costs of maintaining a larger system. An additional 25 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	*$788,042*	*$816,654*	*$849,714*	*$887,407*	*$929,932*	*$977,509*
Projected Revenue Requirements	$893,542	$948,556	$1,013,584	$1,089,435	$1,176,976	$1,277,124
Projected Difference	($105,500)	($131,902)	($163,869)	($202,029)	($247,044)	($299,615)

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 $105,000 in 2016 to $300,000 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 NVSSD. 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 NVSSD. 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 NVSSD's case, the first block of water use (up to 12,000 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 Residential Base Rate no Allowance	$15.61	$16.08	$16.73	$17.50	$18.37	$19.30
Overage Rate ($/kgal) Block 1 (0-10,000 gal)	$2.22	$2.29	$2.37	$2.45	$2.55	$2.64
Overage Rate ($/kgal) Block 2 (10,000+ gal)	$14.47	$14.85	$15.05	$15.10	$15.10	$15.03

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 12,000 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	$66.67	$68.75	$71.24	$73.85	$77.02	$80.02
1 ½"	$79.51	$81.88	$84.88	$88.18	$92.14	$96.03
2"	$94.92	$97.63	$101.25	$105.37	$110.29	$115.25
3"	$130.89	$134.39	$139.46	$145.48	$152.64	$160.08
4"	$182.27	$186.91	$194.03	$202.77	$213.14	$224.13
6"	$310.72	$318.20	$330.47	$346.02	$364.39	$384.26
8"	$464.85	$475.75	$494.19	$517.91	$545.89	$576.42
10"	$644.68	$659.56	$685.20	$718.45	$757.64	$800.60
12"	$1,038.59	$1,062.18	$1,103.60	$1,157.73	$1,221.48	$1,291.66

Volume Rates ($/kgal)

	2016	2017	2018	2019	2020	2021
All use over 12,000 gallons/month						
Residential	$14.47	$14.85	$15.05	$15.10	$15.10	$15.03

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 this 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

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

periodically and adjust them as needed to provide a revenue stream that will adequately 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 165 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 NVSSD 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	19,573	165	118.6	9.9
Total	**19,573**	**165**	**118.6**	**9.9**

Projected Accounts

NVSSD 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 between 15 to 18 percent over the next 6 years. 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	**18.2%**	**17.9%**	**17.4%**	**16.7%**	**15.9%**	**15.1%**
Residential	195	230	270	315	365	420
Additional Connections/year	*30*	*35*	*40*	*45*	*50*	*55*

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	23,132	27,284	32,029	37,367	43,298	49,823
Total		**23,132**	**27,284**	**32,029**	**37,367**	**43,298**	**49,823**

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	50,456	59,512	69,862	81,506	94,443	108,674
TSS	250	50,456	59,512	69,862	81,506	94,443	108,674

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 conveyance impact fee revenue for the next six years is estimated to increase from about $26,000 a year to $49,000 a year as summarized in Table 3-5. It should be noted that NVSSD will be transferring treatment impact fees to JSSD for capacity in JSSD's treatment plant. 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	18.2%	17.9%	17.4%	16.7%	15.9%	15.1%
Projected NVSSD Conveyance Impact Fee Revenue	$26,455	$30,864	$35,273	$39,683	$44,092	$48,501
Projected NVSSD Treatment Impact Fee Revenue (Transferred to JSSD)	*$140,737*	*$164,193*	*$187,649*	*$211,105*	*$234,561*	*$258,017*
Total Projected Impact Fee Revenue	**$26,455**	**$30,864**	**$35,273**	**$39,683**	**$44,092**	**$48,501**
Additional NVSSD ERUs/year	*30*	*35*	*40*	*45*	*50*	*55*

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	$291	$352	$423	$507	$602	$711
Interest Revenue	$1,345	$1,506	$1,682	$1,873	$2,078	$2,297
Construction Inspection Fees	$2,424	$2,931	$3,529	$4,223	$5,020	$5,927
Administration Fees	$6,301	$7,622	$9,176	$10,980	$13,052	$15,411
Hookup Fees	$0	$0	$0	$0	$0	$0
Laboratory Fees	$0	$0	$0	$0	$0	$0
Shared Employee	$0	$0	$0	$0	$0	$0
Total Operating Non-Rate Revenue	$10,361	$12,411	$14,811	$17,583	$20,753	$24,346
Non-Operating						
NVSSD Impact Fees	$26,455	$30,864	$35,273	$39,683	$44,092	$48,501
Total Non-Operating Non-Rate Revenue	$26,455	$30,864	$35,273	$39,683	$44,092	$48,501
Total Non-Rate Revenue	**$36,816**	**$43,275**	**$50,084**	**$57,266**	**$64,845**	**$72,847**

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	$98,886	$111,910	$126,385	$142,309	$159,696	$178,576
Debt Services	$0	$0	$45,915	$45,915	$45,915	$45,915
Capital (Net of bond revenue)	$28,202	$51,149	$18,399	$33,094	$49,326	$67,092
Total Expenditures	**$127,088**	**$163,059**	**$190,700**	**$221,317**	**$254,936**	**$291,583**

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 = 18.2%/2 + 3% = 12.1%). Penalty revenue, Construction Inspection Fees, and Administration 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 and shows that the district currently has no outstanding bond payments.

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 University 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 JSSD'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 NVSSD 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 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. Although the District's ordinance allows for an overage charge for discharge over 12,000 gallons, historically it has not

charged its users more than the base rate. For this reason the sewage rates have been modeled as a $23.00 flat rate.

Table 3-8
Existing Sewer Rates

Base Rate ($/month) (12,000 gal Allowance)	Existing
All Customers	$23.00
Overage Rate ($/kgal) (12,000 + gal)	
All Customers	$5.00

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 $30,000 in 2016 to $90,000 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	*$96,997*	*$114,258*	*$133,412*	*$154,482*	*$177,492*	*$202,468*
Projected Revenue Requirements	*$127,088*	*$163,059*	*$190,700*	*$221,317*	*$254,936*	*$291,583*
Projected Difference	**$30,091**	**$48,801**	**$57,288**	**$66,836**	**$77,445**	**$89,115**

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	$31.51	$36.65	$36.95	$37.21	$37.44	$37.65

Volume Rate	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
Volume Component						
All customers	*$0.39*	*$0.38*	*$0.37*	*$0.35*	*$0.34*	*$0.34*
Capacity Component						
All customers	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$0.00*
Strength Component						
All customers	*$0.32*	*$0.30*	*$0.29*	*$0.27*	*$0.26*	*$0.25*
Total Volume Rate						
All customers	$0.72	$0.68	$0.65	$0.63	$0.60	$0.58

Industrial Surcharges	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
Volume Surcharge ($/kgal)	$0.39	$0.38	$0.37	$0.35	$0.34	$0.34
Capacity Surcharge ($/gpd)	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000
BOD Surcharge ($/lb)	$0.0770	$0.0726	$0.0686	$0.0650	$0.0618	$0.0589
TSS Surcharge($/lb)	$0.0770	$0.0726	$0.0686	$0.0650	$0.0618	$0.0589

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 NVSSD Sewer Rates

Monthly Base Rate	2016	2017	2018	2019	2020	2021
Residential	$38.58	$43.40	$43.40	$43.40	$43.40	$43.40

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 NVSSD 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	$66.67	$68.75	$71.24	$73.85	$77.02	$80.02
1 ½"	$79.51	$81.88	$84.88	$88.18	$92.14	$96.03
2"	$94.92	$97.63	$101.25	$105.37	$110.29	$115.25
3"	$130.89	$134.39	$139.46	$145.48	$152.64	$160.08
4"	$182.27	$186.91	$194.03	$202.77	$213.14	$224.13
6"	$310.72	$318.20	$330.47	$346.02	$364.39	$384.26
8"	$464.85	$475.75	$494.19	$517.91	$545.89	$576.42
10"	$644.68	$659.56	$685.20	$718.45	$757.64	$800.60
12"	$1,038.59	$1,062.18	$1,103.60	$1,157.73	$1,221.48	$1,291.66

Volume Rates ($/kgal)

	2016	2017	2018	2019	2020	2021
All use over 12,000 gallons/month						
Residential	$14.47	$14.85	$15.05	$15.10	$15.10	$15.03

Table 4-2
Recommended Sewer Rates

Monthly Base Rate	2016	2017	2018	2019	2020	2021
Residential	$38.58	$43.40	$43.40	$43.40	$43.40	$43.40

For comparison purposes, Tables 4-3 and 4-4 shows the existing and proposed future rates for NVSSD 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.

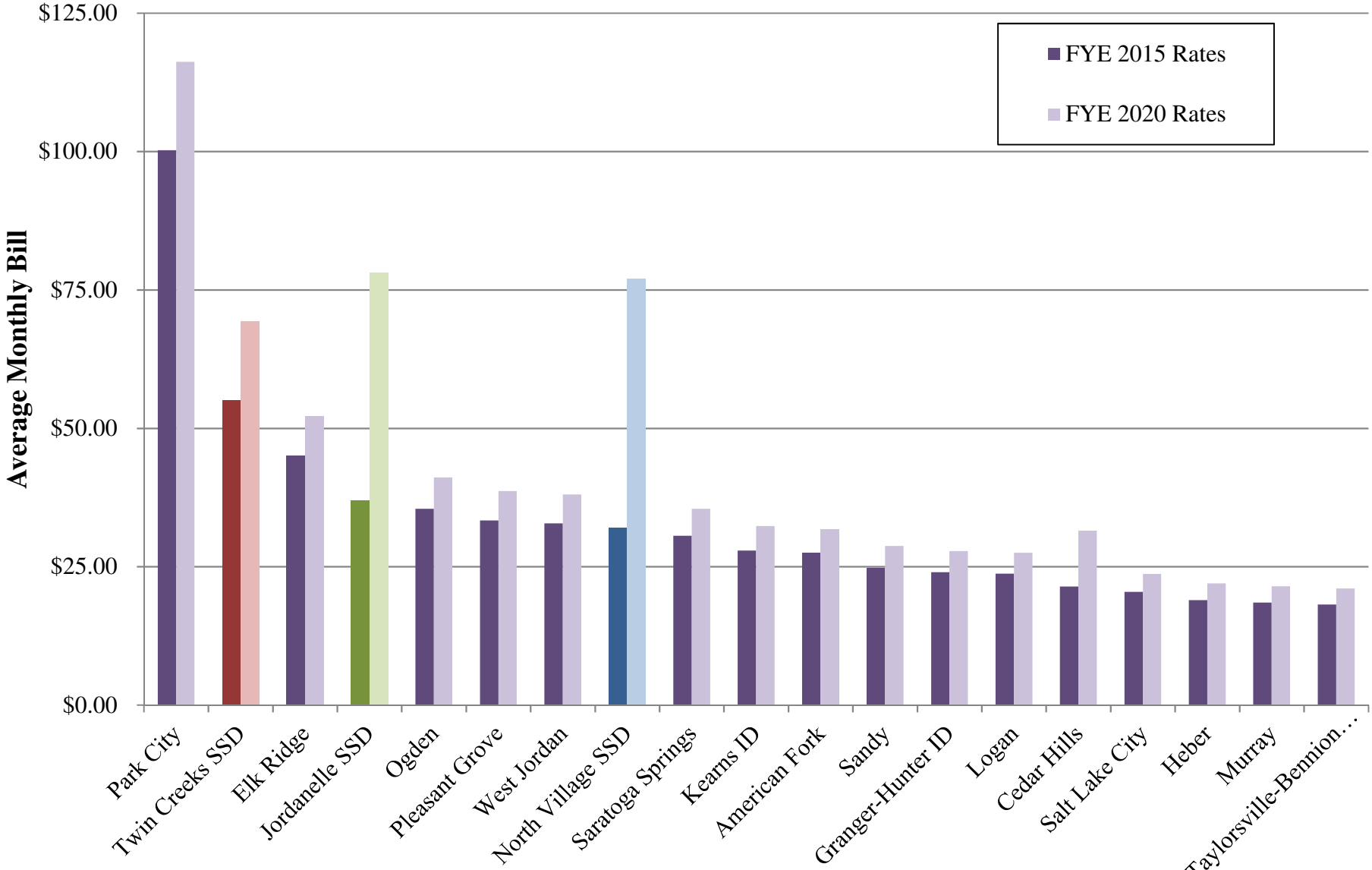
For NVSSD, the future rate shown assumes the District adopts the rates recommended in this report. For Twin Creeks SSD and Jordanelle SSD, the future rate includes proposed rates from their respective rate studies. For all other entities, future rates are simply based on a constant annual inflation of 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

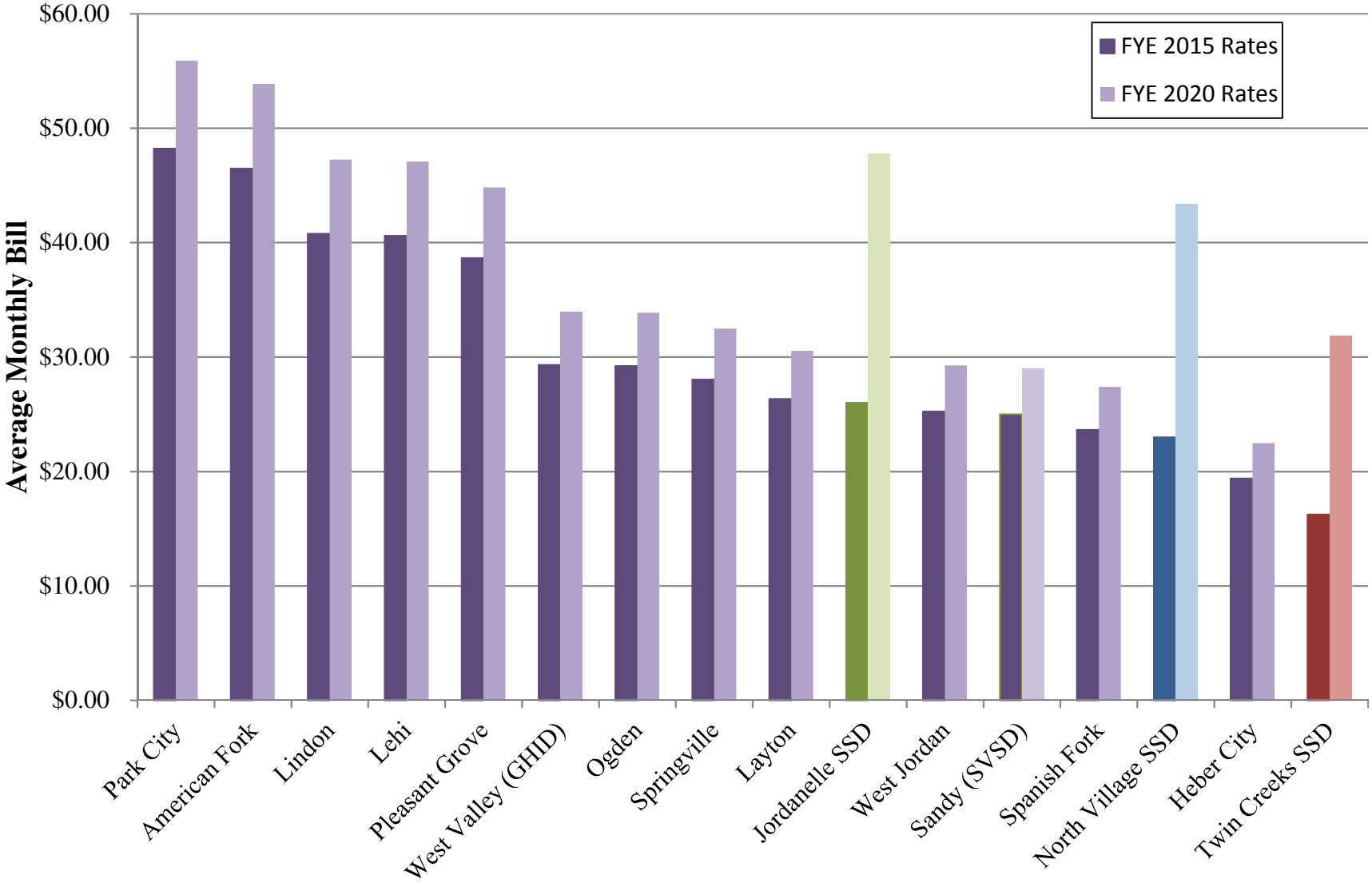
[1] Based on the average consumption for a NVSSD connection
[2] JSSD, TCSSD, and NVSSD based on proposed rates. Assumes all other rates are inflated at 3.0% annually

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, NVSSD'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 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 –**NVSSD'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 significant elevation changes which require additional pumping and infrastructure. With the proposed increases, sewer rates will still be less than Park City which has topography and service requirements that are similar to the District. It should be noted that a significant

portion of the recommended increase is associated with debt service coverage required for a few large capital improvements to be completed in the next few years. After these larger projects are completed, it is expected that capital expenditure levels will return to long-term recommended levels and that District rates will correspondingly drop closer to the average.

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	130	148	165	195	230	270	315	365	420	480	540	600	665
% Growth from Previous Year	-	13.46%	11.86%	18.18%	17.95%	17.39%	16.67%	15.87%	15.07%	14.29%	12.50%	11.11%	10.83%
Expenditures							Open Orifice to 12" and allow DS pipes to pressurize						
O&M	$1,074,977	$835,280	$808,086	$852,063	$899,823	$951,323	$1,006,567	$1,065,598	$1,128,496	$1,196,652	$1,269,713	$1,349,358	$1,436,321
Debt Service	$213	$255	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Capital Expenditures	$0	$0	$0	$0	$0	$0	$0	$34,778	$688,570	$0	$730,504	$0	$774,992
Total Expenditures	*$1,075,190*	*$835,535*	*$808,086*	*$852,063*	*$899,823*	*$951,323*	*$1,006,567*	*$1,100,377*	*$1,817,066*	*$1,196,652*	*$2,000,217*	*$1,349,358*	*$2,211,313*
Expenditures from Outside Revenue Sources	*$0*	*$0*	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Capital Expenditures - Cash Financed	$0	$0	$0	$0	$0	$0	$0	$34,778	$688,570	$0	$730,504	$0	$774,992
Income													
Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Impact Fees	$2,135	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Other Non-Rate	$ 504,033	$ 587,005	$674,260	$682,542	$692,218	$703,638	$716,984	$732,458	$750,278	$770,680	$792,768	$820,611	$853,629
Sales - Existing Rates	$ 65,777	$ 75,500	$ 89,300	$105,500	$124,436	$146,077	$170,423	$197,474	$227,231	$259,692	$292,154	$324,615	$359,782
Projected Income - Existing Rates	*$571,945*	*$662,505*	*$763,560*	*$788,042*	*$816,654*	*$849,714*	*$887,407*	*$929,932*	*$977,509*	*$1,030,372*	*$1,084,922*	*$1,145,226*	*$1,213,411*
System Investment Goal	$25,735	$29,971	$34,426	$41,718	$50,458	$60,747	$72,694	$86,413	$102,027	$119,663	$138,210	$157,713	$179,531
Recommended Long-term Level of Funding	$1,100,712	$865,251	$842,512	$893,781	$950,281	$1,012,070	$1,079,261	$1,152,011	$1,230,522	$1,316,314	$1,407,923	$1,507,071	$1,615,851
Recommended Rate Increases				100.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Sales Revenue With Increase	$65,777	$75,500	$89,300	$211,000	$256,338	$309,946	$372,452	$444,518	$526,845	$620,172	$718,625	$822,426	$938,868
Projected Income - Recommended Rates	$571,945	$662,505	$763,560	$893,542	$948,556	$1,013,584	$1,089,435	$1,176,976	$1,277,124	$1,390,852	$1,511,393	$1,643,037	$1,792,497

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	130	148	165	195	230	270	315	365	420	480	540	600	665
% Growth from Previous Year	-	13.46%	11.86%	18.18%	17.95%	17.39%	16.67%	15.87%	15.07%	14.29%	12.50%	11.11%	10.83%
Expenditures													
O&M	$65,288	$76,035	$87,337	$98,886	$111,910	$126,385	$142,309	$159,696	$178,576	$198,992	$219,763	$242,821	$268,435
Debt Service	$38	$45	$0	$0	$0	$45,915	$45,915	$45,915	$45,915	$45,915	$45,915	$45,915	$45,915
Total Capital Expenditures	$0	$0	$0	$0	$624,283	$0	$0	$46,371	$0	$0	$0	$0	$0
Total Expenditures	*$65,325*	*$76,080*	*$87,337*	*$98,886*	*$736,193*	*$172,300*	*$188,224*	*$251,982*	*$224,491*	*$244,907*	*$265,678*	*$288,736*	*$314,350*
Capital Expenditures from Bond Proceeds	$0	$0	$0	$0	$600,000	$0	$0	$0	$0	$0	$0	$0	$0
Capital Expenditures from Reserves	$0	$0	$0	$0	$24,283	$0	$0	$46,371	$0	$0	$0	$0	$0
Income													
Connection Fees	$11,613	$30,920	$15,432	$26,455	$30,864	$35,273	$39,683	$44,092	$48,501	$52,910	$52,910	$52,910	$57,319
Other Non-Rate	$6,459	$7,522	$8,640	$10,361	$12,411	$14,811	$17,583	$20,753	$24,346	$28,390	$32,633	$37,518	$43,145
Sales - Existing Rates	$40,541	$45,426	$50,815.36	$60,181	$70,983	$83,328	$97,216	$112,647	$129,621	$148,139	$166,656	$185,173	$205,234
Projected Income - Existing Rates	*$58,613*	*$83,867*	*$74,887*	*$96,997*	*$114,258*	*$133,412*	*$154,482*	*$177,492*	*$202,468*	*$229,439*	*$252,199*	*$275,601*	*$305,698*
System Investment Goal	$18,086	$21,063	$24,194	$28,593	$33,725	$39,590	$46,189	$53,520	$61,585	$70,383	$79,181	$87,979	$97,510
Recommended Long-term Level of Funding	$83,374	$97,098	$111,531	$127,479	$145,635	$165,976	$188,498	$213,216	$240,161	$269,375	$298,943	$330,799	$365,944
Recommended Rate Increases				50.0%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Sales Revenue With Increase	$40,541	$45,426	$50,815	$90,272	$119,784	$140,616	$164,052	$190,092	$218,736	$249,984	$281,232	$312,480	$346,332
Projected Income - Recommended Rates	*$58,613*	*$83,867*	*$74,887*	*$127,088*	*$163,059*	*$190,700*	*$221,317*	*$254,936*	*$291,583*	*$331,284*	*$366,775*	*$402,908*	*$446,796*

APPENDIX B

DETAILED WATER RATE MODEL TABLES

Table B-1

North Village Special Service District - Water Rate Study
Estimated 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	38,435	130	295.7	43,608	148	295.7	48,782	165	295.7	295.7	24.6
Water Reserve	0	2,981	0.0	0	1,964	0.0	0	1,822	0.0	0.0	0.0
Total	**38,435**	**3,111**	**12.4**	**43,608**	**2,112**	**20.6**	**48,782**	**1,987**	**24.5**	**24.5**	**2.0**
					0.658851729			0.927653148			
								26.66161788			

Table B-2

North Village Special Service District - Water Rate Study
Projected Accounts

		4804	5667	6652	7761	8993	10348				
		Number									
Customer Class		**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
	% Growth	**18.18%**	**17.95%**	**17.39%**	**16.67%**	**15.87%**	**15.07%**	**14.29%**	**12.50%**	**12.50%**	**12.50%**
All Customers		195	230	270	315	365	420	480	540		% Decreasing of Water Reserve 90%
Water Reserve		1,795	1,764	1,728	1,687	1,642	1,593	1,539	1,485	1,431	1,372
Subtotal (Impact Fee Eligible)		1,795	1,764	1,728	1,687	1,642	1,593	1,539	1,485		
Total		**1,990**	**1,994**	**1,998**	**2,002**	**2,007**	**2,013**	**2,019**	**2,025**		
			1.0017586	1.0020063	1.002252568	1.002497228	1.002740108	1.002981041	1.00297218		
			0.982453404	0.979588597	0.976558702	0.973328908	0.969857875	0.966095736	0.964905896		

Table B-3

North Village Special Service District - Water Rate Study
Projected Annual Water Use

		Amount (kgal)							
Customer Class	**3-Year Avg. Use/Acct.**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
All Customers	295.7	57,652	68,000	79,826	93,130	107,912	124,173	141,912	159,651
Water Reserve	0.0	0	0	0	0	0	0	0	0
Total		**57,652**	**68,000**	**79,826**	**93,130**	**107,912**	**124,173**	**141,912**	**159,651**

Table B-4

North Village Special Service District - Water Rate Study
Peaking Factors

Customer Class	**Max. Mo./ Avg. Mo.**	**Est. Peak Day Factor**
All Customers	2.00	2.02
Water Reserve	0.00	-
System	2.00	2.02

System Peak Day to Average Day Factor	2.02

Table B-5

North Village 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	318.73	375.94	441.32	514.88	596.60	686.50	160.78	189.64	222.62	259.73	300.95	346.30
Water Reserve	-	-	-	-	-	-	-	-	-	-	-	-
Total	**318.73**	**375.94**	**441.32**	**514.88**	**596.60**	**686.50**	**160.78**	**189.64**	**222.62**	**259.73**	**300.95**	**346.30**

Table B-6

North Village 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	12	+	+	+	0.93	0.07	0.0	0.0
1"	12	+	+	+	0	0	0	0
1 1/2"	12	+	+	+	0	0	0	0
2"	12	+	+	+	0	0	0	0
3"	12	+	+	+	0	0	0	0
4"	12	+	+	+	0	0	0	0
6"	12	+	+	+	0	0	0	0
8"	12	+	+	+	0	0	0	0
10"	12	+	+	+	0	0	0	0
Total	**--**	**--**	**--**	**--**	**0.9**	**0.1**	**0.0**	**0.0**
Percentage of Total Use	**--**	**--**	**--**	**--**	**93.4%**	**6.6%**	**0.0%**	**0.0%**

Water Reserve

	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	12	+	+	+	1	0	0.0	0.0
1"	12	+	+	+	0	0	0	0
1 1/2"	12	+	+	+	0	0	0	0
2"	12	+	+	+	0	0	0	0
3"	12	+	+	+	0	0	0	0
4"	12	+	+	+	0	0	0	0
6"	12	+	+	+	0	0	0	0
8"	12	+	+	+	0	0	0	0
10"	12	+	+	+	0	0	0	0
Total	**--**	**--**	**--**	**--**	**1.00**	**0.00**	**0.00**	**0.00**
Percentage of Total Use	**--**	**--**	**--**	**--**	**100.0%**	**0.0%**	**0.0%**	**0.0%**

Summary

2015	Total Use By Block				Percentage of Total Use			
Customer Class	**Block 1**	**Block 2**	**Block 3**	**Block 4**	**Block 1**	**Block 2**	**Block 3**	**Block 4**
All Customers	45,544	3,239	0	0	93.4%	6.6%	0.0%	0.0%
Water Reserve	0	0	0	0	100.0%	0.0%	0.0%	0.0%
Unused	0	0	0	0	100.0%	0.0%	0.0%	0.0%
Unused	0	0	0	0	100.0%	0.0%	0.0%	0.0%
Unused	0	0	0	0	100.0%	0.0%	0.0%	0.0%
Total	**45,544**	**3,239**	**0**	**0**	**93.4%**	**6.6%**	**0.0%**	**0.0%**

Table B-7
North Village 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**	**% of Total**
All Customers	165	0	0	0	0	0	0	0	0	165	100.0%
Water Reserve	0	0	0	0	0	0	0	0	0	0	0.0%
Total	**165**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**165**	**100.0%**
% 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**	**% of Total**
All Customers	165	0	0	0	0	0	0	0	0	165	100.0%
Water Reserve	0	0	0	0	0	0	0	0	0	0	0.0%
Total	**165**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**165**	**100.0%**
% 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
North Village Special Service District - Water Rate Study
Projected Number of Equivalent Meters by Size

Customer Class	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
All Customers	195	230	270	315	365	420
Water Reserve	0	0	0	0	0	0
Total	**195**	**230**	**270**	**315**	**365**	**420**

Table B-9
North Village Special Service District - Water Rate Study
Connection Fee Revenue

Size of Meter	Impact Fee	Actual 2015	Projected 2016	Projected 2017	Projected 2018	Projected 2019	Projected 2020	Projected 2021
3/4 and smaller	$2,600		$78,000.00	$91,000	$104,000	$117,000	$130,000	$143,000
Total Impact Fee Revenue		**$0**	**$78,000**	**$91,000**	**$104,000**	**$117,000**	**$130,000**	**$143,000**

Table B-10
North Village 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		2015	Projected 2016	Projected 2017	Projected 2018	Projected 2019	Projected 2020	Projected 2021
Operations								
Penalty Revenue	$ 1,200	$960	$1,163	$1,407	$1,694	$2,027	$2,410	$2,845
Interest Revenue	$ 6,000	$4,800	$5,380	$6,025	$6,729	$7,492	$8,311	$9,187
Construction Inspection Fees	$ 10,000	$8,000	$9,695	$11,725	$14,116	$16,893	$20,081	$23,709
Administration Fees	$ 26,000	$20,800	$25,206	$30,486	$36,703	$43,921	$52,210	$61,644
O & M Water Revenue	$ 23,700	$ 23,700	$26,566	$29,747	$33,226	$36,991	$41,037	$45,360
Meter Set Revenue	$ 33,000	$ 33,000	$39,990	$48,367	$58,230	$69,682	$82,833	$97,800
Hookup Fees	$ -	$0	$0	$0	$0	$0	$0	$0
Laboratory Fees	$ -	$0	$0	$0	$0	$0	$0	$0
Shared Employee	$ -	$0	$0	$0	$0	$0	$0	$0
Water Reservation	$ 583,000	$ 583,000	$574,542	$564,461	$552,940	$539,978	$525,576	$509,734
Total Operations Non-Rate Revenue		$674,260	$682,542	$692,218	$703,638	$716,984	$732,458	$750,278
Expansion and Replacement								
Connection Fees (Impact Fee)		$0	$78,000	$91,000	$104,000	$117,000	$130,000	$143,000
Inspection Fees	$ -	$0	$0	$0	$0	$0	$0	$0
Impact Fee Transferred to JSSD		$0	($78,000)	($91,000)	($104,000)	($117,000)	($130,000)	($143,000)
Total Expansion Non-Rate Revenue		**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Total Non-Rate Revenue		**$674,260**	**$682,542**	**$692,218**	**$703,638**	**$716,984**	**$732,458**	**$750,278**

Table B-11
North Village 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	$0	$0	$0	$0	$0	$0	$0	$0
Training/Conferences	$0	$0	$0	$0	$0	$0	$0	$0
Utilities	$6,400	$5,120	$6,205	$7,504	$9,034	$10,811	$12,852	$15,174
Water Only Utilities	$0	$0	$0	$0	$0	$0	$0	$0
Phones	$2,000	$1,600	$1,793	$2,008	$2,243	$2,497	$2,770	$3,062
JSSD Maintenance Fee		$162,066	$181,661	$203,414	$227,205	$252,954	$280,619	$310,180
Legal Fees	$600	$480	$538	$602	$673	$749	$831	$919
JSSD Water	$613,300	$613,300	$631,699	$650,650	$670,169	$690,275	$710,983	$732,312
Bank Charges	$1,400	$1,120	$1,289	$1,482	$1,700	$1,943	$2,214	$2,514
Miscellaneous Expense		$0	$0	$0	$0	$0	$0	$0
Supplies	$1,500	$1,200	$1,345	$1,506	$1,682	$1,873	$2,078	$2,297
Water Only Supplies	$0	$0	$0	$0	$0	$0	$0	$0
Postage	$0	$0	$0	$0	$0	$0	$0	$0
Equipment and maintenance	$0	$0	$0	$0	$0	$0	$0	$0
Services	$21,000	$16,800	$20,359	$24,623	$29,644	$35,475	$42,170	$49,789
Unused	$0	$0	$0	$0	$0	$0	$0	$0
Insurance-Liability	$8,000	$6,400	$7,174	$8,033	$8,972	$9,989	$11,082	$12,249
Vehicle Expense	$0	$0	$0	$0	$0	$0	$0	$0
Depreciation Expense	$0	$0	$0	$0	$0	$0	$0	$0
Debt Service Fees	$0	$0	$0	$0	$0	$0	$0	$0
Total O&M		**$808,086**	**$852,063**	**$899,823**	**$951,323**	**$1,006,567**	**$1,065,598**	**$1,128,496**
Debt Service								
	$0	$0	$0	$0	$0	$0	$0	$0
Total Debt Service		**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Capital Improvements								
Growth Related								
T-1	$ 1,730,000	$0	$0	$0	$0	$0	$0	$688,570
SP-1	$ 30,000	$0	$0	$0	$0	$0	$34,778	$0
		$0	$0	$0	$0	$0	$0	$0
R&R of Existing System								
Bond Revenue								
			$0	$0	$0	$0	$0	$0
			$0	$0	$0	$0	$0	$0
Transfer to Capital Reserve			$41,479	$48,733	$62,260	$82,868	$76,599	($539,942)
Total Capital Outlays		**$0**	**$41,479**	**$48,733**	**$62,260**	**$82,868**	**$111,378**	**$148,628**
Gross Revenue Requirements		**$808,086**	**$893,542**	**$948,556**	**$1,013,584**	**$1,089,435**	**$1,176,976**	**$1,277,124**
LESS:								
Operations Non-Rate Revenue		$674,260	$682,542	$692,218	$703,638	$716,984	$732,458	$750,278
Expansion Non-Rate Revenue		$0	$0	$0	$0	$0	$0	$0
Net Revenue Requirements		**$ 133,826**	**$ 211,000**	**$ 256,338**	**$ 309,946**	**$ 372,452**	**$ 444,518**	**$ 526,845**

Table B-12
North Village 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	55%	31%	2%	12%	100%
Training/Conferences	55%	31%	2%	12%	100%
Utilities	60%	18%	10%	12%	100%
Water Only Utilities	75%	25%	0%	0%	100%
Phones	55%	31%	2%	12%	100%
JSSD Maintenance Fee	70%	10%	10%	10%	100%
Legal Fees	55%	31%	2%	12%	100%
JSSD Water	55%	31%	2%	12%	100%
Bank Charges	55%	31%	2%	12%	100%
Miscellaneous Expense	55%	31%	2%	12%	100%
Supplies	55%	31%	2%	12%	100%
Water Only Supplies	55%	31%	2%	12%	100%
Postage	0%	0%	100%	0%	100%
Equipment and maintenance	55%	31%	2%	12%	100%
Services	55%	31%	2%	12%	100%
Unused	55%	31%	2%	12%	100%
Insurance-Liability	55%	31%	2%	12%	100%
Vehicle Expense	55%	31%	2%	12%	100%
Depreciation Expense	55%	31%	2%	12%	100%
Debt Service Fees	55%	31%	2%	12%	100%

Table B-13
North Village 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%	0.0%	5.0%	25.0%	100%	$0	$0	$0	$0	$0
Land\Easements	$0	70.0%	0.0%	5.0%	25.0%	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%	5.0%	0.0%	25.0%	100%	$1,655,189	$118,228	$0	$591,139	$2,364,556
Equipment	$97,058	70.0%	5.0%	0.0%	25.0%	100%	$67,941	$4,853	$0	$24,265	$97,058
Meters	$20,905	0.0%	0.0%	0.0%	100.0%	100%	$0	$0	$0	$20,905	$20,905
Vehicles	$79,788	65.0%	0.0%	0.0%	35.0%	100%	$51,862	$0	$0	$27,926	$79,788
Red Ledges	$24,275,714	70.0%	5.0%	0.0%	25.0%	100%	$16,993,000	$1,213,786	$0	$6,068,929	$24,275,714
Supply	$2,599,660	70.0%	5.0%	0.0%	25.0%	100%	$1,819,762	$129,983	$0	$649,915	$2,599,660
Total	**$29,534,740**						**$20,587,754**	**$1,466,849**	**$48,529**	**$7,431,607**	**$29,534,740**
Percent							**69.7%**	**5.0%**	**0.2%**	**25.2%**	**100.0%**

Table B-14
North Village 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	$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
Training/Conferences	$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
Utilities	$3,723	$1,117	$620	$745	$6,205	$4,503	$1,351	$750	$901	$7,504	$5,421	$1,626	$903	$1,084	$9,034	$6,487	$1,946	$1,081	$1,297	$10,811	$7,711	$2,313	$1,285	$1,542	$12,852	$9,104.28	$2,731	$1,517	$1,821	$15,174
Water Only Utilities	$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
Phones	$986	$556	$36	$215	$1,793	$1,105	$623	$40	$241	$2,008	$1,234	$695	$45	$269	$2,243	$1,374	$774	$50	$300	$2,497	$1,524	$859	$55	$332	$2,770	$1,684.24	$949	$61	$367	$3,062
JSSD Maintenance Fee	$127,163	$18,166	$18,166	$18,166	$181,661	$142,390	$20,341	$20,341	$20,341	$203,414	$159,043	$22,720	$22,720	$22,720	$227,205	$177,068	$25,295	$25,295	$25,295	$252,954	$196,433	$28,062	$28,062	$28,062	$280,619	$217,125.96	$31,018	$31,018	$31,018	$310,180
Legal Fees	$296	$167	$11	$65	$538	$331	$187	$12	$72	$602	$370	$209	$13	$81	$673	$412	$232	$15	$90	$749	$457	$258	$17	$100	$831	$505.27	$285	$18	$110	$919
JSSD Water	$347,434	$195,827	$12,634	$75,804	$631,699	$357,857	$201,701	$13,013	$78,078	$650,650	$368,593	$207,753	$13,403	$80,420	$670,169	$379,651	$213,985	$13,805	$82,833	$690,275	$391,041	$220,405	$14,220	$85,318	$710,983	$402,771.75	$227,017	$14,646	$87,877	$732,312
Bank Charges	$709	$400	$26	$155	$1,289	$815	$459	$30	$178	$1,482	$935	$527	$34	$204	$1,700	$1,069	$602	$39	$233	$1,943	$1,218	$686	$44	$266	$2,214	$1,382.71	$779	$50	$302	$2,514
Miscellaneous 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
Supplies	$740	$417	$27	$161	$1,345	$828	$467	$30	$181	$1,506	$925	$522	$34	$202	$1,682	$1,030	$581	$37	$225	$1,873	$1,143	$644	$42	$249	$2,078	$1,263.18	$712	$46	$276	$2,297
Water Only Supplies	$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
Postage	$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
Equipment and maintenance	$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
Services	$11,197	$6,311	$407	$2,443	$20,359	$13,543	$7,633	$492	$2,955	$24,623	$16,304	$9,190	$593	$3,557	$29,644	$19,511	$10,997	$709	$4,257	$35,475	$23,193	$13,073	$843	$5,060	$42,170	$27,383.96	$15,435	$996	$5,975	$49,789
Insurance-Liability	$3,946	$2,224	$143	$861	$7,174	$4,418	$2,490	$161	$964	$8,033	$4,935	$2,781	$179	$1,077	$8,972	$5,494	$3,097	$200	$1,199	$9,989	$6,095	$3,435	$222	$1,330	$11,082	$6,736.97	$3,797	$245	$1,470	$12,249
Vehicle 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
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	$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
Total	**$496,194**	**$225,184**	**$32,071**	**$98,614**	**$852,063**	**$525,790**	**$235,253**	**$34,870**	**$103,911**	**$899,823**	**$557,760**	**$246,023**	**$37,926**	**$109,615**	**$951,323**	**$592,096**	**$257,510**	**$41,233**	**$115,729**	**$1,006,567**	**$628,814**	**$269,735**	**$44,790**	**$122,259**	**$1,065,598**	**$667,958**	**$282,723**	**$48,598**	**$129,216**	**$1,128,496**
Percent	**58.2%**	**26.4%**	**3.8%**	**11.6%**	**100.0%**	**58.4%**	**26.1%**	**3.9%**	**11.5%**	**100.0%**	**58.6%**	**25.9%**	**4.0%**	**11.5%**	**100.0%**	**58.8%**	**25.6%**	**4.1%**	**11.5%**	**100.0%**	**59.0%**	**25.3%**	**4.2%**	**11.5%**	**100.0%**	**59.2%**	**25.1%**	**4.3%**	**11.5%**	**100.0%**

Table B-15
North Village 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	$496,194	$225,184	$32,071	$98,614	$852,063	$525,790	$235,253	$34,870	$103,911	$899,823	$557,760	$246,023	$37,926	$109,615	$951,323	$592,096	$257,510	$41,233	$115,729	$1,006,567	$628,814	$269,735	$44,790	$122,259	$1,065,598	$667,958	$282,723	$48,598	$129,216	$1,128,496
Debt Service	$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	$0.00	$0.00	$0.00	$0
Capital Outlays	$28,914	$2,060	$68	$10,437	$41,479	$33,970	$2,420	$80	$12,262	$48,733	$43,400	$3,092	$102	$15,666	$62,260	$57,765	$4,116	$136	$20,852	$82,868	$77,638	$5,532	$183	$28,025	$111,378	$103,604	$7,382	$244	$37,398	$148,628
Less: Operations Non-Rate Revenue	$397,474	$180,383	$25,690	$78,995	$682,542	$404,481	$180,976	$26,825	$79,937	$692,218	$412,542	$181,968	$28,051	$81,076	$703,638	$421,753	$183,426	$29,370	$82,434	$716,984	$432,227	$185,407	$30,787	$84,037	$732,458	$444,091	$187,968	$32,310	$85,909	$750,278
Less: Expansion Non-Rate Revenue	$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	$0.00	$0.00	$0.00	$0
Total	**$127,633**	**$46,861**	**$6,449**	**$30,057**	**$211,000**	**$155,279**	**$56,697**	**$8,125**	**$36,236**	**$256,338**	**$188,618**	**$67,147**	**$9,977**	**$44,205**	**$309,946**	**$228,107**	**$78,200**	**$11,999**	**$54,146**	**$372,452**	**$274,226**	**$89,859**	**$14,186**	**$66,247**	**$444,518**	**$327,471**	**$102,137**	**$16,532**	**$80,705**	**$526,845**

Table B-16
North Village 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	$127,633	$46,861	$6,449	$30,057	$211,000	$155,279	$56,697	$8,125	$36,236	$256,338	$188,618	$67,147	$9,977	$44,205	$309,946	$228,107	$78,200	$11,999	$54,146	$372,452	$274,226	$89,859	$14,186	$66,247	$444,518	$327,471	102,136.91	$16,532	$80,705	$526,845
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	**$127,633**	**$46,861**	**$6,449**	**$30,057**	**$211,000**	**$155,279**	**$56,697**	**$8,125**	**$36,236**	**$256,338**	**$188,618**	**$67,147**	**$9,977**	**$44,205**	**$309,946**	**$228,107**	**$78,200**	**$11,999**	**$54,146**	**$372,452**	**$274,226**	**$89,859**	**$14,186**	**$66,247**	**$444,518**	**$327,471**	**$102,137**	**$16,532**	**$80,705**	**$526,845**
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 Rates B-17
North Village Special Service District - Water Rate Study

Existing Rates **Projected Revenue**

Meter Size	Existing		2016	2017	2018	2019	2020	2021
All Customers								
1 and Smaller	$ 32.00		$ 74,880	$ 88,320	$ 103,680	$ 120,960	$ 140,160	$ 161,280
1 1/2	$ 32.00		$ -	$ -	$ -	$ -	$ -	$ -
2	$ 32.00		$ -	$ -	$ -	$ -	$ -	$ -
3	$ 32.00		$ -	$ -	$ -	$ -	$ -	$ -
4	$ 32.00		$ -	$ -	$ -	$ -	$ -	$ -
6	$ 32.00		$ -	$ -	$ -	$ -	$ -	$ -
8	$ 32.00		$ -	$ -	$ -	$ -	$ -	$ -
10	$ 32.00		$ -	$ -	$ -	$ -	$ -	$ -
12	$ 32.00		$ -	$ -	$ -	$ -	$ -	$ -
Water Reserve								
1 and Smaller	$ -		$ -	$ -	$ -	$ -	$ -	$ -
1 1/2	$ -		$ -	$ -	$ -	$ -	$ -	$ -
2	$ -		$ -	$ -	$ -	$ -	$ -	$ -
3	$ -		$ -	$ -	$ -	$ -	$ -	$ -
4	$ -		$ -	$ -	$ -	$ -	$ -	$ -
6	$ -		$ -	$ -	$ -	$ -	$ -	$ -
8	$ -		$ -	$ -	$ -	$ -	$ -	$ -
10	$ -		$ -	$ -	$ -	$ -	$ -	$ -
12	$ -		$ -	$ -	$ -	$ -	$ -	$ -

Block Volume Rates ($/kgal) **Block Volume Rates ($/kgal)**

	Existing		2016	2017	2018	2019	2020	2021
Block 1 Rate								
All Customers	$ -		$ -	$ -	$ -	$ -	$ -	$ -
Water Reserve	$ -		$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ -		$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ -		$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ -		$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ -		$ -	$ -	$ -	$ -	$ -	$ -
Block 2 Rate								
All Customers	$ 8.00		$ 30,620	$ 36,116	$ 42,397	$ 49,463	$ 57,314	$ 65,951
Water Reserve	$ 15.00		$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ 15.00		$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ 2.50		$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ 2.50		$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ -		$ -	$ -	$ -	$ -	$ -	$ -

Total Revenue		$105,500	$124,436	$146,077	$170,423	$197,474	$227,231
Total Needs		$211,000	$256,338	$309,946	$372,452	$444,518	$526,845
Difference		-$105,500	-$131,902	-$163,869	-$202,029	-$247,044	-$299,615

Table Rates B-18
North Village Special Service District - Water Rate Study
Calculated Rates

Meter Size	2016	2017	2018	2019	2020	2021
1 and Smaller	$15.61	$16.08	$16.73	$17.50	$18.37	$19.30
1 1/2	$28.45	$29.21	$30.37	$31.83	$33.49	$35.31
2	$43.86	$44.96	$46.74	$49.02	$51.64	$54.53
3	$79.83	$81.72	$84.95	$89.13	$93.99	$99.36
4	$131.21	$134.24	$139.52	$146.42	$154.49	$163.41
6	$259.66	$265.53	$275.96	$289.67	$305.74	$323.54
8	$413.79	$423.08	$439.68	$461.56	$487.24	$515.70
10	$593.62	$606.89	$630.69	$662.10	$698.99	$739.88
12	$987.53	$1,009.51	$1,049.09	$1,101.38	$1,162.83	$1,230.94

Block Volume Rates ($/kgal)

	2016	2017	2018	2019	2020	2021
Block 1 Rate (Currently in Allowance)						
All Customers	$2.22	$2.29	$2.37	$2.45	$2.55	$2.64
Block 2 Rate						
All Customers	$14.47	$14.85	$15.05	$15.10	$15.10	$15.03

Table B-19
North Village Special Service District - Water Rate Study
Calculated Rates

Meter Size	2016	2017	2018	2019	2020	2021
1 and Smaller	$66.67	$68.75	$71.24	$73.85	$77.02	$80.02
1 1/2	$79.51	$81.88	$84.88	$88.18	$92.14	$96.03
2	$94.92	$97.63	$101.25	$105.37	$110.29	$115.25
3	$130.89	$134.39	$139.46	$145.48	$152.64	$160.08
4	$182.27	$186.91	$194.03	$202.77	$213.14	$224.13
6	$310.72	$318.20	$330.47	$346.02	$364.39	$384.26
8	$464.85	$475.75	$494.19	$517.91	$545.89	$576.42
10	$644.68	$659.56	$685.20	$718.45	$757.64	$800.60
12	$1,038.59	$1,062.18	$1,103.60	$1,157.73	$1,221.48	$1,291.66

Block Volume Rates ($/kgal)

	2016	2017	2018	2019	2020	2021
All use over 12,000 gallons/month						
All Customers	$14.47	$14.85	$15.05	$15.10	$15.10	$15.03

APPENDIX C

DETAILED SEWER RATE MODEL TABLES

Table C-1
North Village Special Service District - Sewer Rate Study
Esitmated 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	15,421	130	118.6	17,497	148	118.6	19,573	165	118.6	118.6	9.9
Total	**15,421**	**130**	**118.6**	**17,497**	**148**	**118.6**	**19,573**	**165**	**118.6**	**118.6**	**9.9**

Table C-2
North Village 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**	**FYE 2024**	**FYE 2025**
	% Growth	**18.18%**	**17.95%**	**17.39%**	**16.67%**	**15.87%**	**15.07%**	**14.29%**	**12.50%**	**12.50%**	**12.50%**
All customers		195	230	270	315	365	420	480	540		
Total		**195**	**230**	**270**	**315**	**365**	**420**	**480**	**540**		

Table C-3
North Village 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	23,132	27,284	32,029	37,367	43,298	49,823	56,940	64,058
Total		**23,132**	**27,284**	**32,029**	**37,367**	**43,298**	**49,823**	**56,940**	**64,058**

Table C-4
North Village Special Service District - Sewer Rate Study
Projected Total Wastewater Flow

	FYE 2015
Total Flow at Treatment Plant (mgd)=	**0.0561**

		Amount (mgd)					
Customer Class		**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
All customers		0.07	0.08	0.09	0.11	0.12	0.14
Total		**0.07**	**0.08**	**0.09**	**0.11**	**0.12**	**0.14**

Table C-5
North Village Special Service District - Sewer Rate Study
Peaking Factors

Customer Class	**Est. Peak Hour Factor**
All customers	2.50

Table C-6
North Village 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	0.17	0.20	0.23	0.27	0.31	0.36
Total	**0.17**	**0.20**	**0.23**	**0.27**	**0.31**	**0.36**

	Excess Over Average Day (mgd)					
Customer Class	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
All customers	0.10	0.12	0.14	0.16	0.19	0.21
Total	**0.10**	**0.12**	**0.14**	**0.16**	**0.19**	**0.21**

Table C-7
North Village Special Service District - Sewer Rate Study
Strength

Customer Class	BOD (mg/L)	TSS (mg/L)
All customers	250	250
Approximate Cost Division	50%	50%

Table C-8
North Village 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	50,456	59,512	69,862	81,506	94,443	108,674
Total	**50,456**	**59,512**	**69,862**	**81,506**	**94,443**	**108,674**

	TSS (lbs/year)					
Customer Class	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
All customers	50,456	59,512	69,862	81,506	94,443	108,674
Total	**50,456**	**59,512**	**69,862**	**81,506**	**94,443**	**108,674**

	Weighted Average (lbs/year)					
Customer Class	**FYE 2016**	**FYE 2017**	**FYE 2018**	**FYE 2019**	**FYE 2020**	**FYE 2021**
All customers	50,456	59,512	69,862	81,506	94,443	108,674
Total	**50,456**	**59,512**	**69,862**	**81,506**	**94,443**	**108,674**

Table C-9
North Village 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	$ 881.83		$26,455	$30,864	$35,273	$39,683	$44,092	$48,501
Total Impact Fee Revenue		**$15,432**	**$26,455**	**$30,864**	**$35,273**	**$39,683**	**$44,092**	**$48,501**

Table C-10
North Village 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	**$ 1,200.00**	$240	$291	$352	$423	$507	$602	$711
Interest Revenue	**$ 6,000.00**	$1,200	$1,345	$1,506	$1,682	$1,873	$2,078	$2,297
Construction Inspection Fees	**$ 10,000.00**	$2,000	$2,424	$2,931	$3,529	$4,223	$5,020	$5,927
Administration Fees	**$ 26,000.00**	$5,200	$6,301	$7,622	$9,176	$10,980	$13,052	$15,411
Hookup Fees	**$ -**	$0	$0	$0	$0	$0	$0	$0
Laboratory Fees	**$ -**	$0	$0	$0	$0	$0	$0	$0
Shared Employee	**$ -**	$0	$0	$0	$0	$0	$0	$0
		$0	$0	$0	$0	$0	$0	$0
Total Operations Non-Rate Revenue		$8,640	$10,361	$12,411	$14,811	$17,583	$20,753	$24,346
Expansion and Replacement								
Impact Fee		$15,432	$26,455	$30,864	$35,273	$39,683	$44,092	$48,501
Inspection Fees	**$ -**	$0	$0	$0	$0	$0	$0	$0
Total Expansion Non-Rate Revenue		$15,432	$26,455	$30,864	$35,273	$39,683	$44,092	$48,501
Total Non-Rate Revenue		**$24,072**	**$36,816**	**$43,275**	**$50,084**	**$57,266**	**$64,845**	**$72,847**

Table C-11
North Village 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	$0.00	$0	$0	$0	$0	$0	$0	$0
Training/Conferences	$0.00	$0	$0	$0	$0	$0	$0	$0
Utilities	$6,400.00	$6,400	$7,756	$9,380	$11,293	$13,514	$16,065	$18,967
Sewer Only Utilities	$0.00	$0	$0	$0	$0	$0	$0	$0
Phones	$2,000.00	$400	$448	$502	$561	$624	$693	$766
JSSD Maintenance Fee		$74,037	$82,989	$92,926	$103,794	$115,558	$128,196	$141,700
Legal Fees	$600.00	$120	$135	$151	$168	$187	$208	$230
Bank Charges	$1,400.00	$280	$339	$410	$494	$591	$703	$830
Supplies	$1,500.00	$300	$336	$377	$421	$468	$519	$574
Postage	$0.00	$0	$0	$0	$0	$0	$0	$0
Equipment and maintenance	$0.00	$0	$0	$0	$0	$0	$0	$0
Services	$21,000.00	$4,200	$5,090	$6,156	$7,411	$8,869	$10,542	$12,447
Insurance-Liability	$8,000.00	$1,600	$1,793	$2,008	$2,243	$2,497	$2,770	$3,062
Vehicle Expense	$0.00	$0	$0	$0	$0	$0	$0	$0
Depreciation Expense	$0.00	$0	$0	$0	$0	$0	$0	$0
Debt Service Fees	$0.00	$0	$0	$0	$0	$0	$0	$0
Total O&M		**$87,337**	**$98,886**	**$111,910**	**$126,385**	**$142,309**	**$159,696**	**$178,576**
Debt Service								
SAB Series 2006	-	$0	-	-	-	-	-	-
Proposed 2017 Bond					$45,915.01	$45,915.01	$45,915.01	$45,915.01
Total Debt Service	**-**	**$0**	**$0**	**$0**	**$45,915**	**$45,915**	**$45,915**	**$45,915**

Expansion and Replacement		FYE 2015	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
GS-2	$ 235,000.00			$ 249,312				
FM2B	$ 12,328.65			$ 13,079				
LS-1	$ 306,000.00			$ 324,635				
LS-2 (Phase 1)	$ 35,117.97			$ 37,257				
Master Plan	$ 40,000.00						$ 46,371	
Rehabilitation and Replacement Budget	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Bond Proceeds				$ (600,000)				
Transfer to/(from) Reserve Fund		$ (12,450)	$ 28,202	$ 26,866	$ 18,399	$ 33,094	$ 2,955	$ 67,092
Total Capital Outlays		**$ (12,450)**	**$28,202**	**$51,149**	**$18,399**	**$33,094**	**$49,326**	**$67,092**
Total Revenue Requirements		**$ 74,887**	**$127,088**	**$163,059**	**$190,700**	**$221,317**	**$254,936**	**$291,583**
LESS:								
Operations Non-Rate Revenue		$8,640	$10,361	$12,411	$14,811	$17,583	$20,753	$24,346
Expansion Non-Rate Revenue		$15,432	$26,455	$30,864	$35,273	$39,683	$44,092	$48,501
Net Revenue Requirements		**$ 50,815**	**$ 90,272**	**$ 119,784**	**$ 140,616**	**$ 164,052**	**$ 190,092**	**$ 218,736**

Table C-12
North Village 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%
JSSD Maintenance Fee	9%	0%	10%	81%	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
North Village 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
	$0	0%	0%	0%	100%	100%	$0	$0	$0	$0	$0
	$0	0%	0%	0%	100%	100%	$0	$0	$0	$0	$0
	$0	0%	0%	0%	100%	100%	$0	$0	$0	$0	$0
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
North Village Special Service District - Sewer Rate Study
Allocation of O&M Costs to Service Characteristics

	FYE 2016					FYE 2017					FYE 2018				
Item	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**
O&M															
Travel	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Training/Conferences	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Utilities	$2,714	$0	$0	$5,041	$7,756	$3,283	$0	$0	$6,097	$9,380	$3,953	$0	$0	$7,341	$11,293
Sewer Only Utilities	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Phones	$0	$0	$0	$448	$448	$0	$0	$0	$502	$502	$0	$0	$0	$561	$561
JSSD Maintenance Fee	$7,469	$0	$8,299	$67,221	$82,989	$8,363	$0	$9,293	$75,270	$92,926	$9,341	$0	$10,379	$84,073	$103,794
Legal Fees	$0	$0	$0	$135	$135	$0	$0	$0	$151	$151	$0	$0	$0	$168	$168
Bank Charges	$0	$0	$0	$339	$339	$0	$0	$0	$410	$410	$0	$0	$0	$494	$494
Miscellaneous Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Supplies	$0	$0	$0	$336	$336	$0	$0	$0	$377	$377	$0	$0	$0	$421	$421
Postage	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Equipment and maintenance	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Services	$0	$0	$0	$5,090	$5,090	$0	$0	$0	$6,156	$6,156	$0	$0	$0	$7,411	$7,411
Heber Valley Treatment Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Insurance-Liability	$0	$0	$0	$1,793	$1,793	$0	$0	$0	$2,008	$2,008	$0	$0	$0	$2,243	$2,243
Vehicle Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Depreciation Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Debt Service Fees	$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
Unused	$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
Unused	$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
Unused	$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
Unused	$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
Unused	$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
Unused	$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
Unused	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$10,183**	**$0**	**$8,299**	**$80,404**	**$98,886**	**$11,646**	**$0**	**$9,293**	**$90,971**	**$111,910**	**$13,294**	**$0**	**$10,379**	**$102,712**	**$126,385**
Percent	**10.3%**	**0.0%**	**8.4%**	**81.3%**	**100.0%**	**10.4%**	**0.0%**	**8.3%**	**81.3%**	**100.0%**	**10.5%**	**0.0%**	**8.2%**	**81.3%**	**100.0%**

	FYE 2019					FYE 2020					FYE 2021				
Item	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**
O&M															
Travel	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Training/Conferences	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Utilities	$4,730	$0	$0	$8,784	$13,514	$5,623	$0	$0	$10,442	$16,065	$6,639	$0	$0	$12,329	$18,967
Sewer Only Utilities	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Phones	$0	$0	$0	$624	$624	$0	$0	$0	$693	$693	$0	$0	$0	$766	$766
JSSD Maintenance Fee	$10,400	$0	$11,556	$93,602	$115,558	$11,538	$0	$12,820	$103,839	$128,196	$12,753	$0	$14,170	$114,777	$141,700
Legal Fees	$0	$0	$0	$187	$187	$0	$0	$0	$208	$208	$0	$0	$0	$230	$230
Bank Charges	$0	$0	$0	$591	$591	$0	$0	$0	$703	$703	$0	$0	$0	$830	$830
Miscellaneous Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Supplies	$0	$0	$0	$468	$468	$0	$0	$0	$519	$519	$0	$0	$0	$574	$574
Postage	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Equipment and maintenance	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Services	$0	$0	$0	$8,869	$8,869	$0	$0	$0	$10,542	$10,542	$0	$0	$0	$12,447	$12,447
Heber Valley Treatment Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Insurance-Liability	$0	$0	$0	$2,497	$2,497	$0	$0	$0	$2,770	$2,770	$0	$0	$0	$3,062	$3,062
Vehicle Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Depreciation Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Debt Service Fees	$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
Unused	$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
Unused	$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
Unused	$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
Unused	$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
Unused	$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
Unused	$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
Unused	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$15,130**	**$0**	**$11,556**	**$115,623**	**$142,309**	**$17,160**	**$0**	**$12,820**	**$129,716**	**$159,696**	**$19,392**	**$0**	**$14,170**	**$145,015**	**$178,576**
Percent	**10.6%**	**0.0%**	**8.1%**	**81.2%**	**100.0%**	**10.7%**	**0.0%**	**8.0%**	**81.2%**	**100.0%**	**10.9%**	**0.0%**	**7.9%**	**81.2%**	**100.0%**

Table C-15
North Village Special Service District - Sewer Rate Study
Revenue Requirements by Service Characteristics

	FYE 2016					FYE 2017					FYE 2018				
Item	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**
O&M	$10,183	$0	$8,299	$80,404	$98,886	$11,646	$0	$9,293	$90,971	$111,910	$13,294	$0	$10,379	$102,712	$126,385
Debt Service	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$45,915	$45,915
Capital Outlays	$0	$0	$0	$28,202	$28,202	$0	$0	$0	$51,149	$51,149	$0	$0	$0	$18,399	$18,399
Less: Operations Non-Rate Revenue	$1,067	$0	$870	$8,424	$10,361	$1,292	$0	$1,031	$10,089	$12,411	$1,558	$0	$1,216	$12,036	$14,811
Less: Expansion Non-Rate Revenue	$0	$0	$0	$26,455	$26,455	$0	$0	$0	$30,864	$30,864	$0	$0	$0.00	$35,273	$35,273
Total	**$9,116**	**$0**	**$7,429**	**$73,726**	**$90,272**	**$10,355**	**$0**	**$8,262**	**$101,167**	**$119,784**	**$11,736**	**$0**	**$9,163**	**$119,717**	**$140,616**

	FYE 2019					FYE 2020					FYE 2021				
Item	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**
O&M	$15,130	$0	$11,556	$115,623	$142,309	$17,160	$0	$12,820	$129,716	$159,696	$19,392	$0	$14,170	$145,015	$178,576
Debt Service	$0	$0	$0	$45,915	$45,915	$0	$0	$0	$45,915	$45,915	$0.00	$0.00	$0.00	$45,915.01	$45,915
Capital Outlays	$0	$0	$0	$33,094	$33,094	$0	$0	$0	$49,326	$49,326	$0	$0	$0	$67,092	$67,092
Less: Operations Non-Rate Revenue	$1,869	$0	$1,428	$14,286	$17,583	$2,230	$0	$1,666	$16,857	$20,753	$2,644	$0	$1,932	$19,771	$24,346
Less: Expansion Non-Rate Revenue	$0	$0	$0	$39,683	$39,683	$0	$0	$0	$44,092	$44,092	$0.00	$0.00	$0.00	$48,500.88	$48,501
Total	**$13,261**	**$0**	**$10,128**	**$140,663**	**$164,052**	**$14,930**	**$0**	**$11,154**	**$164,008**	**$190,092**	**$16,748**	**$0**	**$12,238**	**$189,750**	**$218,736**

Table C-16
North Village Special Service District - Sewer Rate Study
Cost Allocations to Customer Classes

	FYE 2016					FYE 2017					FYE 2018				
	Volume	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**
All customers	$9,116	$0	$7,429	$73,726	$90,272	$10,355	$0	$8,262	$101,167	$119,784	$11,736	$0	$9,163	$119,717	$140,616
Unused	$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
Unused	$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
Unused	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$9,116**	**$0**	**$7,429**	**$73,726**	**$90,272**	**$10,355**	**$0**	**$8,262**	**$101,167**	**$119,784**	**$11,736**	**$0**	**$9,163**	**$119,717**	**$140,616**
Allocation Basis	Avg. Demand	Pk. Demand	Strength	Account		Avg. Demand	Pk. Demand	Strength	Account		Avg. Demand	Pk. Demand	Strength	Account	

	FYE 2019					FYE 2020					FYE 2021				
	Volume	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**	**Volume**	**Capacity**	**Strength**	**Customer**	**Total**
All customers	$13,261	$0	$10,128	$140,663	$164,052	$14,930	$0	$11,154	$164,008	$190,092	$16,747.82	$0	$12,238	$189,750	$218,736
Unused	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.00	$0	$0	$0	$0
Unused	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.00	$0	$0	$0	$0
Unused	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0.00	$0	$0	$0	$0
Unused	$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
Total	**$13,261**	**$0**	**$10,128**	**$140,663**	**$164,052**	**$14,930**	**$0**	**$11,154**	**$164,008**	**$190,092**	**$16,748**	**$0**	**$12,238**	**$189,750**	**$218,736**
Allocation Basis	Avg. Demand	Pk. Demand	Strength	Account		Avg. Demand	Pk. Demand	Strength	Account		Avg. Demand	Pk. Demand	Strength	Account	

Table Rates C-17
North Village Special Service District - Sewer Rate Study
Existing Rates and Projected Revenue

Base Rate	Existing
All customers	$23.00
Unused	
Unused	
Unused	$ -
Unused	$ -
Unused	$ -

Meter Size	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
All customer	$53,820	$63,480	$74,520	$86,940	$100,740	$115,920
Unused	$0	$0	$0	$0	$0	$0
Unused	$0	$0	$0	$0	$0	$0
Unused	$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ -	$ -	$ -	$ -	$ -	$ -

Volume Rate	Existing
All customers	$5.00
Unused	
Unused	
Unused	$ -
Unused	$ -
Unused	$ -

	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
All customer	$6,361	$7,503	$8,808	$10,276	$11,907	$13,701
Unused	$0	$0	$0	$0	$0	$0
Unused	$0	$0	$0	$0	$0	$0
Unused	$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ -	$ -	$ -	$ -	$ -	$ -
Unused	$ -	$ -	$ -	$ -	$ -	$ -

		FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
Revenue - Existing Rates	Revenue	$60,181	$70,983	$83,328	$97,216	$112,647	$129,621
Revenue Required	Revenue Req	$90,272	$119,784	$140,616	$164,052	$190,092	$218,736
Surplus/(Shortfall)		($30,091)	($48,801)	($57,288)	($66,836)	($77,445)	($89,115)

Table Rates C-18
North Village 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	$31.51	$36.65	$36.95	$37.21	$37.44	$37.65

Volume Rate	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
Volume Component						
All customers	*$0.39*	*$0.38*	*$0.37*	*$0.35*	*$0.34*	*$0.34*
Capacity Component						
All customers	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$0.00*
Strength Component						
All customers	*$0.32*	*$0.30*	*$0.29*	*$0.27*	*$0.26*	*$0.25*
Total Volume Rate						
All customers	$0.72	$0.68	$0.65	$0.63	$0.60	$0.58

Industrial Surcharges	FYE 2016	FYE 2017	FYE 2018	FYE 2019	FYE 2020	FYE 2021
Volume Surcharge ($/kgal)	$0.39	$0.38	$0.37	$0.35	$0.34	$0.34
Capacity Surcharge ($/gpd)	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000	$0.0000
BOD Surcharge ($/lb)	$0.0770	$0.0726	$0.0686	$0.0650	$0.0618	$0.0589
TSS Surcharge($/lb)	$0.0770	$0.0726	$0.0686	$0.0650	$0.0618	$0.0589

Table Rates C-19
North Village 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	$23.00	$38.58	$43.40	$43.40	$43.40	$43.40	$43.40
Total Volume Rate (Over 12k gallons)							
All customers	$5.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Average Monthly Rate							
All customers	**$25.66**	**$38.58**	**$43.40**	**$43.40**	**$43.40**	**$43.40**	**$43.40**
Percent Increase		50%	12.5%	0%	0%	0%	0%

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