SPRINGVILLE CITY

WASTEWATER COLLECTION SYSTEM MASTER PLAN

DRAFT

December 2025

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(HAL Project No.: 260.63.100)

DRAFT

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December 2025

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CHAPTER 1
INTRODUCTION

BACKGROUND AND PURPOSE

Springville is a rapidly growing city in Utah County, Utah. Located in central Utah Valley, between the southeastern edge of Utah Lake and the base of the Wasatch Mountains, Springville is a community that supports a wide range of residential, commercial, industrial, and recreational development, creating strong economic vitality. Springville is a community that has become a center for the arts, with strong local support. This positive environment continues to attract many new residents and businesses, leading to rapid growth.

This rapid growth has caused increased loads on City resources, including the wastewater collection system. These loads consume available capacity of sewers, lift stations and force mains. Monitoring, planning, financing, and constructing new facilities is necessary to serve new development.

Recognizing the need for wastewater collection system planning, Springville City retained Hansen, Allen & Luce, Inc. (HAL) to prepare a wastewater collection system master plan. The purpose of the master plan is to 1) estimate wastewater loading values for the existing system, 2) evaluate the existing system's ability to convey existing wastewater flows, 3) prepare growth projections, 4) predict growth areas with City input, 5) prepare future loading estimates based on growth, 6) evaluate future infrastructure needs and 7) recommended projects that will create the additional needed wastewater conveyance capacity.

The results of this study are limited by the accuracy of the development projections and other assumptions used in preparing the master plan. It is expected that the City will continue to review and update this master plan every 5 years, or more frequently if the assumptions included in this effort change significantly.

AUTHORIZATION

The Springville City Council and Administration authorized Hansen, Allen & Luce, Inc. to proceed with the wastewater collection system master plan in 2025.

SCOPE OF WORK

A summary of the scope of work is as follows:

1. Communicate and coordinate with City personnel.
2. Attend a start-up meeting with the City personnel to discuss data and key issues.
3. Prepare population growth projections.
4. Compare GIS data to the existing system model.
5. Evaluate winter water use billing records to estimate water volumes due to indoor water demand. Use data to estimate infiltration values.
6. Evaluate wastewater treatment plant meter data.

7. Attend a planning meeting to discuss current and future land use.
8. Prepare an existing system model.
9. Prepare a future conditions model.
10. Use the models to identify deficiencies.
11. Develop a capital facilities list.
12. Attend a workshop with City personnel to present results and select preferred alternatives.
13. Prepare estimated construction costs and estimated schedules for project construction.
14. Prepare a draft report.
15. Review draft report with City.
16. Prepare a final master plan document.

PREVIOUS STUDIES

This master plan is part of a long-term ongoing planning effort by Springville City. The City has prepared master plans, as needed, in the past, to ensure that the wastewater collection system facilities are adequate to meet the community needs. Prior master plans include the following:

1. *Springville City - Wastewater Collection System Master Plan*. Hansen, Allen & Luce, Inc. August 2020.

2. *Springville City - Wastewater Collection System Master Plan and Capital Facilities Plan*. Springville City Staff. May 2014.

3. *Springville City - Wastewater Collection System Master Plan*. Hansen, Allen & Luce, Inc. May 2006.

CHAPTER 2
EXISTING WASTEWATER SYSTEM

SERVICE AREA

The service area of Springville City's wastewater collection system includes the area within the municipal boundary. This boundary is provided on Figure 2-1. The City may expand the incorporated boundary at a future date, but the expansion schedule has not been identified.

EXISTING WASTEWATER SYSTEM

The existing wastewater system consists of gravity pipes including laterals, collectors, interceptors and outfalls. The system also includes lift stations, force mains and the Wastewater Reclamation Facility (WRF). This master plan evaluates the above items, except that the WRF has been evaluated by Aqua Engineering in a separate master plan document. The existing wastewater system is shown on Figure 2-1.

Source of Data

Data for the existing wastewater collection system was provided by the City. This data includes the following:

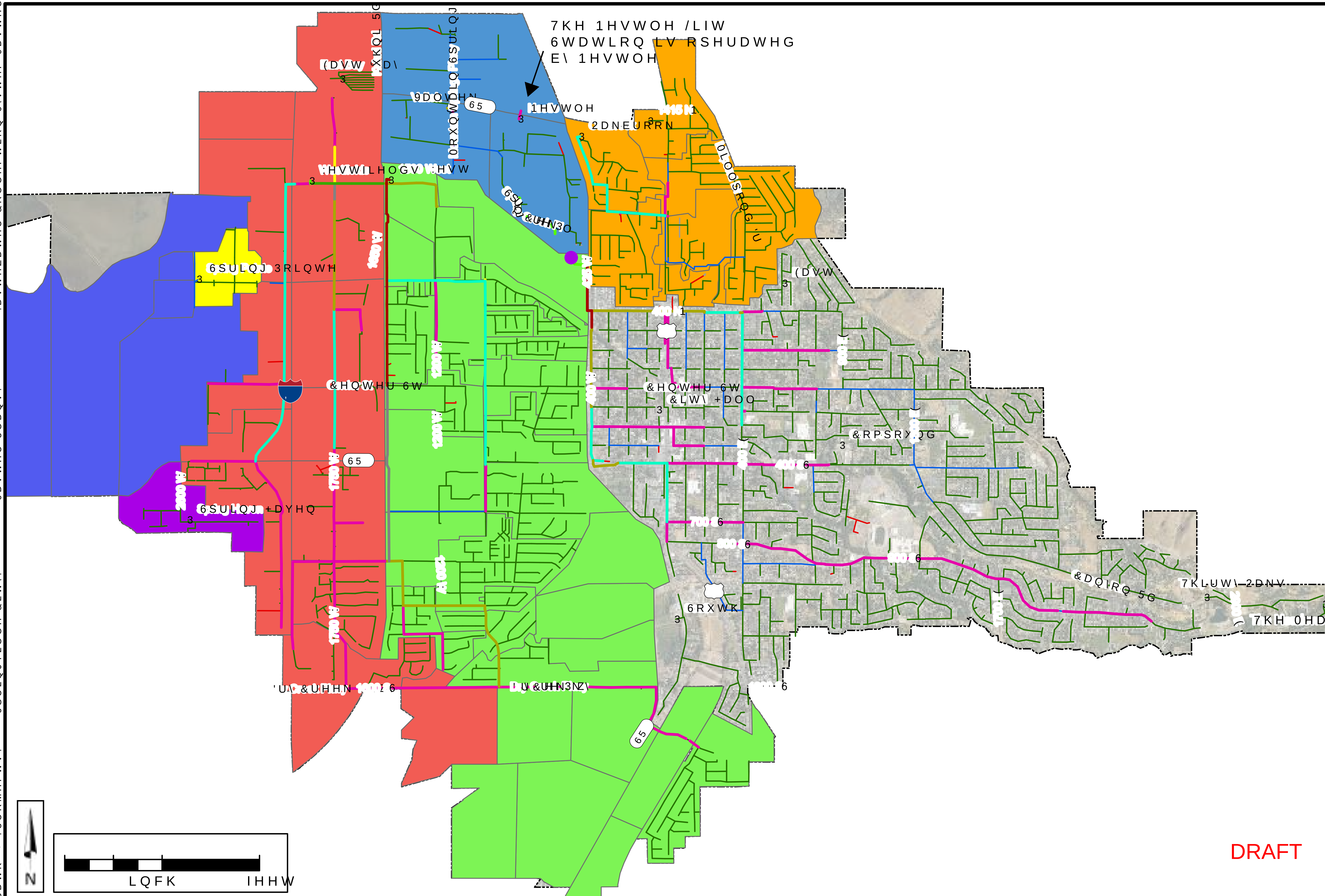
- *Wastewater Collection System Master Plan*. HAL. 2020.
- *Water Reclamation Facility Master Plan*. Aqua Engineering. 2024.
- Existing and future computer hydraulic models from the 2020 master plan in the Autodesk Storm and Sanitary Analysis modeling software format.
- GIS files describing manholes, gravity pipes, lift stations, and force mains.
- The online Springville City GIS databased located at https://maps.springville.org/emap/.
- Record drawings and technical data describing lift stations and completed projects.

Collection Network

The existing Springville City wastewater collection system consists of nearly 150 miles of gravity pipeline and about 2,900 manholes. Gravity pipe sizes range from 4-inch diameter to 36-inch diameter pipe. The system also has force main piping ranging from 2-inch diameter to 12-inch diameter pipe.

Wastewater Treatment Plant

The wastewater in the collection system flows to the Springville City Wastewater Reclamation Facility (WRF). Flows arrive at the WRF via two outfalls. One is a 36-inch diameter gravity sewer that conveys flows from throughout the City. The second is a pressurized force main from the Nestle facility. This wastewater is pre-treated primarily to remove suspended solids, fats, oils, and greases. The WRF has a permitted capacity of 6.6 MGD average daily flow and peak day flow up to 9.3 MGD.



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Lift Stations

As a result of the relatively flat topography in portions of the City and as a result of the patterns of development growth, it has been necessary to use lift stations in some locations to provide wastewater service. Springville City uses 14 lift stations to convey wastewater to the WRF. The locations of the lift stations are provided on Figure 2-1. Table 2-1 provides a list of the lift stations with key characteristics.

TABLE 2-1 LIFT STATION INVENTORY

NAME	ADDRESS	VFD	RATED PUMP CAPACITY (GPM)[1]	NO. OF PUMPS	BACKUP POWER
1500 West	1500 W 1000 N	Y	1,375	2	Yes
Westfields	1780 W 1000 N	Y	650	2	Yes
Valtek	1375 N Industrial Cir.	Y	540	2	Yes
Oakbrook	1275 N Meadowbrook Ln.	Y	350	2	Yes
East	520 N 600 E	N	80	2	Yes
South	1270 So. Main	N	200	2	Yes
Spring Haven	2480 W. 700 So.	N	257	2	Yes
Spring Pointe	500 N 2400 W	N	260	2	Yes
30 Oaks	2800 E. Canyon Rd	N	57	2	No
1415 North	1425 No. Main	N	57	2	No
City Hall	110 So. Main	N	50	2	Yes
East Bay (KOA)	1604 N 1750 W	N		2	No
Meadows	1078 S Oak Leaf Ln	N		2	No
4th South Compound	909 E. 400 So.	N	55	1	No

1. Rated capacity is based on the capacity of one pump with the larger of the two pumps being out of service.

Potential for Lift Station Removal or Flow Reduction

The City indicated a desire to eliminate lift stations, when possible, since this would reduce power and other operations and maintenance costs. As part of the previous master plan, the City commissioned a separate study to consider how key lift stations could be eliminated and to consider the costs and savings resulting from lift station removal. A copy of that study has been included in Appendix A.

CHAPTER 3
FLOW MONITORING

FLOW MONITORING

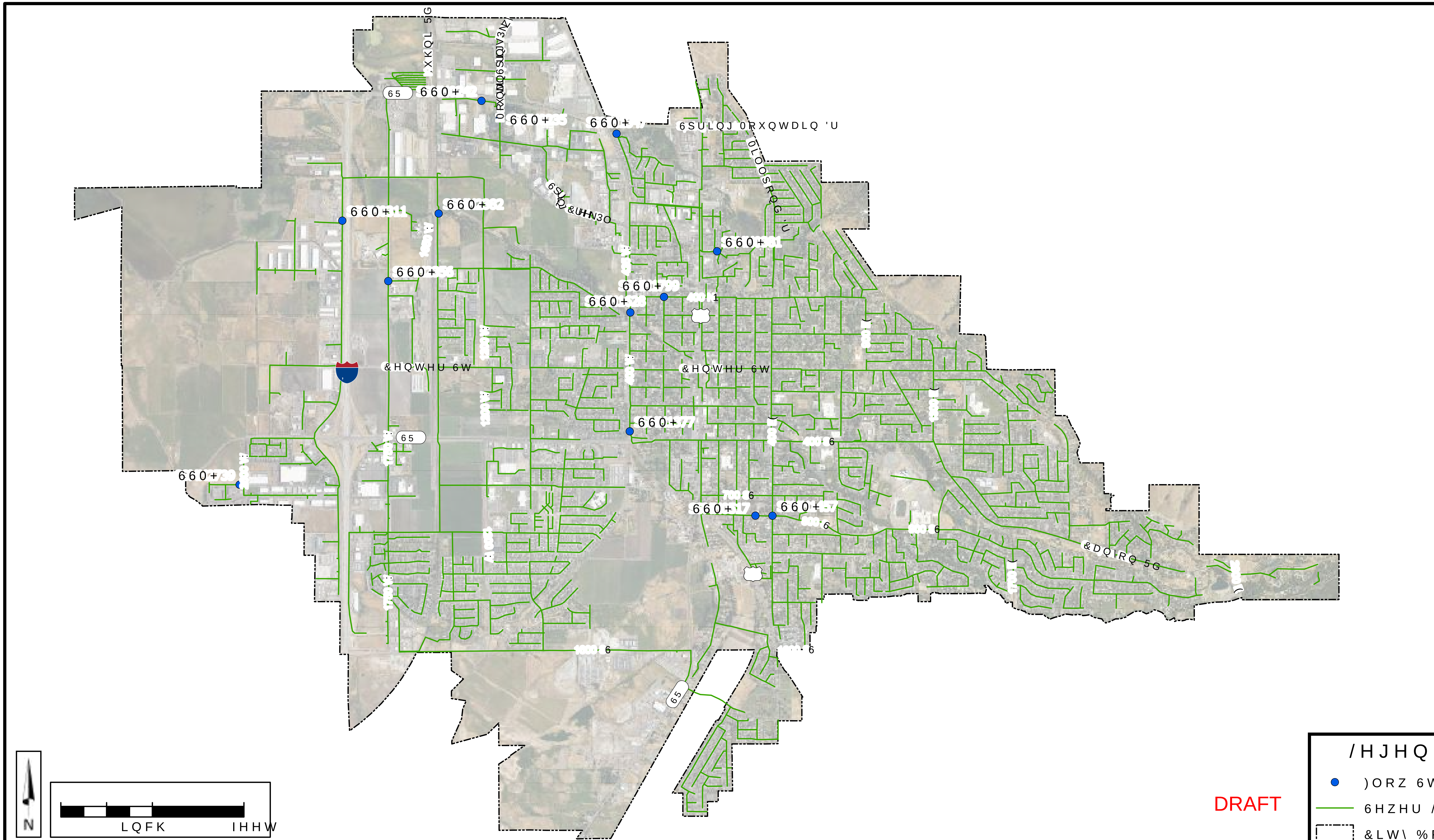
The purpose of flow monitoring is to obtain flow data at several locations throughout the City to provide the basis for flow characterization, including flow peaking factors, construction of a model, and calibration of the model to real values.

Local Flow Monitoring

Flow monitoring was previously completed at various sites throughout the city by City personnel. The data was then provided to HAL for analysis. Additional flow monitoring was performed for Lakeside Landing near Westfields Lift Station for a recent flow study. Each flow study provided about one to two weeks of time-series flow data.

Springville City - Wastewater Treatment Plant Flow Monitoring

In addition to the flow studies, the City provided HAL with three years of metered influent flow data at the wastewater treatment plant headworks. The flows arriving at the treatment plant were analyzed in conjunction with precipitation data and the Nestle pre-treatment flows to determine possible inflow and infiltration values. The model was calibrated to match the assumed peak flow at the treatment plant, including inflow and infiltration. Graphs showing the recorded flow data are located in Appendix B. Flow study locations are shown on Figure 3-1.



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CHAPTER 4
FLOW CHARACTERIZATION

METHODOLOGY

The purpose of flow characterization is to determine the flow patterns and variations that may be experienced by a wastewater system so that sewers, lift stations, and the treatment facility can be evaluated and sized appropriately. The flow characterization included evaluation of the following wastewater flow characteristics:

- Unit Flows
- Daily Flow Variation
- Annual Flow Variation
- Long Term Flow Variation
- Extraordinary Flows

UNIT FLOWS

Unit flows were estimated for Springville City and are expressed as Equivalent Residential Units (ERUs). An ERU is the average wastewater loading of an average residential unit. The ERU is used to express all loadings by the same unit. Commercial, industrial and other types of development loading can be expressed by the same unit as residences. For example, a commercial development that produces a loading of 5 times the average residence will be designated with a 5 ERU loading.

In order to estimate the loading for an ERU, the amount of drinking water used during the winter was examined. Winter drinking water is mostly consumed indoors and can be identified by use type (i.e. residential) from the billing record codes. The amount of indoor water used is essentially the same as the amount of wastewater produced. It is therefore possible to estimate residential indoor wastewater use from the billing records.

Several years of City billing records were obtained and analyzed to determine current average indoor water usage for each equivalent residential unit (ERU) in the City. This resulted in an average indoor water usage of about 170 gpd per ERU for 15,952 existing ERUs (with Nestle excluded). Monthly production records and usage patterns were analyzed to determine the peak day indoor demand, which was determined to be 260 gpd per ERU. To account for possible future variability above the current usage and incorporate a portion of inflow and infiltration for both existing and future development into the level of service, 250 gpd/ERU was selected as the level of service. It is assumed that all indoor water usage will be converted to wastewater flow, resulting in a system design wastewater flow of the following:

Hydraulic Loading / ERU = 250 gallons/day

DAILY FLOW VARIATION

Flow in a wastewater collection system varies continuously throughout the day. Data were provided for the WRF headworks on a 15-minute interval from January 2022 through May 2025. From the data, it may be observed that the minimum flow generally occurs during the early morning between 3:00 AM and 5:00 AM. Maximum or peak flows typically occur during the morning between around 8:00 AM and 9:00 AM and in the evening between 8:00 PM and 9:00 PM. Another peak occurs in the early morning between midnight and 3:00 AM. This peak is due to operations at the Nestle facility which discharges wastewater during the night, avoiding a coincident peak with the City-wide collections system.

Peaking Factors

Peaking factors were developed for the Springville wastewater collection system. The peaking factor is the ratio between the peak instantaneous flow and the average daily flow. These peaking factors were calculated based on the WRF loading data and on the local flow studies that were conducted by Springville City personnel.

Flow monitoring data was previously collected by Springville City at locations downstream of residential, industrial, and mixed-use areas. These local flow studies provided data at key locations for a one-to-two-week period. The peaking factors and flow patterns revealed in the flow studies were examined as part of the effort to establish peaking factors and patterns for the hydraulic model. The data from the flow studies were used to create a pattern of 15-minute increments. Based on this information, peaking factors were determined for the different land use types. The flow study data, peaking factors and patterns are provided in Figure 4-1.

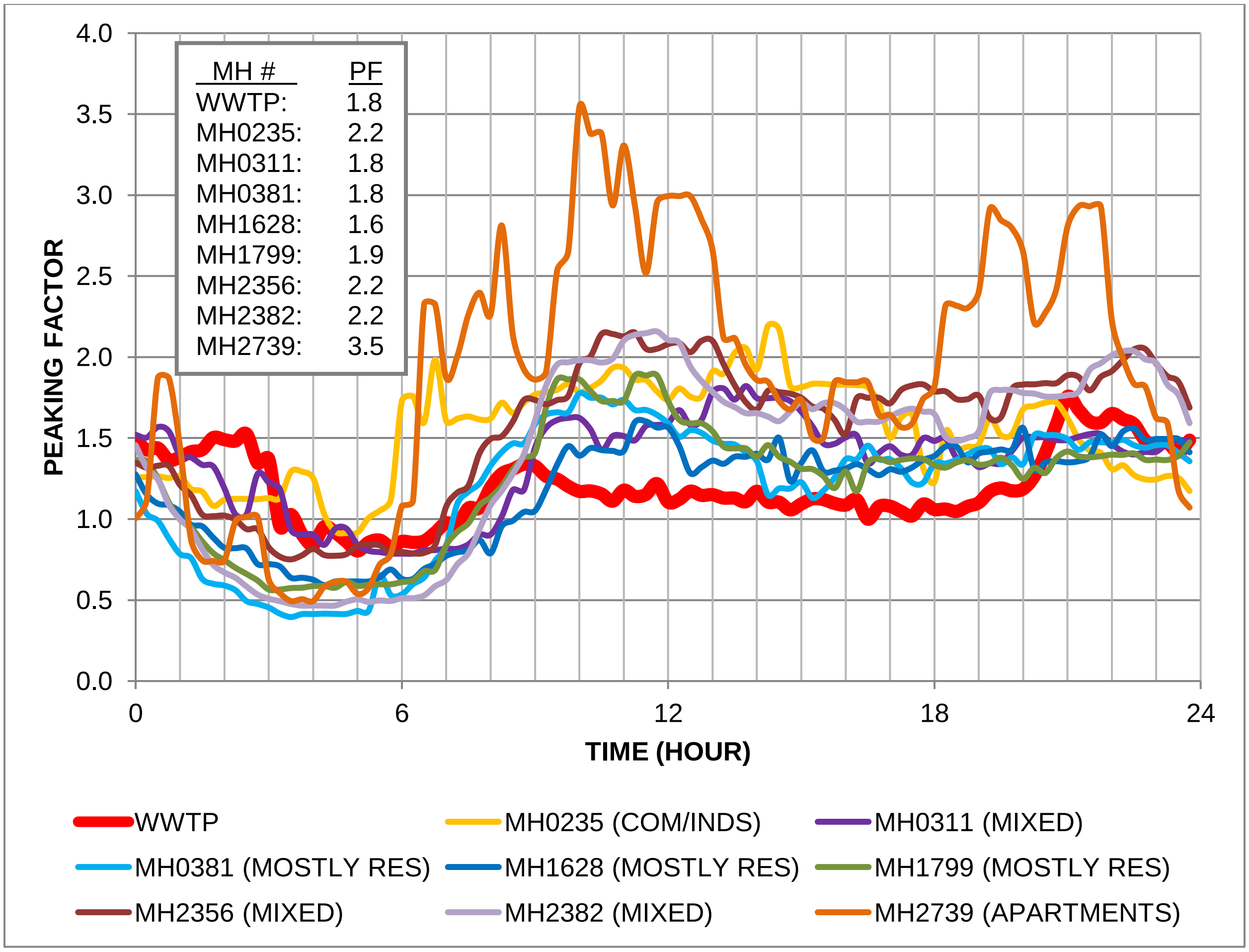


FIGURE 4-1 FLOW MONITORING SITE PEAKING FACTORS

In Figure 4-1, it may be observed that the flow meter data provides information with regard to peaking factor values. The residential, industrial, and mixed-use peaking factors of 2.0, 1.8, and 2.2 were derived from the previous master plan flow studies. It was decided that the shape of the curve used in the previous master plan has been effective and is consistent with flow data. The diurnal curves which were used in the model are provided in Figure 4-2. Note that the shape the WRF inflow curve shows less peaking than the other metered areas due to attenuation in the system.

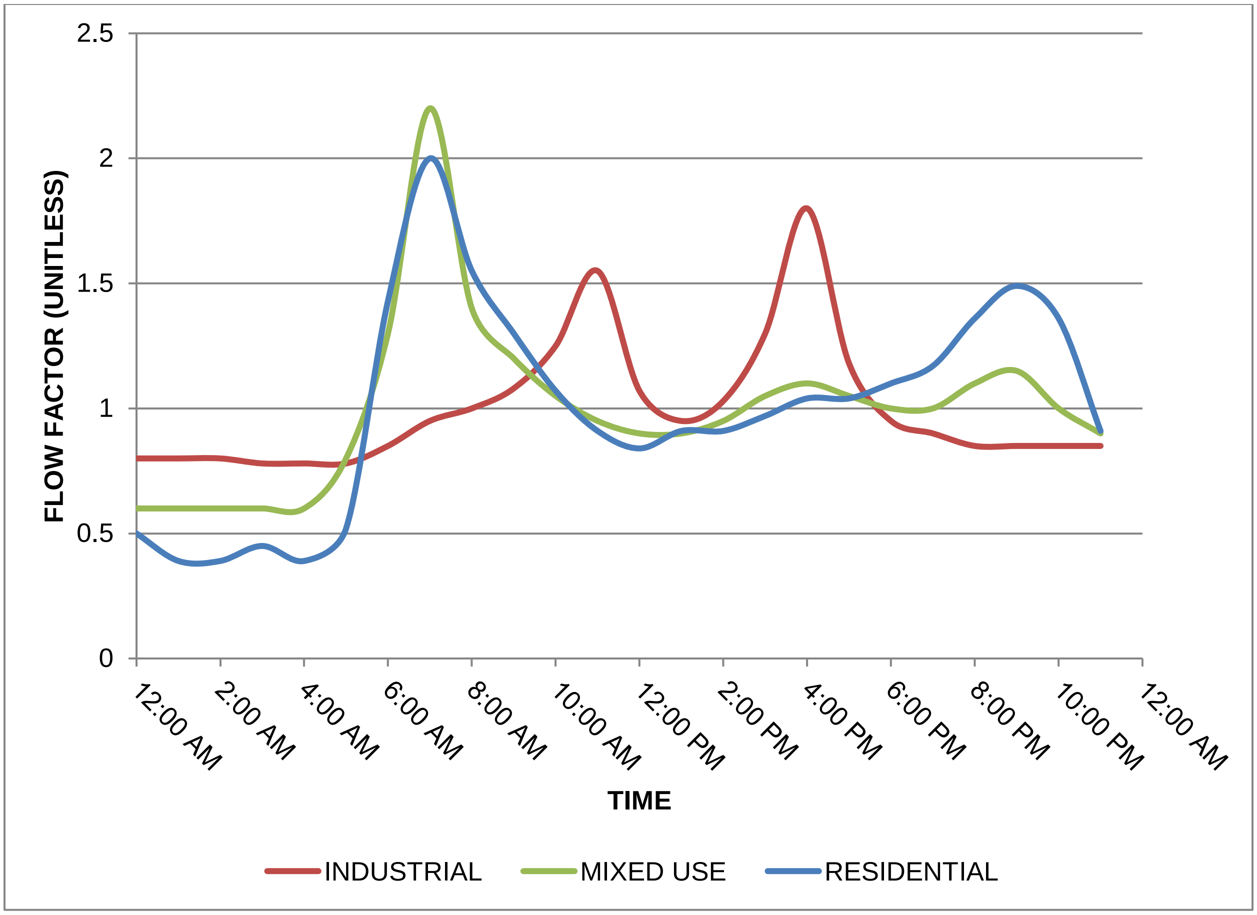


FIGURE 4-2 DIURNAL CURVES

HYDROGRAPHS

Hydrographs were developed for existing and future conditions. In each case, the wastewater hydrograph was developed using the hydraulic model. A diurnal curve pattern was assigned to hydraulic loadings in each collection area. Each collection area is designated as residential, industrial or mixed use. The model applies the loading to each collection area based on the pattern. An outflow hydrograph results for each collection area. The model also performs routing calculations to determine how the wastewater flows are routed to the WRF.

SPRINGVILLE WASTEWATER TREATMENT PLANT METER DATA

The Springville wastewater collection system discharges to the WRF. A flow meter is located at the WRF headworks. 15-minute flowrate data at the treatment plant were obtained from January 2022 through May 2025. The treatment plant flowrate is provided on Figure 4-3. Also, provided on the figure is the daily moving average wastewater flowrate. This line on the figure shows the average flowrate for each day and helps with a comparison between peak, minimum and average flowrates.

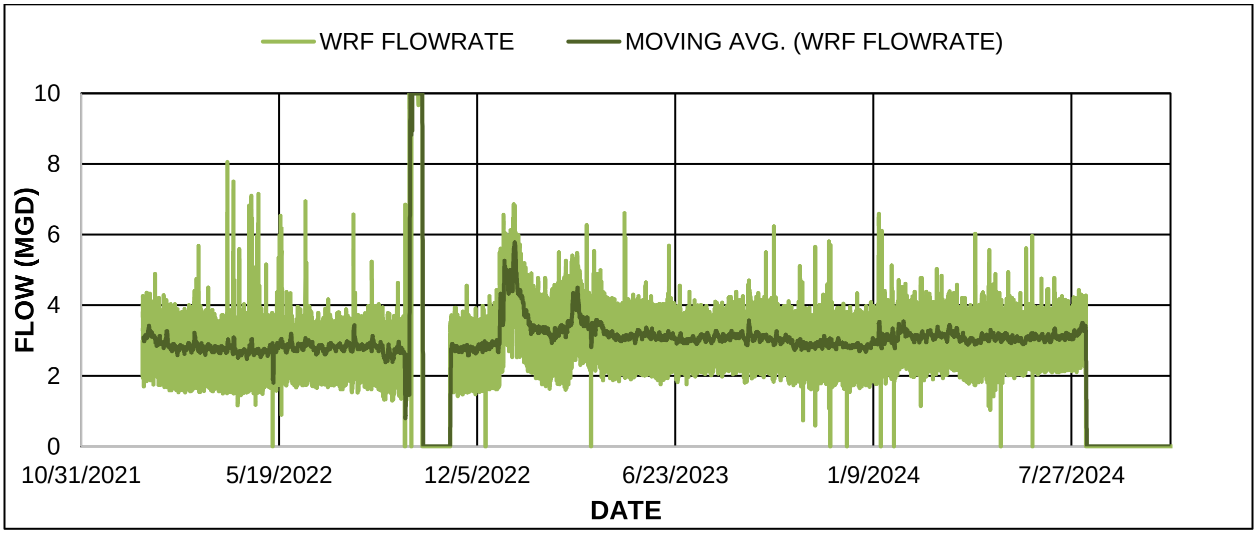


FIGURE 4-3 WRF HEADWORKS FLOW INCLUDING PRE-TREATMENT

Figure 4-3 provides the total inflow to the Springville WRF, including the pre-treatment flows from Nestle. There is a period of bad data from September 2022 to November 2022, and some outliers are present. It may be observed that flows have generally been in the same range and that a slight growth trend is occurring. However, as the population continues to growth, the wastewater production will inevitably increase.

Nestle Flowmeter Data

The Nestle food processing plant is a major contributor of wastewater to the WRF. Since the Nestle wastewater is conveyed via a force main from the Nestle facility to the WRF, it is not conveyed in the City's gravity sewer system. Therefore, while the Nestle flows are significant to the WRF, they are independent of the collection system. It is also important to point out that the Nestle flows are not related to population growth and therefore are not expected to change as the City grows, unless significant production changes are made by Nestle.

During development of the flow projections and hydrographs, the Nestle flows have been removed from the analysis. Nestle flows are provided in Figure 4-4. It may be observed in Figure 4-4 that the Nestle peak flows have been consistent within the timeframe of available data, except for a brief spike in August 2024. In any case, a look at the data reveals that the peak flowrates typically occur between midnight and 3 am, which is an off-peak time for the rest of the City. These flows have not contributed to the maximum peak flow rate due to this timing.

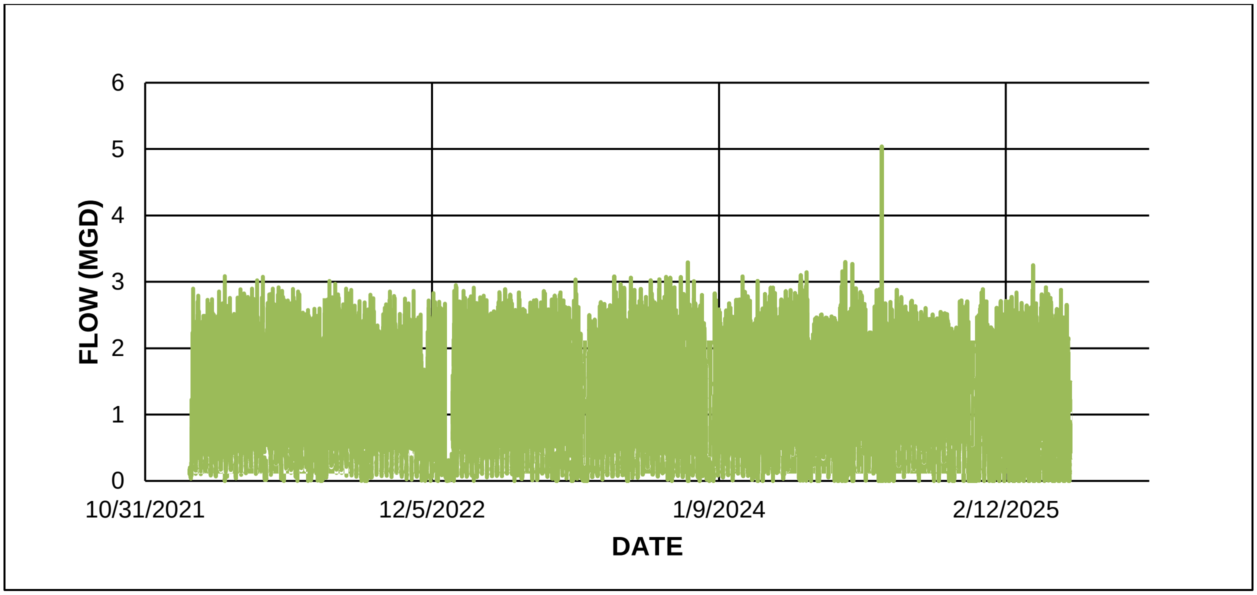


FIGURE 4-4 NESTLE PRE-TREATMENT FLOWS

Wastewater Treatment Plant Loading without Pre-Treatment Flows

The wastewater treatment plant's loading was examined after the Nestle flow data was removed. This data is included as Figure 4-5. The average flowrate without the pre-treatment portion over the three years of flow data was 3.4 million gallon/day (MGD). Peak flows were typically less than 5 MGD, although a few peaks, possibly outliers, were as high as 10 MGD.

An evaluation of indoor winter water use estimated an average daily flowrate of 3.4 MGD over the past three years. This shows that the indoor winter water use data and the wastewater treatment plant's data are comparable and correlate well with each other.

After reviewing the data with the City, it was decided that an existing flow of 6.7 MGD would be assumed as the current peak loading value. This includes a portion of inflow and infiltration which is discussed below.

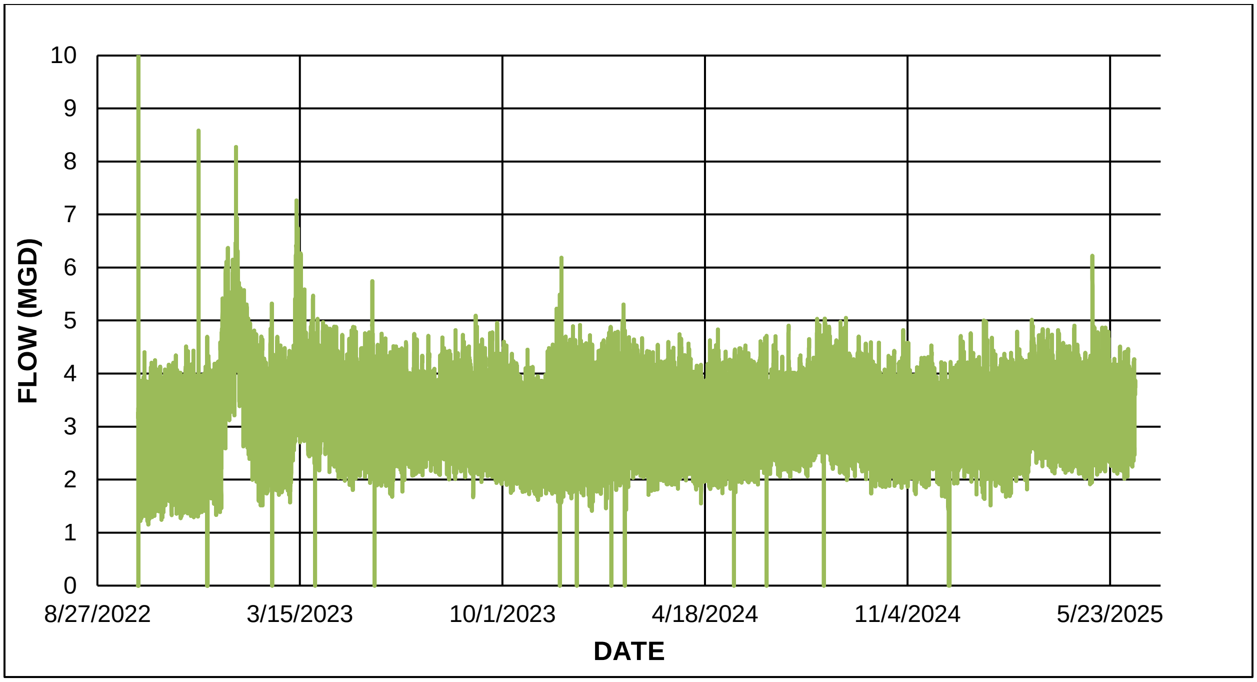


FIGURE 4-5 WRF HEADWORKS FLOW (NO PRE-TREATMENT)

ANNUAL FLOW VARIATION

Wastewater systems can experience annual flow variation due to infiltration and other seasonal inflows such as irrigation or precipitation events.

Infiltration

Infiltration is defined as groundwater which enters a wastewater collection system through pipe joints, cracks in the pipe, and leaks in manholes or building connections. Infiltration may occur due to seasonal increases in groundwater level or may occur as the groundwater level increases due to a storm.

One indicator of seasonal infiltration is changes in the wastewater baseflow (minimum flow). In examining base flow of the study data set, it appears that base flow changes of about 0.4 MGD occurred in the flow record. These changes were discussed with Springville City, and it was decided that a flow of 0.4 MGD would be assumed for seasonal infiltration, also known as wet weather infiltration. Dry weather infiltration is accounted for in the level of service.

Inflow

Inflow is defined as surface water that enters a wastewater collection system (including building connections) through roof leaders, cellars, foundations, yards, area drains, cooling water discharges, manhole covers, cross connections from storm drains, culinary water main flushing, etc.

In order to estimate the amount of inflow, the WRF data was compared to precipitation data. It was observed that during medium to large storm events, the WRF flows would increase during or shortly after a rainfall event. A series of events occurred during a week in March 2023. The rainfall data and the WRF flows were plotted together to observe the correlations. This comparison is found on Figure 4-6. A series of spikes in flows arriving at the treatment plant can be seen following the rainfall events. Based on a comparison of peaks before and during the storm, it appears that each peak increased in loading by about 1.0 MGD higher than the previous peak at the WRF due to the series of storms.

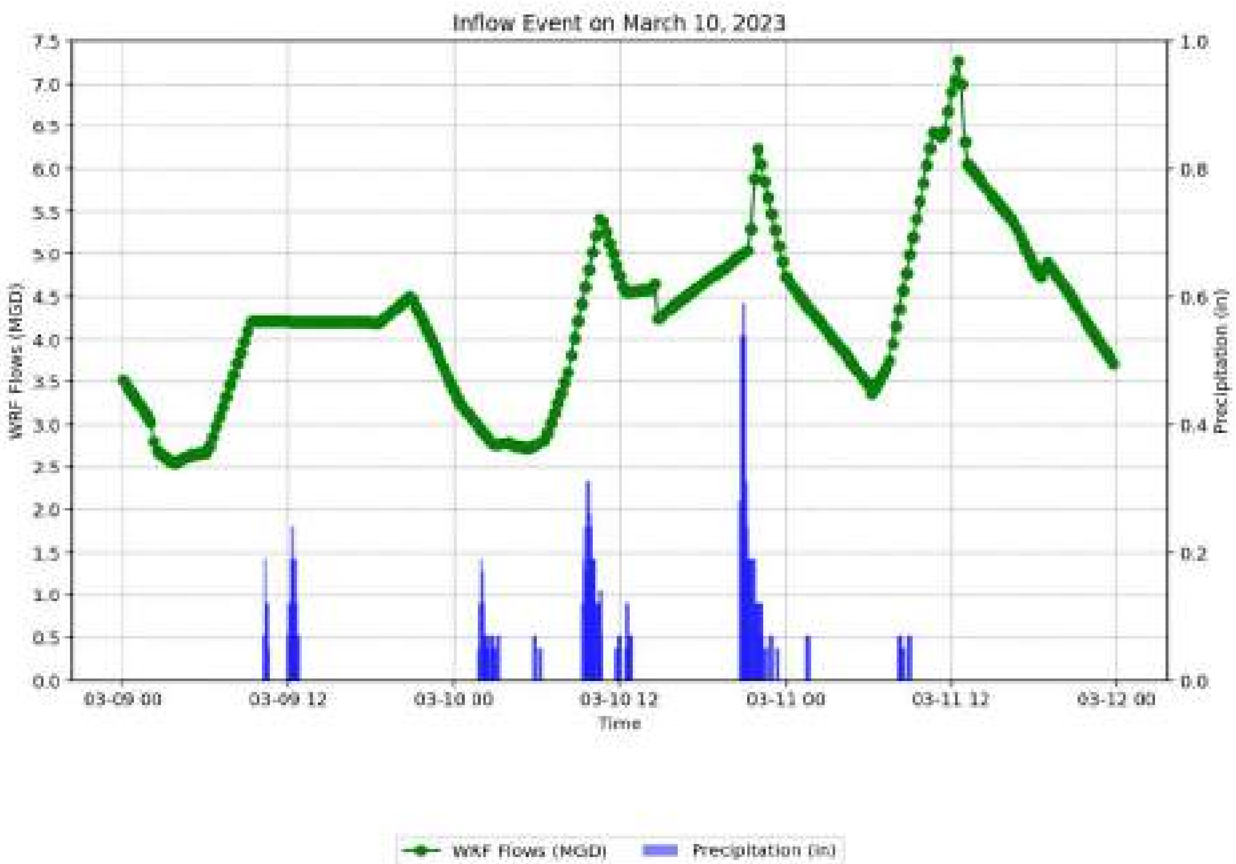


FIGURE 4-6 WRF FLOW VS. PRECIPITATION

This information was discussed with Springville City. It was decided that an inflow value of 1.0 MGD would be assumed for modeling purposes. The level of service also incorporates a portion of inflow for existing and future development.

The City continues to identify and mitigate inflow and infiltration as an ongoing process. This effort includes the completing of sewer lining projects as i&i problem areas are found.

Existing Flow Summary and Modeling Application

Based on the above discussion, a prediction of existing conditions peak hour flows has been prepared. This summary is provided in Table 4-1.

TABLE 4-1 EXISTING PEAK HOUR FLOW SUMMARY

Flow Type	Flowrate (MGD)
Existing Development	6.7
Infiltration	0.4
Inflow	1.0
TOTAL	8.1

The existing flowrates provided in Table 4-1 were included in the hydraulic models. The portion for existing development was distributed in the model throughout the collection areas based on water meter demand data weighting. The infiltration and inflow data were distributed across the collection system in 20 different locations. The infiltration and inflow loading locations were selected based on groundwater levels and the results of the local flow studies.

LONG TERM FLOW VARIATION

Average annual wastewater flows usually vary from year to year, although the variation between years is typically not extreme. The most predictable changes in average annual flows are typically associated with changes in population. Long-term variations may also be caused by changes in weather patterns which may last several years.

Changes in weather patterns can result in changes in infiltration and water use patterns. Decreased precipitation results in lower groundwater levels and less infiltration. Water conservation measures implemented during droughts result in reduction in both indoor and outdoor water use. A reduction in indoor use results in less domestic wastewater. A reduction in outside use for watering lawns and gardens may lead to lowering of the groundwater table and less infiltration. Weather pattern changes are not expected to significantly impact the long-term flow rates of the Springville wastewater collection system.

Long term flow variations are difficult to predict, except those related to population growth. As noted previously, the WRF flow data shows a slight growth trend. However, as the City grows, increases in hydraulic loading values will occur. Otherwise, projected flowrates have not been increased in this study for long term flow variations.

EXTRAORDINARY FLOWS

Extraordinary flows may include flow anomalies such as holidays. Typically, Thanksgiving and Christmas are days with higher flowrates. No predictable extraordinary flow sources were identified during this study. Therefore, no special adjustments were made in the model. The sewer has been sized with some extra capacity to handle higher than expected flows.

CHAPTER 5
WASTEWATER FLOW PROJECTIONS

PLANNING PERIOD

The wastewater collection system master plan planning periods were established in consultation with Springville City. The periods that were modeled were the existing conditions, and projected demands through 2035 (10-year), 2045 (20-year), and through 2070. Growth areas and growth projections were developed in cooperation with Springville City Community Development, Engineering, and Public Works Departments. Additionally, growth areas within the next ten years were also identified and modeled in isolated areas. This enabled the identification of projects that are needed within the 0-10 year timeframe. Cost estimations were assembled for all projects needed within 20 years. However, only projects needed within the next 10 years are eligible to include in the assessment of impact fees.

COLLECTION AREAS

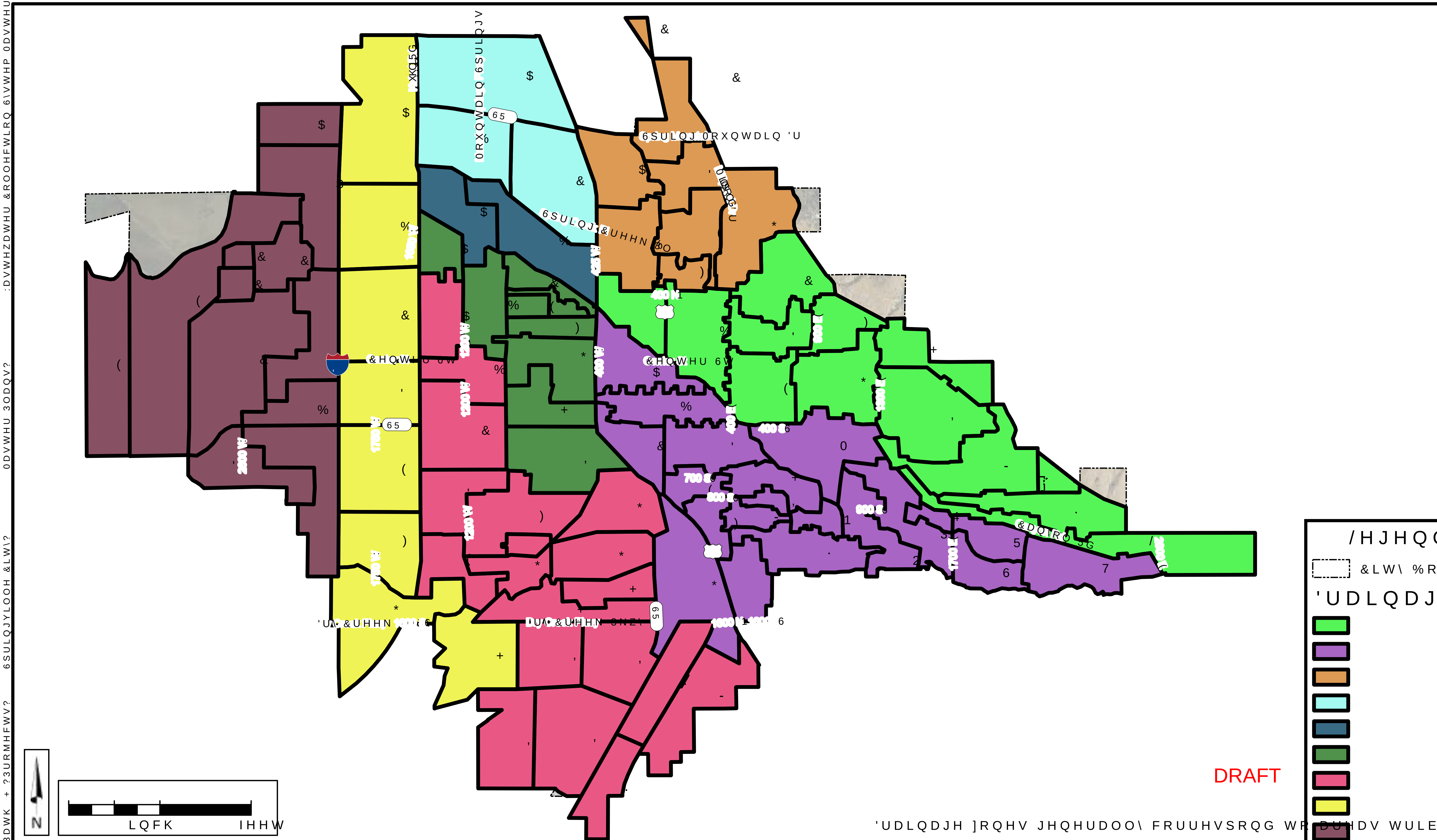
A collection area is defined as a geographic area that contributes flow to a common point in the collection system. Collection areas were delineated in the 2013 master plan with some updates made in the 2020 master plan. Existing collection areas were based on the location of existing sewers and services. Future collection areas were based on the location of the existing system and based on likely areas of expansion. For this master plan, collection areas are mostly the same as the previous master plan, but have been updated to match current growth projections, sewer manholes, and topography. The collection areas were updated to reflect improvements to the collection system. The collection areas were also discussed and reviewed by the wastewater collection system operators. Collection areas generally have an existing contribution of less than 400 units. The delineated collection areas are shown on Figure 5-1.

GROWTH PROJECTIONS

ERU estimates for the existing wastewater collection system and growth projections have been prepared for the planning periods. These estimates and projections are summarized in Table 5-1. A detailed list is provided in Appendix C.

TABLE 5-1 SYSTEM ERU PROJECTIONS

Approximate Year	Additional ERUs	Total ERUs	Description
2025	0	20,794	Existing System
2035	4,452	25,246	10-Year Development
2045	8,804	29,598	20-Year Development
2070	14,778	35,572	45-Year Development



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FLOW PROJECTIONS

For the 2035, 2045, and 2070 planning periods, the new ERUs provided in Table 5-1 were distributed to collection areas throughout the City. The specific distribution of ERUs was based on workshops and discussions with Springville City personnel. The property locations for development applications as well as existing available water and wastewater infrastructure and transportation routes were considered in assigning the growth to areas within the City. Generally, most of the growth is expected to occur in the western portions of the City, with some growth occurring at other locations throughout the City. The City's General Plan land use classifications were used to determine densities and allocate demands across the City. As these classifications were prepared in 2011, updates to these classifications were made by HAL based on community plans for large developments, city zoning, and nearby development. Figure 5-2 shows the planned future land use. Table 5-2 provides a list of the land use types and assumed densities.

TABLE 5-2 ERU DENSITIES

Land Use Type	Land Use Density ERUs/Acre
Agriculture	10
Commercial	5
Industrial / Manufacturing	3
Low Density Residential	3
Medium Density Residential	10
Medium High Density Residential	15
Medium Low Density Residential	5
Mixed Use	5

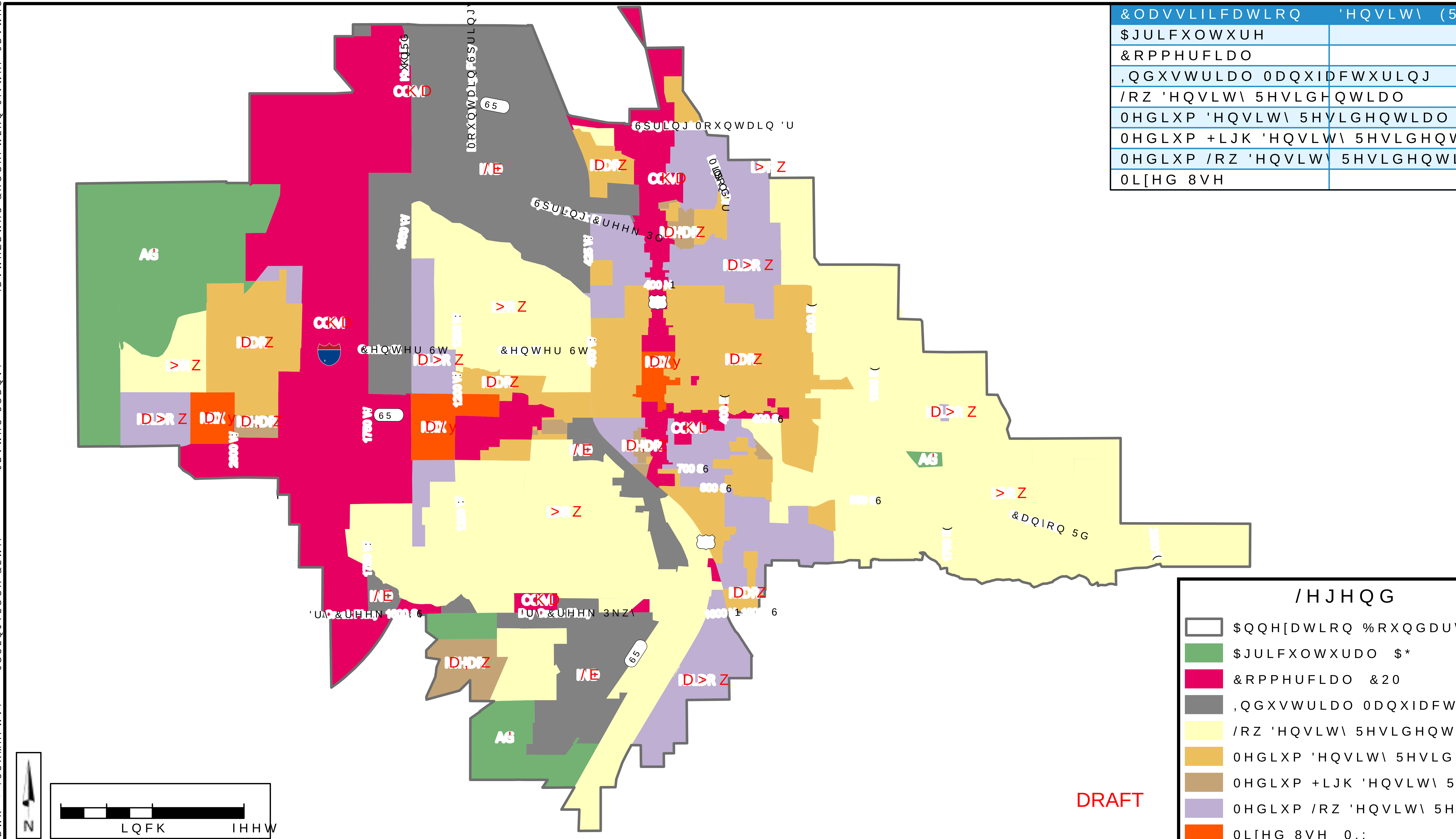
For future loading projections, the loading per ERU (250 gpd) was multiplied by the land use density (ERUs/acre) and the area (acres). These average demands were loaded into the hydraulic models at key manholes. The models were used to apply peaking factors and predict future loading. The future models included 0.4 MGD for infiltration and 1.0 MGD for inflow, the same as the existing model. The existing and future peak hour loadings are provided in Table 5-3. This is based on modeled LOS and is slightly higher than actual peak flows in the past.

TABLE 5-3 PROJECT PEAK HOUR HYDRAULIC LOADINGS

Planning Period	Peak Hydraulic Loading* (MGD)
Existing Conditions	8.1
2035	9.8
2045	11.0
2070	13.4

*Including infiltration (0.4 MGD) and inflow (1.0 MGD).

It may be observed in Table 5-3 that the projected peak hydraulic loading for 2035 is 9.8 MGD. This exceeds the current wastewater treatment plant design capacity of about 9.3 MGD.



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Lift Station Flow Projections

The loading projections were compared with the lift station rated capacities. Table 5-4 shows the capacities of the lift stations compared to the future projected flow rates to the lift stations.

TABLE 5-4 LIFT STATION FLOW RATE PROJECTIONS

Lift Station	Rated Capacity (gpm)	Existing Modeled Peak Flow (gpm)	2035 Modeled Peak Flow (gpm)	2045 Modeled Peak Flow (gpm)	2070 Modeled Peak Flow (gpm)
Valtek	540	370	370	370	370
Westfields	650	**850**	**1,200**	**1,950**	**2,450**
1500 West	1,375	1,230	**1,650**	**2,000**	**2,350**
Oakbrook	350	**800**	**800**	**800**	**900**
Spring Haven	257	245	245	245	245
Spring Pointe	260	To be decommissioned within 10 years.			

It may be observed in Table 5-4 that the Spring Haven and Valtek lift stations are predicted to have adequate capacity to meet existing and future needs. However, the Westfields, 1500 West, and Oakbrook lift stations are not predicted to have adequate capacity and will need additional capacity and improvements or less tributary flows to mitigate capacity needs. The 1500 West lift station was designed to be expanded and has space for additional pumps and other equipment.

The Spring Pointe lift station is planned to be decommissioned within 10 years.

CHAPTER 6
WASTEWATER COLLECTION SYSTEM EVALUATION

MODEL SELECTION

It was decided by HAL and Springville personnel to use the Autodesk Storm and Sanitary Analysis (SSA) Model Software for the master plan. The software was selected because it had performed adequately in the past, the City already had an SSA license, and data from the previous master plan was in the SSA format. SSA was also used because of the model's ability to import GIS data, export models to EPA SWMM (free distribution), and because the model runs on an Autodesk platform.

SYSTEM LAYOUT

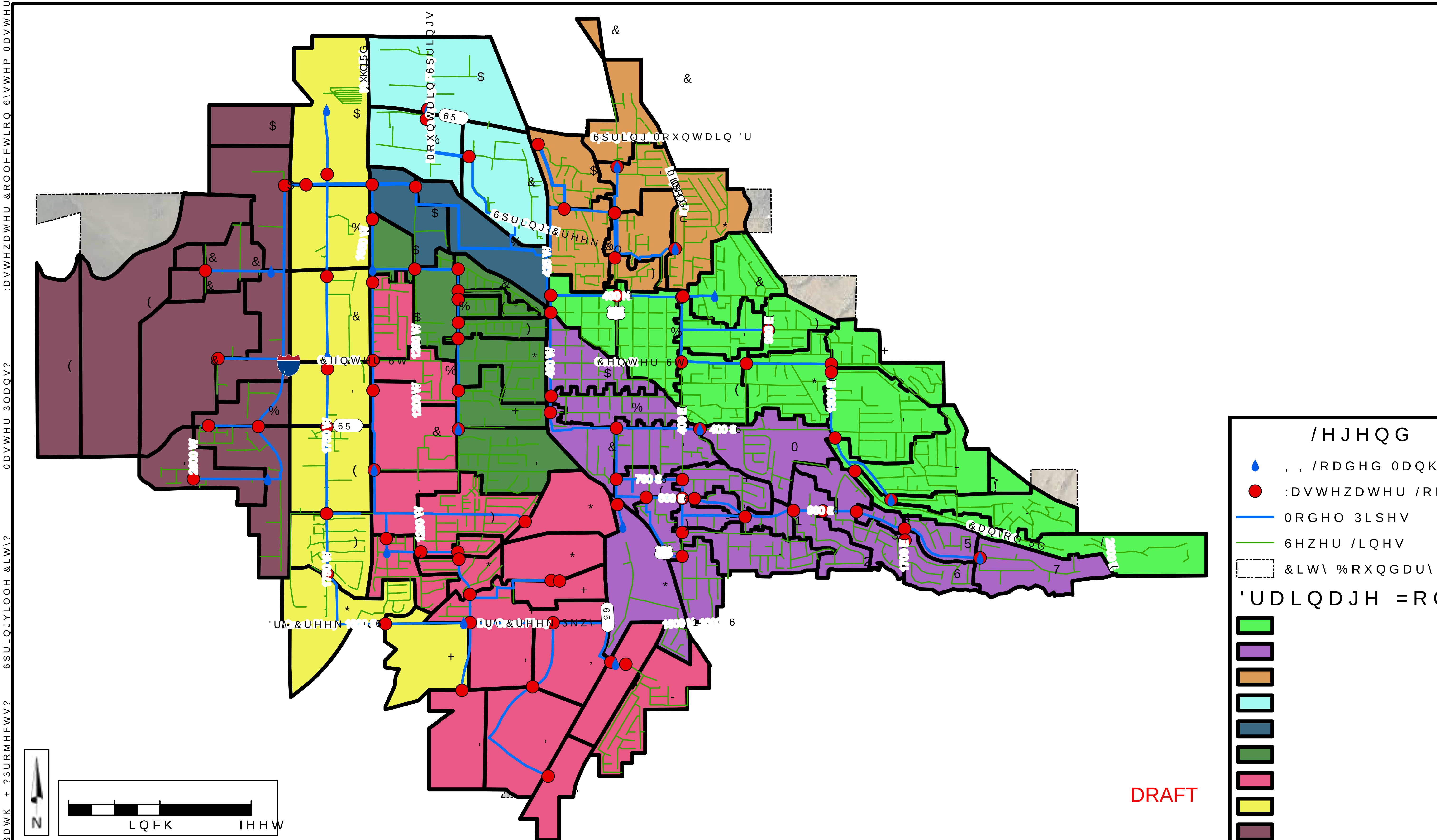
The wastewater collection system layout was provided by Springville in a GIS data format. Copies of the SSA models from the previous master plan were also provided. A map of the Springville wastewater collection system, wastewater and I&I loading, as included in the model, is shown on Figure 6-1. Wastewater loading allocation within the model was performed using GIS and model data. Inflow and infiltration loads were determined using flow data from the wastewater treatment plant and precipitation data. As questions came during model creation, HAL and Springville City personnel coordinated to correct identified errors or to add newly available data to the model.

MODELING CRITERIA

A range of potential modeling criteria and values were suggested by HAL and reviewed by Springville. The criteria and values adopted for this modeling effort are included in Table 6-1.

TABLE 6-1 MODELING CRITERIA

CRITERIA	VALUE OR ASSUMPTION
System Loading	Existing system loading was developed using winter water use data for each water meter and inflow/infiltration based on the tributary area of each manhole with flow data for collection areas. Future loading was developed based on growth projections.
Daily Flow Variation	Diurnal curves were developed from flow monitoring.
Peak Flow	Peaking factors were developed with diurnal curves and peak flows were developed from the AutoCAD SSA model.
Inflow and Infiltration	Inflow and infiltration values were determined by reviewing WRF data and precipitation values. Infiltration and inflow values were distributed throughout the City.
Planning Periods	Years 2035, 2045, and 2070.
Land Use & Population Projections	Provided by Springville in 2025.
Pipe Capacity	Roughness Coefficient = 0.013 Manning's n City Selected Maximum d/D = 0.75 for all pipes
Lift Stations	Pump capacities were provided by Springville City. One pump was assumed to be redundant.



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MODEL CALIBRATION

Model calibration included comparing hydrographs generated by the model with actual flows measured in the collection system. As discussed in Chapter 3, flow data observations at the wastewater treatment plant were used to calibrate the model. Winter water use billing data was used for the calibration model and as such, was compared to SCADA data during the winter months. Flow studies were also included in the calibration process. In January 2025, the WRF peak hour flow with infiltration was found to be about 4.8 MGD. The SSA calibration model peak hour flow plus infiltration was about 5.0 MGD. Flow monitoring locations can be seen on Figure 3-1.

MODEL SCENARIOS

Five modeling scenarios were developed and evaluated for the Springville wastewater collection system as shown in Table 6-2.

TABLE 6-2 MODEL SCENARIOS

SCENARIO	DESCRIPTION
Calibration	The calibration scenario was used to calibrate the model to SCADA data. Winter water use data was used in the model to calibrate to SCADA flows during winter months.
Existing LOS	The Existing scenario was used to identify deficiencies in the wastewater collection system, and to establish a baseline for evaluation of future conditions.
2035	The 2035 (10-Year) scenario was used to identify deficiencies in the wastewater collection system under 2035 development conditions.
2045	The 2045 (20-Year) scenario was used to identify deficiencies in the wastewater collection system under 2045 development conditions.
2070	The 2070 (45-Year) scenario was used to identify deficiencies in the wastewater collection system under 2070 development conditions.
2070 Corrected	The Corrected scenario reflects system improvements that resolve all 2070 deficiencies.

EXISTING DEFICIENCIES

The maximum depth ratio is the ratio of the maximum depth in the pipe and the diameter of the pipe (d/D). Deficiencies were identified as pipes in the model that exceeded a d/D of 0.75 during peak flow conditions. Pipe capacity deficiencies identified in the Existing Scenario model are summarized in Table 6-3. Additional operation and maintenance projects, as defined by the City, have also been included with existing deficiencies. Existing deficiencies are shown on Figure 6-2.

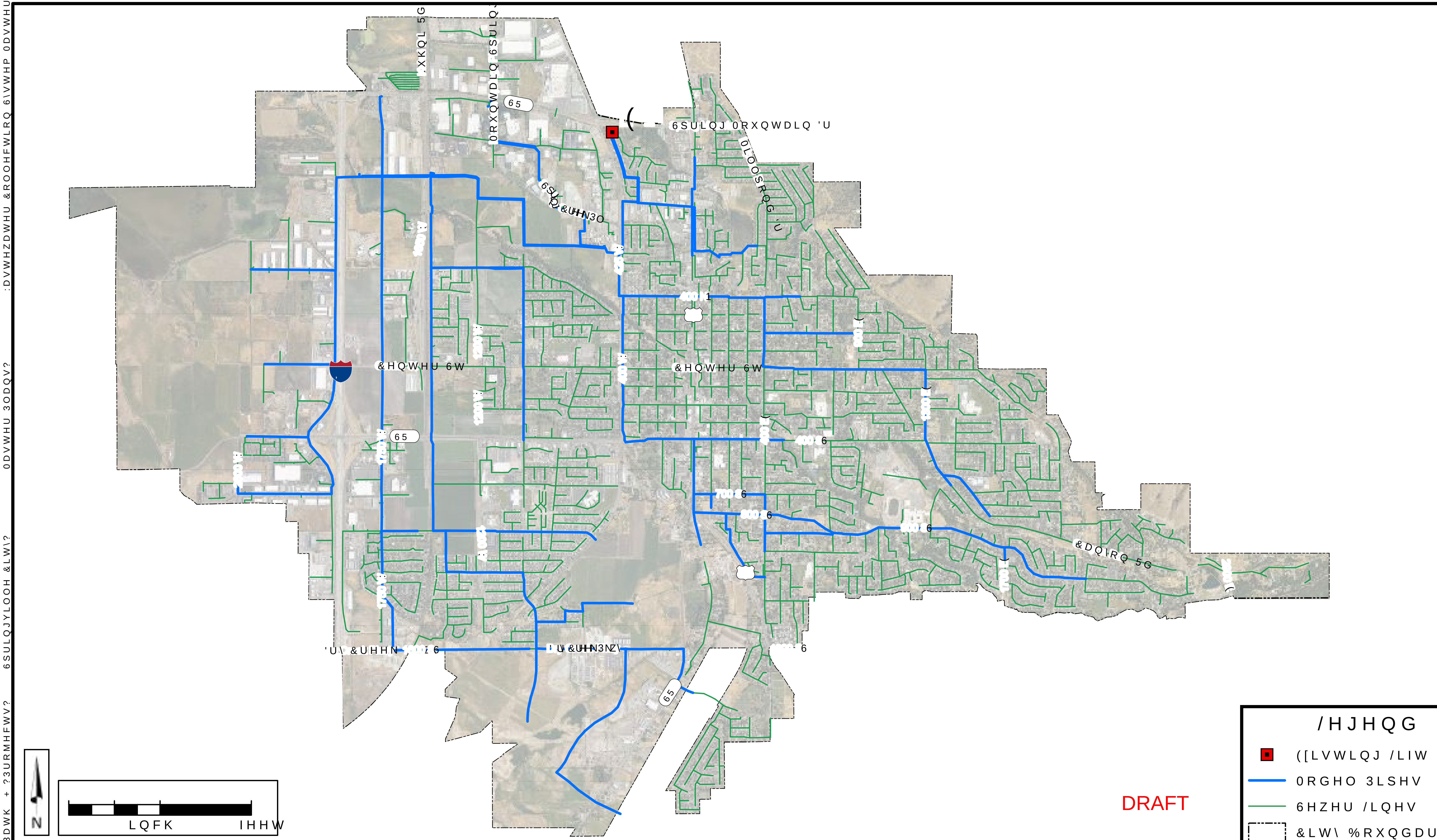

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TABLE 6-3 EXISTING LIFT STATION CAPACITY DEFICIENCIES AND SOLUTIONS

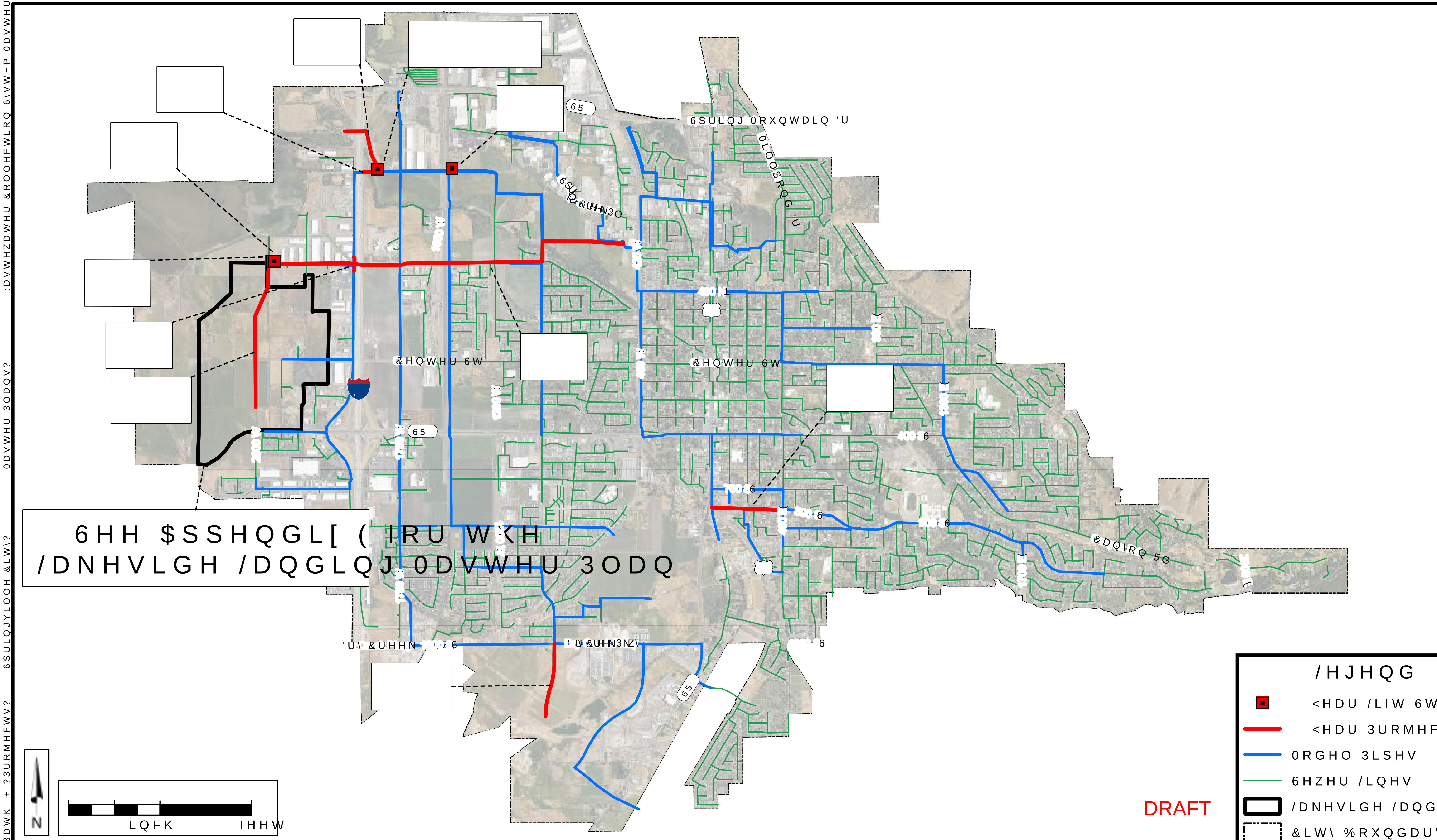
ID	LOCATION	ISSUE	SOLUTION
E-1	Oakbrook/North Lift Station	City identified capital facility project	Upgrade Oakbrook/North Lift Station with the Overwatch system.

FUTURE IMPROVEMENTS

The improvements identified in the future scenarios are predicted problems that will occur if development occurs as projected by the City without system improvements. Future improvements were determined from the 2035 (10-Year), 2045 (20-Year), and 2070 modeling scenarios. Pipe capacity improvements identified in the future scenarios are shown on Figures 6-3, 6-4, and 6-5 and are summarized in Table 6-4. All the previously identified existing deficiencies would remain problems in the future scenarios if improvements are not implemented. The maximum depth ratios of future improvements are sometimes larger than existing deficiencies due to increased flow from future redevelopment.

TABLE 6-4 FUTURE IMPROVEMENTS

ID	LOCATION	ISSUE	SOLUTION
10-Year Improvements			
10-1	Westfields Lift Station	Peak flows exceed capacity	Increase lift station capacity by replacing one pump.
10-2	Westfields Lift Station	Peak flows exceed capacity	Increase lift station capacity by adding new pumps and upgrading electrical. Existing 10" force main needs to be cleaned / evaluated for future development beyond lift station capacity after Project 10-1 is implemented.
10-3	Next to Spring Pointe Lift Station	Growth west of I-15 requires a regional lift station	Construct new regional lift station with at least two (2) 1,000 gpm pumps. Install 10,600 feet of dual force mains (8" and 10"). Exact layout finalized at design.
10-4	Spring Pointe Lift Station	Growth west of I-15 requires a regional lift station	Decommission Spring Pointe Lift Station.
10-5	1400 N, west of I-15	Future growth	Install 1,700 ft of 10” gravity line with a bore under I-15.
10-6	From east side of I-15 to ~1900 W along 1000 N	Pipe exceeds capacity because d/D > 0.75 (0.81)	Install 450 ft of parallel 15" gravity line next to existing 12" gravity line from SSMH0346 to SSMH00308. A bore crossing is required at the canal. Both pipes are to remain in service.



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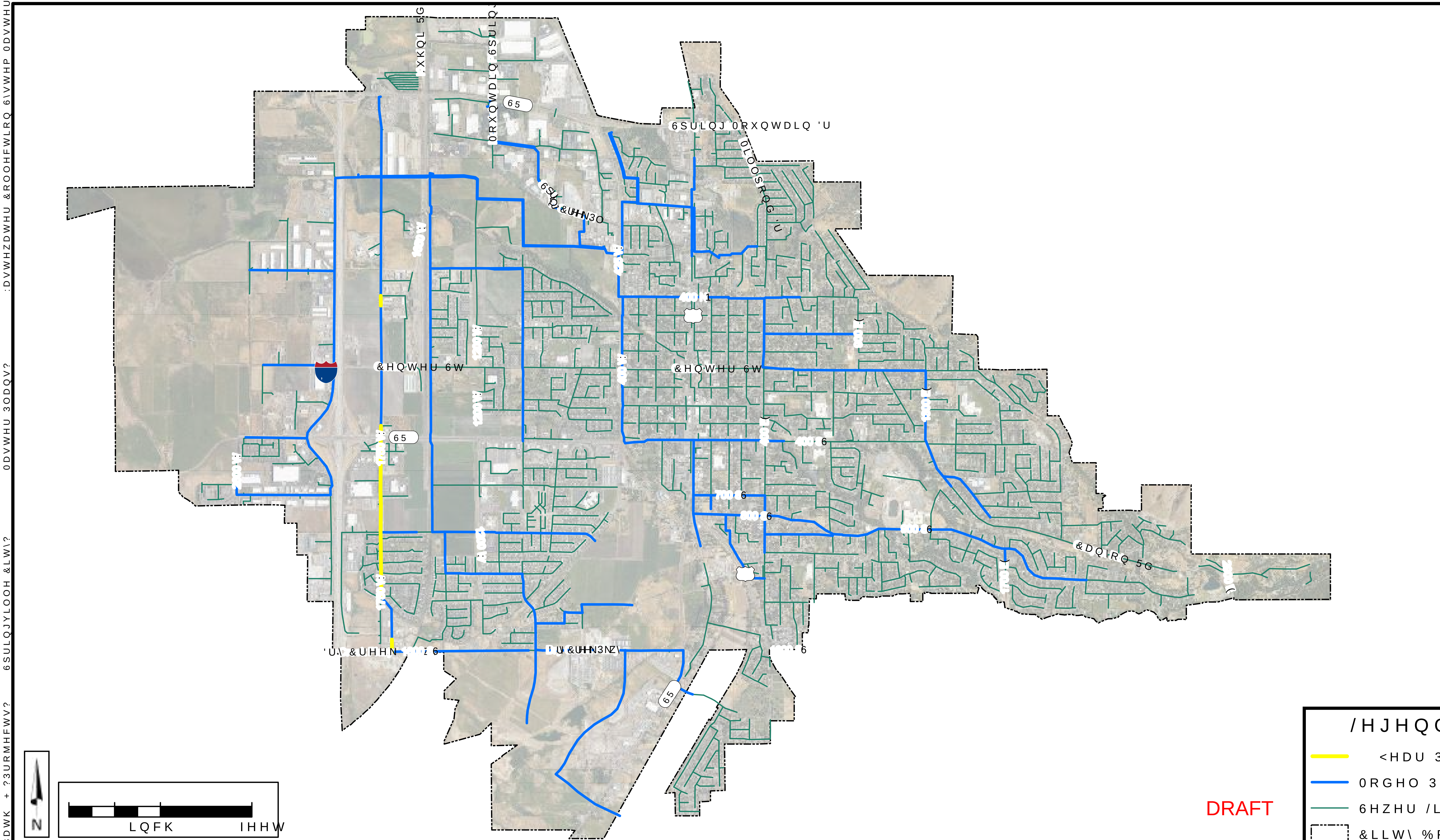

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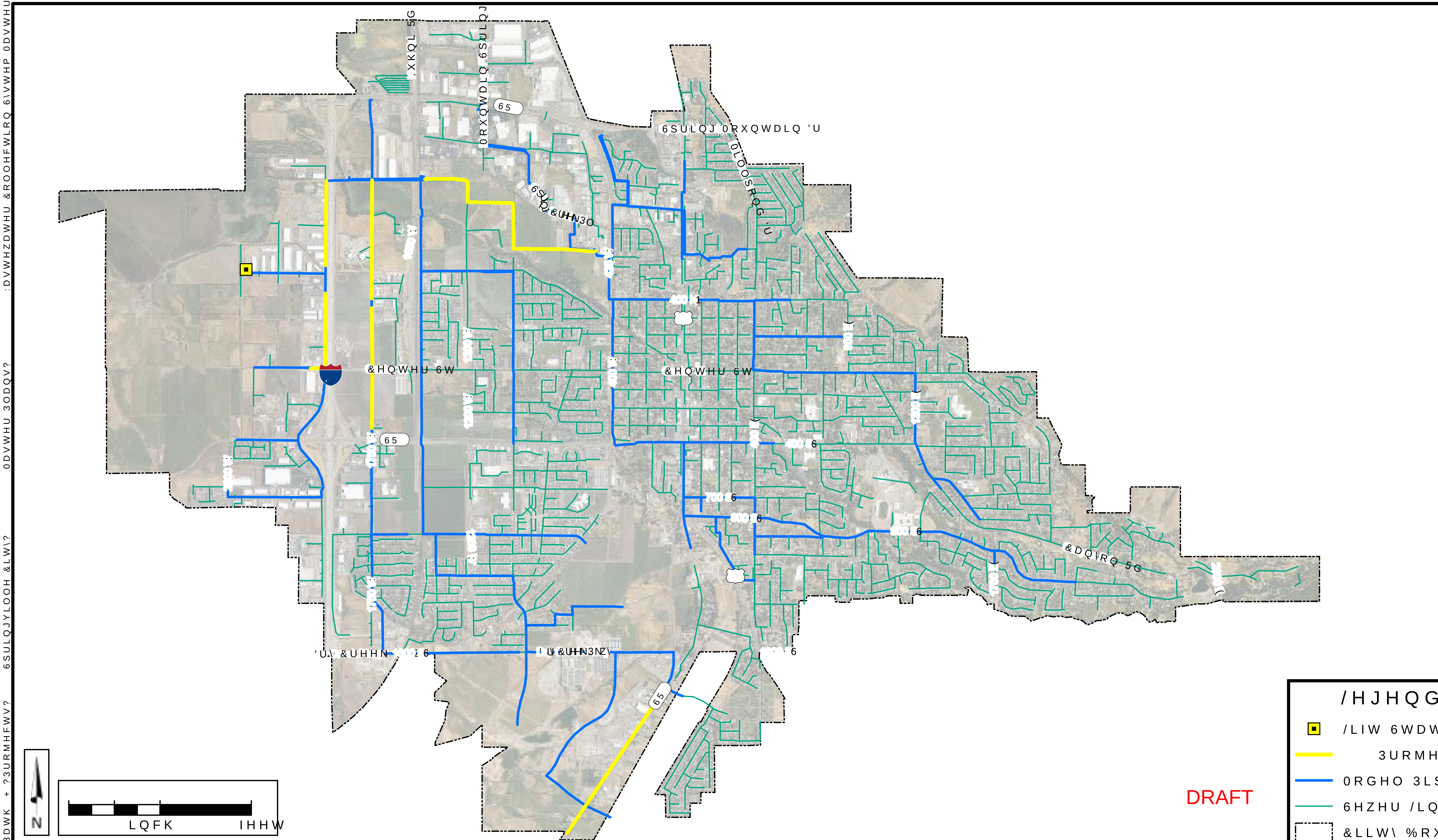

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ID	LOCATION	ISSUE	SOLUTION
10-7	1500 W Lift Station	Modeled flow exceeds existing pumping capacity of 1,400 gpm by 245 gpm.	Install a new 1,500 gpm pump to increase pump capacity to 3,000 gpm and maintain one redundant pump. Exact layout to be finalized at design.
10-8	Along 2000 W near 500 N	Adverse pipe exceeds capacity because d/D > 0.75 (0.84)	Install 450 ft of parallel 15" gravity line next to the existing 15" gravity line from SSMH0315 to SSMH0314. Both pipes are to remain in service.
10-9	From 400 E to Main Street along 800 S	Pipe exceeds capacity because d/D > 0.75 (0.92)	Remove and upgrade existing 8" gravity line to 1,900 ft of 12" gravity line. MH1636 to MH0516.
10-10	950 W, south of 1600 S	Future growth	Install 2,100 ft of 10" gravity line.
10-11	2600 W, 500 N to 200 S	Future growth	Install 1,400 ft of 12" gravity line and 2,800 ft of 15" gravity line.
20-Year Improvements			
20-1	Along 1750 W ~400 N.	Pipe exceeds capacity because d/D > 0.75 (0.82)	Remove and upgrade existing 15" gravity line to 300 ft of 21" gravity line from SSMH1921 to SSMH1920.
20-2	Along 1750 W from 1300 S to ~400 S.	Pipe exceeds capacity because d/D > 0.75 (1.0)	Remove and upgrade existing 12" gravity line to 1,200 ft of 15" gravity line and 3,700 ft of 18" gravity line from SSMH1851 to SSMH1950.
20-3	1600 S and 1700 W	Pipe exceeds capacity because d/D > 0.75 (0.96)	Remove and upgrade existing 12" gravity line to 350 ft of 15" gravity line from SSMH0693 to SSMH1941.
2070 Improvements			
45-1	From 400 S to 400 N along 1750 W	Pipe exceeds capacity because d/D > 0.75 (0.98)	Remove and upgrade existing 15" gravity line to 3,500 ft of 18" gravity line from SSMH1921 to SSMH1920.
45-2	From 400 N to 1000 N along 1750 W	Pipe exceeds capacity because d/D > 0.75 (0.78)	Remove and upgrade existing 18" gravity line to 3,400 ft of 21" gravity line from SSMH1920 to SSMH0304.
45-3	From ~600 N to 1000 N along 2000 W	Pipe exceeds capacity because d/D > 0.75 (0.85)	Remove and upgrade existing 15" gravity line to 2,450 ft of 18" gravity line from SSMH0314 to SSMH0309.
45-4	1500 W Lift Station and Westfields Lift Station	Force mains reaching high velocities	Install 6,800 ft of 16" force main pipe from 1500 W lift station to WRF. Re-construct headworks inlet manhole to accommodate 16" force main pipe. Reconfigure force mains: Westfields to use 10" and 12" force mains, and 1500 W to use new 16" force main.

ID	LOCATION	ISSUE	SOLUTION
45-5	From ~600 N to 1000 N along 2000 W	Pipe exceeds capacity because d/D > 0.75 (0.88)	Remove and upgrade existing 12" gravity line to 400 ft of 15" and 2,125 ft of 18" gravity line from SSMH00361 to SSMH00361.
45-6	Next to Spring Pointe Lift Station	Growth west of I-15 requires increased pumping capacity at new lift station	Install two new 1,000 gpm pumps to increase pump capacity to 3,000 gpm and maintain one redundant pump.
45-7	State St	Future growth	Upsize 8" to 3,300 ft of 10" and 1,700 ft of 12" gravity line.

LIFT STATION PHASING

Westfields Lift Station

Future growth will require some existing lift stations to increase their current capacity. As Westfields Lift Station is currently running at its capacity, it will need improvements soon. Table 6-5 shows recommendations for the Westfields Lift Station.

TABLE 6-5 WESTFIELDS LIFT STATION PHASING

Phase	Westfields Lift Station Recommendations	Timing
1	Replace one existing pump to increase pumping capacity.	Near future, when peak flows reach 850 gpm.
2	Evaluate and/or pig the 10-inch force main.	Near future.
3	Upgrade the VFD, breakers, and wires for all four bays.	Within 10 years, as required for new pumps.
4	Install 3 new pumps capable of pumping 1,200 gpm in positions 1, 2, and 3 of the lift station. Pumps are available for rent to test performance before purchasing. Upgrade the pump bases for all four bays to support the larger pumps. If required after the new pumps are placed, replace the vertical piping, valves, and flow meter for the new pumps with larger diameter components.	Within 10 years, when peak flows reach 1,200 gpm.

Phase	Westfields Lift Station Recommendations	Timing
5	Evaluate replacing Westfields Lift Station and force mains at end of life.	70 years from construction (constructed in 1984) at about year 2054.
6	Reconfigure the force mains for Westfields to use the 10-inch and 12-inch (the 1500 West Lift Station currently uses the 12-inch). 1500 West will need a new 16-inch force main before the force mains are reconfigured.	Within 45 years, when peak flows reach 2,000 gpm.
7	Install one new pump capable of pumping 1,200 gpm in position 4 of the lift station.	Within 45 years, when peak flows reach 2,000 gpm.

* Spring Pointe Lift Station is assumed to be decommissioned by 10 years and its tributary area not contributing flows to Westfields Lift Station.
* Pumps selected for earlier phases should be evaluated for suitability to be used for future phases. As flow rates increase, total head increases, and new pumps may be required.

The existing 10-inch force main in Westfields Lift Station is projected to reach maximum velocities of 7.8 feet/second by 20 years, with peak flows nearing 2,000 gpm. This is when a new 16-inch force main should be constructed for 1500 W Lift Station and the existing 10-inch and 12-inch force mains be reconfigured for use by the Westfields Lift Station.

1500 West Lift Station

The 1500 West Lift Station was designed for future growth and currently has two empty bays. Table 6-6 shows recommendations for the 1500 West Lift Station.

TABLE 6-6 1500 WEST LIFT STATION PHASING

Phase	1500 West Lift Station Recommendations	Timing
1	Install one new pump capable of pumping 1,500 gpm in position 3 of the lift station.	Within 10 years, when peak flows reach 1,375 gpm.
2	Install a new 16-inch force main. Westfields will use the 12-inch force main that 1500 West is currently using.	Within 45 years when Westfields Lift Station peak flows reach 2,000 gpm.

* Pumps selected for earlier phases should be evaluated for suitability to be used for future phases. As flow rates increase, total head increases, and new pumps may be required.

As mentioned above, a new 16-inch force main should be constructed for the 1500 W Lift Station when peak flows reach about 2,000 gpm in the Westfields Lift Station, and the existing 10-inch and 12-inch force mains should be reconfigured for use by the Westfields Lift Station.

The 1500 West Lift Station was originally designed for an ultimate capacity of 4,500 gpm and to use two force mains in the future (an 8-inch and 16-inch). Since then, plans have changed and much of that future flow is planned to be conveyed through the Lakeside Landing lift station. As such, current flow projections show that one 16-inch force main will be sufficient to convey future flows. As the Westfields Lift Station reaches its end of life, opportunities to utilize the 1500 West Lift Station should be considered.

Lakeside Landing Lift Station

The Lakeside Landing Lift Station has not been constructed yet. It will serve the Lakeside Landing area and provide wastewater conveyance for additional growth in the area. Table 6-7 shows recommendations for the Lakeside Landing Lift Station.

TABLE 6-7 LAKESIDE LANDING LIFT STATION PHASING

Phase	1500 South Lift Station Recommendations	Timing
1	Construct a new lift station with two new pumps capable of pumping 1,000 gpm each. Install one 8-inch and one 10-inch force main to help with phasing, redundancy, and growth.	Near future.
2	Install 2 new pumps capable of pumping 1,000 gpm each in positions 3 and 4 of the lift station.	Within 45 years, when peak flows reach 1,000 gpm.

While keeping the 10-inch force main as backup for redundancy and for future growth, the 8-inch force main is anticipated to reach maximum velocities of 4.6 feet/second by 20 years. By the year 2070, the maximum velocities in the 8-inch and 10-inch force mains are anticipated to reach 3.2 and 3.7 feet/second, respectively.

When the time comes to design and construct new wastewater infrastructure, such as gravity mains, force mains, or lift stations, it is recommended to follow State code or perform a hydraulic modeling engineering analysis to calculate wastewater loading and verify the sizing of the infrastructure. Refer to Utah State Code R317-3-2 for calculating wastewater design flowrates, minimum pipe sizing, and other design requirements. Refer to Utah State Code R317-3-3 for sewer lift station design requirements. However, a hydraulic modeling engineering analysis provides more detailed information about the modeled system and can be used in the design process.

CHAPTER 7
OPERATIONS AND MAINTENANCE ALTERNATIVES

Recommendations for key operations and maintenance procedures have been developed. Many of these recommendations are a continuation of procedures already in effect. A discussion is included below, along with a recommendation for continued practice. These items are as follows:

SYSTEM AGING

Pipe age can be used to identify areas that might require more repairs. The typical design life for a sanitary sewer is between 50 and 100 years. Factors affecting design life may include pipe material, soil conditions and quality of construction. Because of the variability of these factors, it is difficult to determine the condition of the wastewater collection system based on age alone. Springville uses sewer video inspection technology to evaluate the structural integrity of the pipes in the sewer network. Sewer video inspection is very useful at identifying cracks, holes, offset joints, erosion, low points in pipes, and significant inflow/infiltration. It is recommended that the City continue the system video schedule and use the inspection to plan for future repair projects.

Replacement

In addition to completing projects to resolve deficiencies, the City should continue replacing aging pipes throughout the city on a regular basis. Table 7-1 and Table 7-2 show the cost of all pipes in the city and the cost to replace all of them over its service life. These costs include manholes associated with the pipelines.

TABLE 7-1: REPLACEMENT PROGRAM FOR ALL GRAVITY PIPES

Pipe Diameter (inches)	Length of Pipe (feet)	Cost
4	300	$110,000
6	6,300	$2,460,000
8	526,900	$205,510,000
10	42,100	$16,850,000
12	73,700	$32,410,000
14	1,000	$460,000
15	31,800	$15,260,000
18	17,100	$9,070,000
21	5,100	$2,970,000
24	7,400	$4,730,000
30	1,900	$1,540,000
36	2,300	$2,250,000

Pipe Diameter (inches)	Length of Pipe (feet)	Cost
	Subtotal	$293,630,000
	Contingency (20%) & Engineering (10%)	$88,090,000
	Total Cost for Replacement of All Gravity Pipes	**$381,720,000**
	Annual Cost for Replacement of All Gravity Pipes Over Service Life	**$3,820,000**

TABLE 7-2: REPLACEMENT PROGRAM FOR ALL FORCE MAINS

Pipe Diameter (inches)	Length of Pipe (feet)	Cost
4	2,900	$670,000
6	5,600	$1,410,000
8	11,300	$3,040,000
10	12,500	$3,620,000
12	8,900	$2,850,000
	Subtotal	$11,590,000
	Contingency (20%) & Engineering (10%)	$3,480,000
	Total Cost for Replacement of All Force Mains	**$15,070,000**
	Annual Cost for Replacement of All Force Mains Over Service Life	**$151,000**

PIPELINE IMPROVEMENTS

The following improvement alternatives are typically considered when addressing pipeline deficiencies.

Cleaning

If the slope of the pipe is insufficient to provide adequate flow velocity, deposition of solids will occur. Solids deposition lessens pipe capacity. Many locations in Springville are relatively flat where sewers have slopes less than desired. It is recommended that Springville continue cleaning pipes in the system on a regular schedule. Problem areas should be cleaned more frequently.

Clean outs are sometimes installed to clean sewer pipes. However, cleanouts are easily buried or often become unusable. Access manholes are preferred for cleaning and maintenance purposes. It is recommended that access manholes be considered for clean out locations on the wastewater collections system for cleaning and maintenance purposes (not including small private cleanouts).

Replacement Sewers

Historically, where pipe capacity has been identified as being insufficient, the typical solution has been to provide additional capacity by replacing the existing sewer with a larger sewer. Portions of the recommended projects are replacement projects.

Bypass Sewers/Re-routing Flows

While replacement of an existing sewer may be appropriate when the existing sewer is structurally inadequate, construction of a bypass or parallel sewer to supplement the capacity of the existing sewer is generally a less expensive alternative.

New Sewers

New sewers are often the only option to collect flows from future development or previously inaccessible areas. Because future growth in Springville is expected to occur in areas of the City without existing sewer networks, new sewer networks are expected to be constructed in the foreseeable future.

Alternative Construction Technologies

Within the last few years, several alternative technologies have become popular when sewers need to be replaced, when pipeline capacity needs to be increased, or when there are significant constraints to more conventional construction methods. Typical alternative technologies include:

New Construction

- Steered Auger Boring (Directional Drilling)
- Micro-tunneling

Sewer Pipe Rehabilitation

- Cured-in-Place Pipe
- Slip Lining
- Pipe Bursting
- Pipe Eating (drilling away old pipe as new pipe is installed)
- Thermoforming (Fold and Form)

COMPARISON OF IMPROVEMENT ALTERNATIVES

Sewers

For the purposes of this report, most of the sewer replacements were assumed to be open-cut to provide conservative cost estimates for budgeting purposes. Locations where alternative construction methods were assumed are specified.

Lift Stations

Some of the City's lift stations do not have sufficient capacity to meet the modeled flows determined from the future scenarios. These lift stations were included in the list of future improvements.

Future Considerations

During design of the recommended improvements, the City will review all assumptions, compare improvement alternatives, and will decide on the most cost-effective and appropriate improvement method at that time.

CHAPTER 8
CAPITAL IMPROVEMENTS PLAN

Recommendations have been prepared based on the findings described in the previous chapters. These recommendations include the correction of existing deficiencies as soon as practical and the implementation of future improvements corresponding with population growth. Cost estimates have been prepared for recommended improvements for existing deficiencies and for future improvements through 2045.

PROJECT COST ESTIMATES

Typical representative unit costs were used to develop the project construction cost estimates. Sources of typical unit costs included HAL's bid tabulation records for similar recent projects in Utah, and the RS Means Heavy Construction Cost Index. Project cost estimates and related material are included in Appendix D.

ACCURACY OF COST ESTIMATES

When considering cost estimates, there are several levels or degrees of accuracy, depending on the purpose of the estimate and the percentage of detailed design that has been completed. The following levels of accuracy are typical:

Type of Estimate	Accuracy
Master Plan	-50% to +100%
Preliminary Design	-30% to +50%
Final Design or Bid	-10% to +10%

For example, at the master plan level (or conceptual or feasibility design level), if a project is estimated to cost $1,000,000, then the accuracy or reliability of the cost estimate would typically be expected to range between approximately $500,000 and $2,000,000. While this may not seem very accurate, the purpose of master planning is to develop general sizing, location, cost and scheduling information on a number of individual projects that may be designed and constructed over a period of many years. Master planning also typically includes the selection of common design criteria to help ensure uniformity and compatibility among future individual projects. Details such as the exact capacity of individual projects, the level of redundancy, the location of facilities, the alignment and depth of pipelines, the extent of utility conflicts, the cost of land and easements, the construction methodology, the types of equipment and material to be used, the time of construction, interest and inflation rates, permitting requirements, etc., are typically developed during the more detailed levels of design.

At the preliminary design level, some of the aforementioned information will have been developed. Major design decisions such as the size of facilities, selection of facility sites, pipeline alignments and depths, and the selection of the types of equipment and material to be used during construction, will typically have been made. At this level of design, the accuracy of the cost estimate for the same $1,000,000 project would typically be expected to range between approximately $700,000 and $1,500,000.

After the project has been completely designed, and is ready to bid, all design plans and technical specifications will have been completed and nearly all the significant details about the project should be known. At this level of design, the accuracy of the cost estimate for the same $1,000,000 project would typically be expected to range between approximately $900,000 and $1,100,000.

RECOMMENDED IMPROVEMENT PROJECTS

Development of the recommended improvement projects includes consideration of a number of factors including the following:

- Input by City sewer system operation personnel regarding their experience with, and opinions regarding, the deficiency and potential solutions.
- Input from City management regarding a wide range of issues including development schedules, budgeting issues, coordination with other public works projects, etc.
- Priority indicated by the modeling efforts and by the operational personnel's experience with the repair projects
- Project cost estimates

Table 8-1 identifies the recommended improvement projects to correct deficiencies and Table 8-2 identifies the recommended improvement projects to prevent pipe deficiencies in the wastewater system and the estimated cost associated with each project.

TABLE 8-1 EXISTING IMPROVEMENT PROJECT COST ESTIMATES

PROJECT ID	DESCRIPTION	TOTAL COST[1]
E-1	Upgrade Oakbrook/North Lift Station with the Overwatch system.	**$520,000**
	TOTAL	**$520,000**

[1] All costs include 30% for engineering, administrative costs, and contingencies. Costs are shown in 2025 dollars.

TABLE 8-2 FUTURE IMPROVEMENT PROJECT COST ESTIMATES

PROJECT ID	DESCRIPTION	TOTAL COST[1]	% IMPACT FEE ELIGIBLE	IMPACT FEE ELIGIBLE COST[1]
10-1	Increase lift station capacity by replacing one pump.	**$98,000**	**100%**	**$98,000**
10-2	Increase lift station capacity by adding new pumps and upgrading electrical. Existing 10" force main needs to be cleaned / evaluated for future development beyond lift station capacity after Project 10-1 is implemented.	**$2,841,000**	**100%**	**$2,841,000**
10-3	Construct new regional lift station with at least two (2) 1,000 gpm pumps. Install 10,600 feet of dual force mains (8" and 10"). Bore under I-15, the railroad, and Hobble Creek. Exact layout finalized at design.	**$11,167,000**	**100%**	**$11,167,000**
10-4	Decommission Spring Pointe Lift Station.	**$46,000**	**100%**	**$46,000**
10-5	Install 1,700 ft of 10" gravity line with a bore under I-15.	**$1,742,000**	**100%**	**$1,742,000**
10-6	Install 450 ft of parallel 15" gravity line next to existing 12" gravity line from SSMH0346 to SSMH00308. A bore crossing is required at the canal.	**$573,000**	**100%**	**$573,000**
10-7	Install a new 1,500 gpm pump to increase pump capacity to 3,000 gpm and maintain one redundant pump.	**$130,000**	**100%**	**$130,000**
10-8	Install 450 ft of parallel 15" gravity line next to the existing 15" gravity line from SSMH0315 to SSMH0314.	**$281,000**	**100%**	**$281,000**
10-9	Remove and upgrade existing 8" gravity line to 1,900 ft of 12" gravity line. MH1636 to MH0516.	**$1,087,000**	**100%**	**$1,087,000**
10-10	Install 2,100 ft of 10" gravity line. Impact fee eligible cost is to upsize from an 8" to 10" pipe.	**$1,092,000**	**2.5%**	**$27,000**
10-11	Install 1,400 ft of 12" gravity line and 2,800 ft of 15" gravity line. Impact fee eligible cost is to upsize from an 8" to 12" or 8" to 15".	**$2,548,000**	**16.5%**	**$419,000**
20-1	Remove and upgrade existing 15" gravity line to 300 ft of 21" gravity line from SSMH1921 to SSMH1920.	**$226,000**	**100%**	**$226,000**

PROJECT ID	DESCRIPTION	TOTAL COST[1]	% IMPACT FEE ELIGIBLE	IMPACT FEE ELIGIBLE COST[1]
20-2	Remove and upgrade existing 12" gravity line to 1,200 ft of 15" gravity line and 3,700 ft of 18" gravity line from SSMH1851 to SSMH1950.	**$3,298,000**	**100%**	**$3,298,000**
20-3	Remove and upgrade existing 12" gravity line to 350 ft of 15" gravity line from SSMH0693 to SSMH1941.	**$218,000**	**100%**	**$218,000**
	TOTAL	**$25,347,000**	**-**	**$22,153,000**

[1] All costs include 30% for engineering, administrative costs, and contingencies. Costs are shown in 2025 dollars.

TABLE 8-3 IMPROVEMENT PROJECT COST ESTIMATES SUMMARY

PROJECT IDs	PROJECTS	TOTAL COST[1]	IMPACT FEE ELIGIBLE COST[1]
E-1	Existing Recommended Improvement Projects	**$520,000**	**$0**
10-1 to 20-3	Future Recommended Improvement Projects	**$25,347,000**	**$22,153,000**
	TOTAL	**$25,867,000**	**$22,153,000**

WASTEWATER COLLECTION SYSTEM CLEANING

Wastewater collection system maintenance problems can occur in sewers with flatter slopes, sewers with root problems, and sewers with grease problems. Costs for maintenance and replacement of these sewers should be included in the sewer budget.

UTAH SEWER MANAGEMENT PROGRAM

The State of Utah Water Quality Board has developed a Utah Sewer Management Program (USMP) to reduce sanitary sewer overflows (SSO) by giving added emphasis to collection system maintenance, collection system analysis and program documentation. The USMP is intended to meet forthcoming Capacity, Management, Operation, and Maintenance requirements (CMOM) of the Environmental Protection Agency (EPA). The USMP prohibits SSOs, outlines enforcement, and guidelines for reporting SSOs when they occur. It requires all public agencies that own or operate sanitary sewer collection systems in Utah to enroll for coverage with the Utah State Division of Water Quality (DWQ) under the USMP. The enrollees are required to provide a plan and schedule to properly manage, operate, and maintain all parts of the sanitary sewer system to help reduce and prevent SSOs as well as mitigate any SSOs that do occur. Enrollees must prepare, submit, and certify this Sewer System Management Plan (SSMP) to the DWQ within the time period specified in the USMP after its adoption. Enrollees must then take all feasible steps to comply with the conditions of the USMP and follow their own SSMP including: report SSOs, submit an annual report as part of the Utah Municipal Wastewater Planning Program, and resubmit an updated SSMP at least every five years (R317-801). It is recommended that Springville City enroll in and comply with the USMP.

ELIMINATE UNNECESSARY WASTEWATER

One way to increase capacity in the wastewater collection system is to identify and eliminate the unnecessary generation of wastewater. Wastewater is made up of inflow, infiltration, and direct sewage. An effort should be made to reduce inflow and infiltration because the sewer system experiences a significant amount of inflow and infiltration. Eliminating unnecessary wastewater will not only increase the capacity of the system, but it will also lower the expected treatment costs.

Direct Sewage

Another example of eliminating unnecessary wastewater is to offer incentives to homeowners for replacing older water wasting fixtures and appliances with new water efficient models. Not only do efficient fixtures and appliances save drinking water, they also reduce wastewater flow. It is recommended that Springville offer incentives for installing water-wise fixtures and appliances.

FUNDING OPTIONS

Funding options for the recommended projects, in addition to sewer use fees, could include the following options: general obligation bonds, revenue bonds, State/Federal grants and loans, and impact fees. In reality, the City may need to consider a combination of these funding options. The following discussion describes each of these options.

Sewer Service Fees

The sewer service fee is used to pay for the operation and maintenance of the sewer system. As part of the maintenance of the sewer system, it is recommended that sewer systems set aside a part of the budget (including depreciation) into a capital facilities replacement account.

General Obligation Bonds

This form of debt enables the City to issue general obligation bonds for capital improvements and replacement. General Obligation (GO) Bonds would be used for items not typically financed through the Revenue Bonds. GO bonds are debt instruments backed by the full faith and credit of the City which would be secured by an unconditional pledge of the City to levy assessments, charges or ad valorem taxes necessary to retire the bonds. GO bonds are the lowest-cost form of debt financing available to local governments and can be combined with other revenue sources such as specific fees, or special assessment charges to form a dual security through the City's revenue generating authority. These bonds are supported by the City as a whole, so the amount of debt issued for the sewer system is limited to a fixed percentage of the real market value for taxable property within the City.

Revenue Bonds

This form of debt financing is also available to the City for utility-related capital improvements. Unlike GO bonds, revenue bonds are not backed by the City as a whole, but constitute a lien against the sewer service charge revenues of a Sewer Utility. Revenue bonds present a greater risk to the investor than do GO bonds, since repayment of debt depends on an adequate revenue stream, legally defensible rate structure and sound fiscal management by the issuing jurisdiction. Due to this increased risk, revenue bonds generally require a higher interest rate than GO bonds, although current interest rates are historically very low. This type of debt also has very specific coverage requirements in the form of a reserve fund specifying an amount, usually expressed in terms of average or maximum debt service due in any future year. This debt service is required to be held as a cash reserve for annual debt service payment to the benefit of bondholders. Typically, voter approval is not required when issuing revenue bonds.

State/Federal Grants and Loans

Historically, both local and county governments have experienced significant infrastructure funding support from state and federal government agencies in the form of block grants, direct grants in aid, interagency loans, and general revenue sharing. Federal expenditure pressures and virtual elimination of federal revenue sharing dollars are clear indicators that local government may be left to its own devices regarding infrastructure finance in general. However, state/federal grants and loans should be further investigated as a possible funding source for needed sewer system improvements.

It is also important to assess likely trends regarding federal/state assistance in infrastructure financing. Future trends indicate that grants will be replaced by loans through a public works revolving fund. Local governments can expect to access these revolving funds or public works trust funds by demonstrating both the need for and the ability to repay the borrowed monies, with interest. As with the revenue bonds discussed earlier, the ability of infrastructure programs to wisely manage their own finances will be a key element in evaluating whether many secondary funding sources, such as federal/state loans, will be available to the City.

Rocky Mountain Power Energy Incentive

Rocky Mountain Power will provide financial incentives for utilities to reduce energy use.

Impact Fees

Impact fees can be applied to wastewater related facilities under the Utah Impact Fees Act. The Utah Impacts Fees Act is designed to provide a logical and clear framework for establishing new development assessments. It is also designed to establish the basis for the fee calculation which the City must follow to comply with the statute. However, the fundamental objective for the fee structure is the imposition on new development of only those costs associated with providing or expanding water infrastructure to meet the capacity needs created by that specific new development.

REFERENCES

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APPENDIX A

Lift Station Technical Memorandum

DRAFT

HANSEN ALLEN & LUCE INC
ENGINEERS

TECHNICAL MEMORANDUM

DRAFT

8-26-2020

PROFESSIONAL ENGINEER
BENJAMIN D. MINER
No. 318761-2202
STATE OF UTAH

DATE:	August 26, 2020
TO:	Mr. Jeff Anderson, P.E. Springville City Engineer 110 S Main St. #5741 Springville, Utah 84663
FROM:	Benjamin D. Miner, P.E. Jacob Nielsen, Engineer Hansen, Allen & Luce, Inc. (HAL) 859 W. South Jordan Parkway, Ste. 200 South Jordan, Utah 84095
SUBJECT:	Sanitary Sewer Lift Station Analysis
PROJECT NO.:	260.50.100

INTRODUCTION

Springville City (the City) operates 12 sewer lift stations throughout the City. Generally, the City prefers to avoid the use of lift stations because of maintenance and power requirements. City crews dedicate large amounts of labor to cleaning and maintaining the lift stations.

At times, lift stations are the only way to service low lying areas of the City in that they allow development of areas that are lower in elevation than existing gravity operated sewers. However, with new development and the related sewer construction, and as funding becomes available, lift stations can sometimes be taken out of service.

The City has identified three lift stations that are candidates to be taken out of service. These are the East Lift Station, the Thirty Oaks Lift Station and the South Lift Station. Additionally, the City desires to reduce the amount of flow that is being pumped at the Oakbrook Lift Station.

ELEVATION DATA

The evaluation of the lift stations has relied on elevation data provided in the Springville City GIS database, including rim and flowline elevations and including the 2012 Lidar Data. Prior to the design and construction of a project, it will be necessary to confirm the elevations with a land survey.

BACKGROUND, METHODOLOGY, AND COST ESTIMATING

Sewer flow demands assumed for each lift station analyzed either came from the SSA model used to develop the 2019 Sewer Master Plan, or were calculated by estimating the average daily sewer demand. This was done by counting the number of Equivalent Residential Units (ERU) and multiplying by the level of service estimated to be 250 gallons per day per ERU. Inflow and infiltration (I&I) were also added to represent the peak day demand. From the master plan, I&I was estimated to account for 35% of the peak day flow at the treatment plant. The sewer demands arriving at the lift stations were also scaled up by 35%.

Operation and maintenance costs were provided by the City. Materials and equipment used to repair or maintain all of the City's lift stations was $42,027 in the fiscal year 2019. The annual labor, excluding weekly cleanings and inspections, was 300 hours billed at $38/hour. This equates $11,400. These annual costs ($53,427) were proportionally allocated to each lift station based on the pumping capacity of each facility. Each lift station was also assumed to have a weekly cleaning or inspection requiring 2 city personnel for 2 hours, again billed at $38/hour. The annual cost of cleanings and inspections assumed for each lift station is $7,904.

Power costs were also provided by the City. The City pays $0.0865/kWh with an assumed $25.63/month as a service charge for each lift station. The annual energy used by each lift station was provided by the City in order to calculate the annual cost to operate each lift station.

The feasibility of taking these sewers out of service has been evaluated and is described below.

East

The East Lift Station is located at 520 North 600 East. This lift station serves about 61 lots. The lift station is currently necessary since the surrounding neighborhood is located in a low-lying area. The potential pipe alignment that could facilitate the removal of the lift station is shown in Figure 1. This alternative is to connect a new 8-inch diameter sewer to SSMH01139 and route the sewer through residential lots to 450 East. The sewer would then be connected to SSMH01117 at the intersection of 450 East and 550 North. The economic feasibility of removing this lift station is shown in Table 1.

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Table 1: East Lift Station Cost Estimates

Item	Description	Cost	Savings
Annual Power			
	11,087 kWh @ $0.0865/kWh		*$959.03*
	12 months @ $25.63		*$307.56*
	Total Annual Power		$1,266.59
Annual O&M			
	Weekly Cleaning/Inspections		*$7,904.00*
	Materials and Equipment		*$828.17*
	Total Annual O&M		$8,732.17
Annual Total	Annual Power and O&M		$9,998.75
20-Year Total	$9,998.75 x 20		$199,975.01
Summary			
	Capital Project Cost (910 ft of 8" pipe @ $308.11/LF)	**$380,000.00***	
	20-Year Savings		**$199,975.01**
	Project Net Cost	**$180,024.99**	

*Cost reflects 35% for engineering and contingency.

It is important to note that one of the City goals has been to reduce the amount of wastewater reaching the Oakbrook Lift Station. While the re-routing scenario described above eliminates the East Lift Station, it increases the flow to the Oakbrook Lift Station.

Thirty Oaks

The Thirty Oaks lift station is located at 2800 East Canyon Road. It currently serves about 20 lots. It is feasible to eliminate this lift station and re-route wastewater along the side or back of lots along Canyon Road and provide sewer service to properties that are currently on septic systems. The alignment, shown in Figure 2, would tie into SSMH02366 on 1100 S. The economic feasibility of removing this lift station is shown in Table 2.

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Table 2: Thirty Oaks Lift Station Cost Estimates

Item	Description	Cost	Savings
Annual Power			
	3,740 kWh @ $0.0865/kWh		*$323.51*
	12 months @ $25.63		*$307.56*
	Total Annual Power		$631.07
Annual O&M			
	Weekly Cleaning/Inspections		*$7,904.00*
	Materials and Equipment		*$590.07*
	Total Annual O&M		$8,494.07
Annual Total	Annual Power and O&M		$9,125.14
20-Year Total	$9,125.14 x 20		$182,502.75
Summary			
Capital Project Cost (950 ft of 8" pipe @ $308.11/LF)		**$400,000.00***	
20-Year Savings			**$182,502.75**
Project Net Cost		**$217,497.25**	

*Cost reflects 35% for engineering and contingency.

South

The South Lift Station is located at 1270 South Main. It currently serves about 115 lots. A solution to remove the lift station and allow the wastewater to gravity flow all the way to the WWTP was evaluated and found to not be feasible. The feasible solution discussed here provides a gravity line through the fields on the west side of State Road 51 and tying in at SSMH00205 on 1375 S. However, this solution routes flows to the 1500 W Lift Station, which pumps to the WWTP at a higher head than the South Lift Station. The proposed capital project is shown in Figure 3 and the economic feasibility of removing this lift station is shown in Table 3.

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Table 3: South Lift Station Cost Estimates

Item		Description	Cost	Savings
Annual Power				
		18,883 kWh @ $0.0865/kWh		*$1,633.38*
		12 months @ $25.63		*$307.56*
		South Lift Station Annual Power		$1,940.94
		Transfer Energy to 1500 W		
	Before	*128,920 kWh @ $0.0865/kWh*	*$11,151.58*	
	***After	*175,318 kWh @ $0.0865/kWh*	*$15,165.03*	
		Net Additional Cost at 1500 W	$4,013.45	
		Total Annual Power	$2,072.51	
Annual O&M				
		Weekly Cleaning/Inspections		*$7,904.00*
		Materials and Equipment		*$1,552.81*
		Total Annual O&M		$9,456.81
Annual Total		Annual Power and O&M**		$7,384.30
20-Year Total		$7,384.30 x 20		$147,686.05
Summary				
Capital Project Cost (3,550 ft of 8" pipe @ $308.11/LF)			**$1,480,000.00***	
		20-Year Savings		**$147,686.05**
		Project Net Cost	**$1,332,313.95**	

*Cost reflects 35% for engineering and contingency.

**In comparing annuals costs, the Total Annual Power is a net loss to the project. Therefore, it is subtracted from the Annual Total.

***Energy used is proportional to head being pumped. The energy used at the South Lift Station would be transferred to the 1500 W Lift Station. The head at the 1500 W Lift Station is about 2.45 times higher than the head at the South Lift Station. The 18,883 kWh was multiplied by 2.45 and added to the 1500 W usage (128,920 kWh).

Oakbrook

The Oakbrook Lift Station is located at 1275 North Meadowbrook Lane. Most of the sewer north of 400 N and east of 400 W flows to the Oakbrook Lift Station. A capital project was explored to identify the feasibility of diverting some of the flow directly to the WWTP and reduce the amount of wastewater reaching the Oakbrook Lift Station. The solution identified reduces the flow being received at Oakbrook by approximately 60%. The alignment starts on the east side of Main Street at SSMH02204 and runs through private property and along 650 North until it reaches the headworks of the WWTP. The proposed capital project is shown in Figure 4 and the economic feasibility of removing this lift station is shown in Table 4.

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Table 4: Oakbrook Lift Station Cost Estimates

Item	Description	Cost	Savings
Annual Power			
	Energy Reduction at Oakbrook		
Before	*64,960 kWh @ $0.0865/kWh*	*$5,619.04*	
***After	*39,639 kWh @ $0.0865/kWh*	*$3,428.75*	
	Net Annual Energy		$2,190.29
	12 months @ $25.63		No Change
	Total Annual Power		$2,190.29
Annual O&M			
	Weekly Cleaning/Inspections		No Change
	Materials and Equipment		No Change
	Total Annual O&M		No Change
Annual Total	Annual Power and O&M		$2,190.29
20-Year Total	$2,190.29 x 20		$43,805.75
Summary			
Capital Project Cost (2,650 ft of 12" pipe @ $343.37/LF)		**$1,230,000.00***	
	20-Year Savings		**$43,805.75**
	Project Net Cost	**$1,186,194.25**	

*Cost reflects 35% for engineering and contingency.

***Energy used is proportional to flow being pumped. The flow pumped at the Oakbrook Lift Station would be reduced because of the capital project to divert flow directly to the WWTP. The projected flow at the Oakbrook Lift Station is about 61% less than the current estimated flow at the Oakbrook Lift Station. The 64,960 kWh was multiplied by 0.61 to estimate the future annual energy usage (39,639, kWh).

ADDITIONAL FLOW STUDIES

The alternatives presented herein appear to be feasible based on the available flowrate and elevation data. However, prior to design and construction it is recommended that flow monitoring be performed at the list stations and at key sewers so that final design data can be obtained.

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Date: 9/27/2019
Document Path: H:\Projects\260 - Springville City\50.100 - 2018 Wastewater Collection System Master Plan\GIS\Lift Station Analysis\Sewer_LiftStationAnalysis_East.mxd

HANSEN ALLEN & LUCE INC ENGINEERS

Springville City
East Lift Station Bypass Project (Conceptual)

FIGURE 1

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Date: 9/27/2019

HANSEN ALLEN & LUCE INC ENGINEERS

Springville City
Thirty Oaks Lift Station Project (Conceptual)

FIGURE 2

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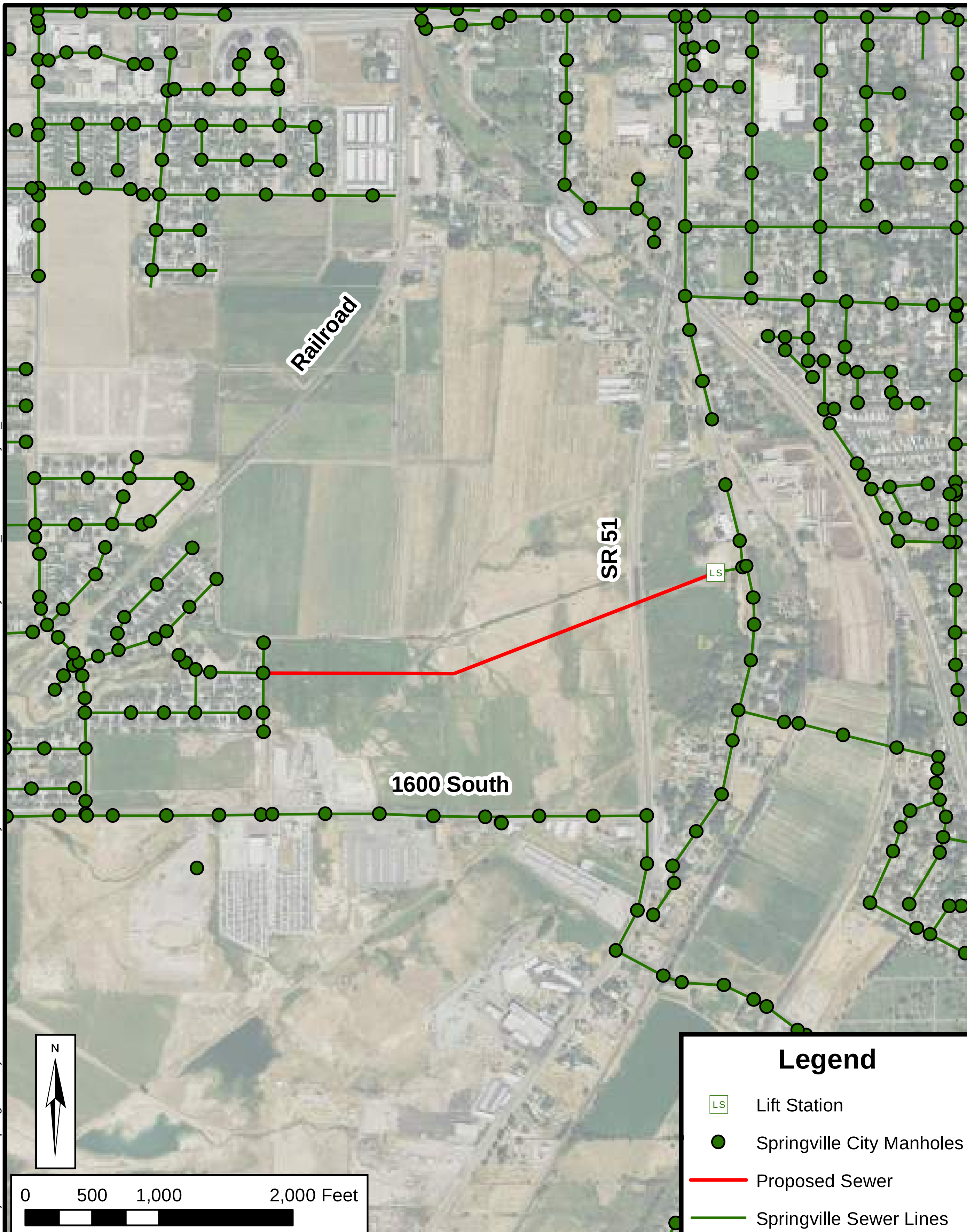

Date: 9/27/2019
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Springville City
South Lift Station Project (Conceptual)

FIGURE 3

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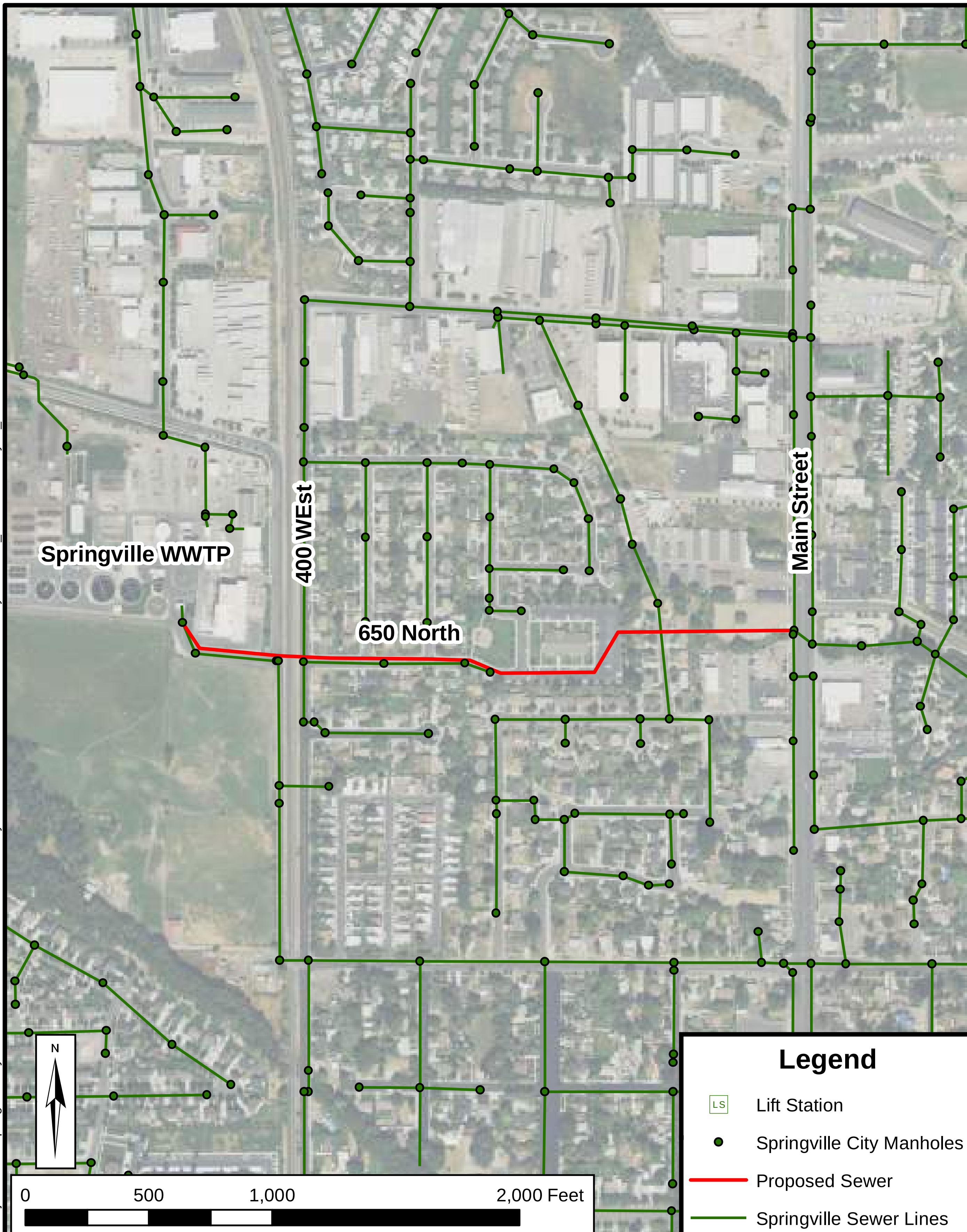

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HANSEN ALLEN & LUCE INC ENGINEERS

Springville City
Oakbrook Lift Station Project (Conceptual)

FIGURE 4

APPENDIX B

Flow Study Results

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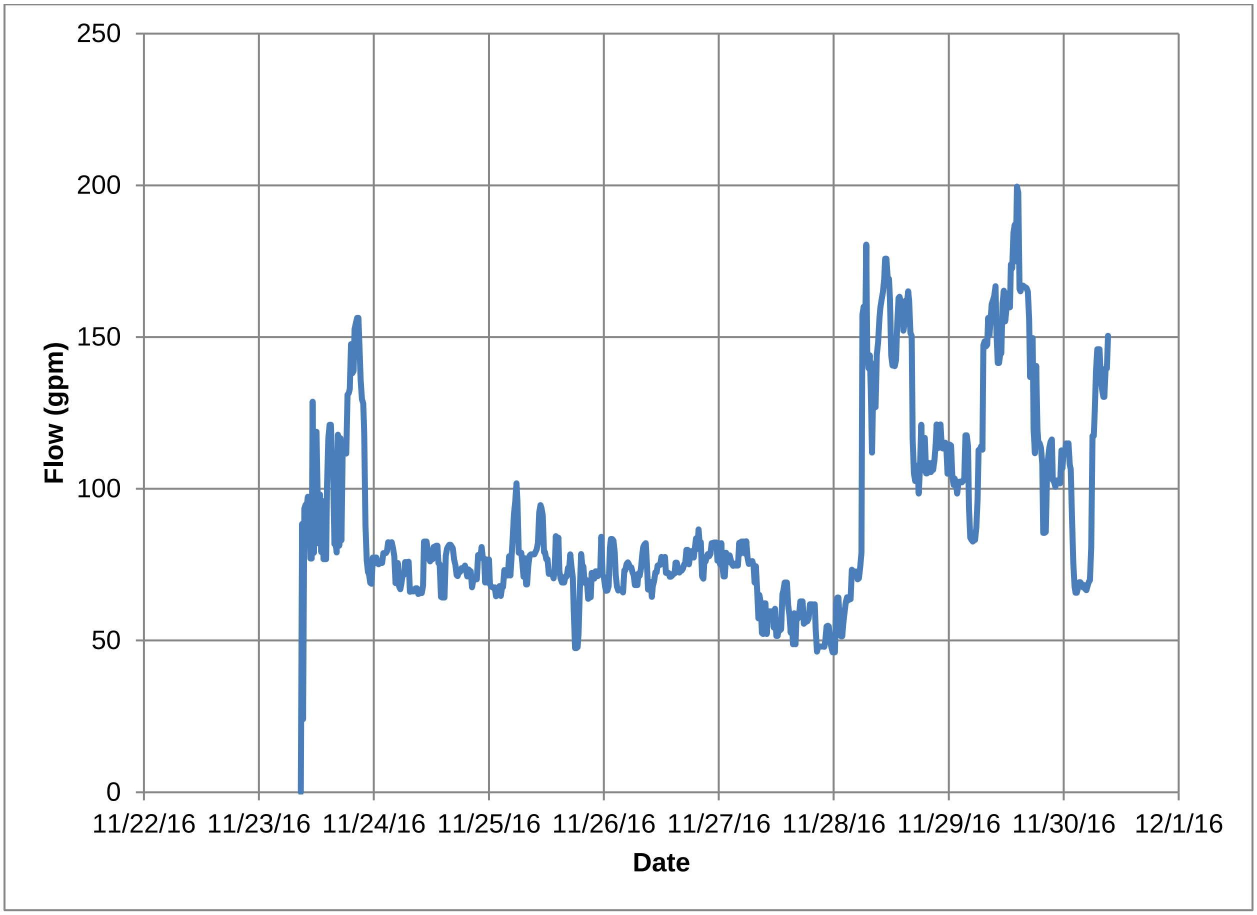
SSMH0235

Site Location: W Industrial Circle and 1100 W
Maximum Flow: 200 gpm
Minimum Flow: 24 gpm
Average Flow: 91 gpm
Peaking Factor: 2.2



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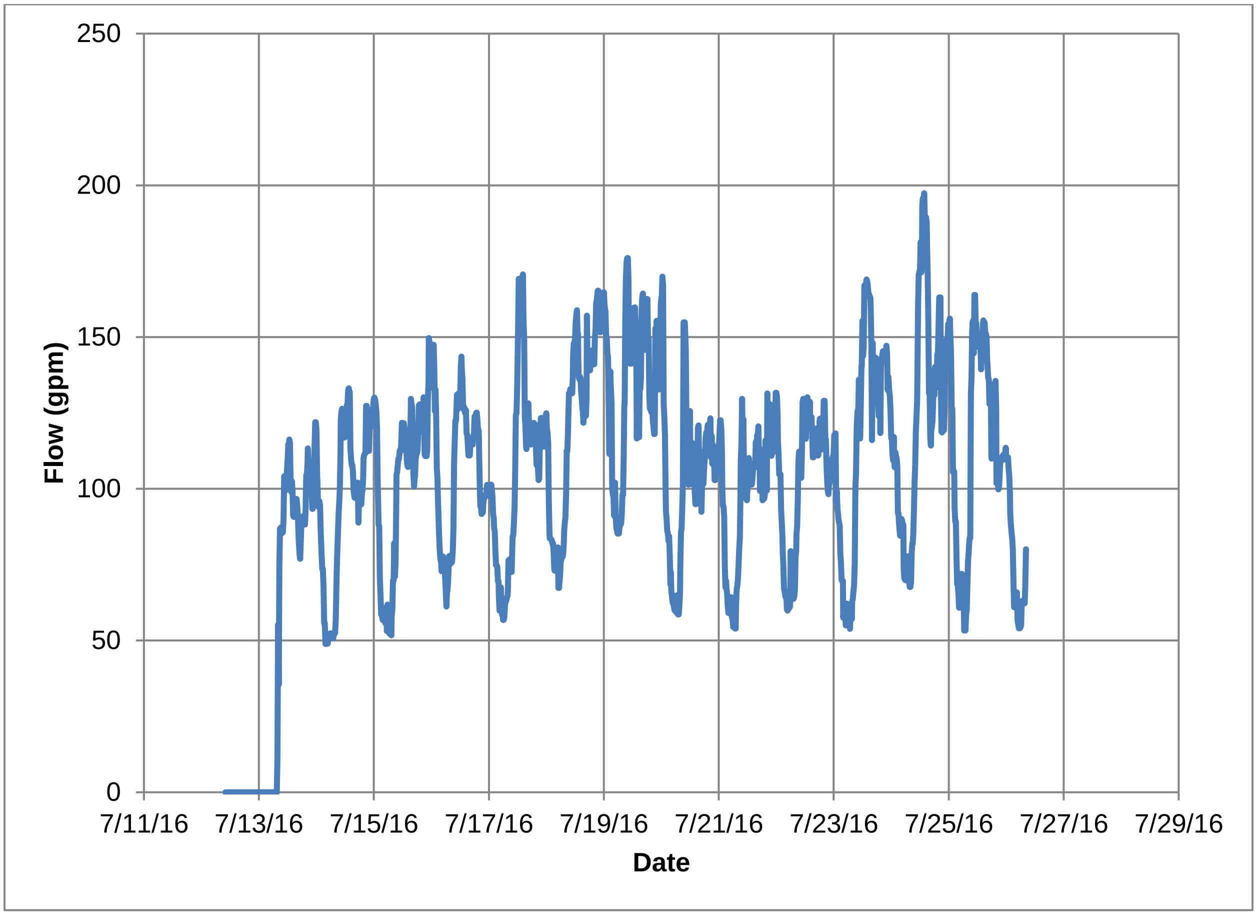
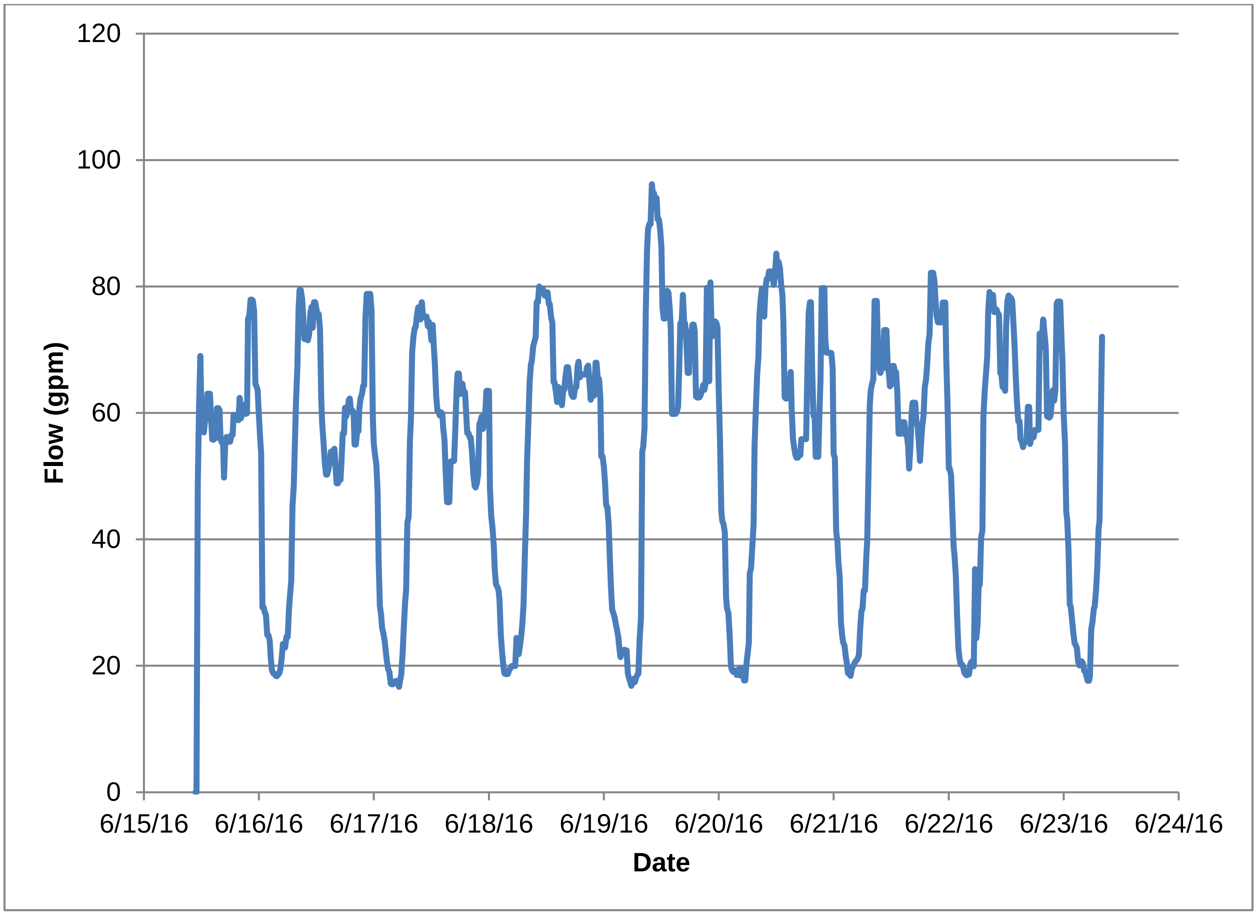
SSMH0311

Site Location: 800 N and 200 W
Maximum Flow: 197 gpm
Minimum Flow: 12 gpm
Average Flow: 108 gpm
Peaking Factor: 1.8



SSMH0381

Site Location: 700 N Main Street
Maximum Flow: 96 gpm
Minimum Flow: 17 gpm
Average Flow: 54 gpm
Peaking Factor: 1.8



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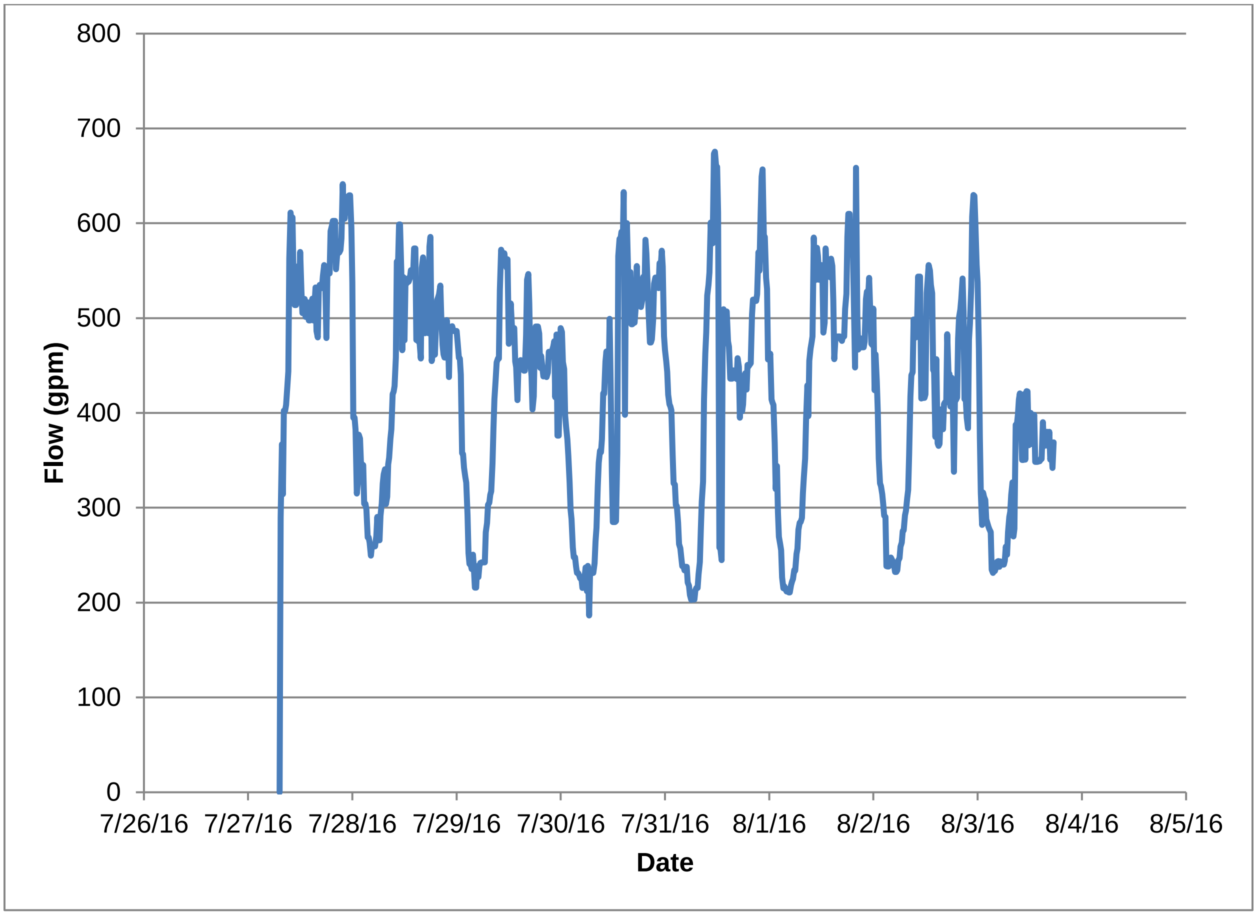
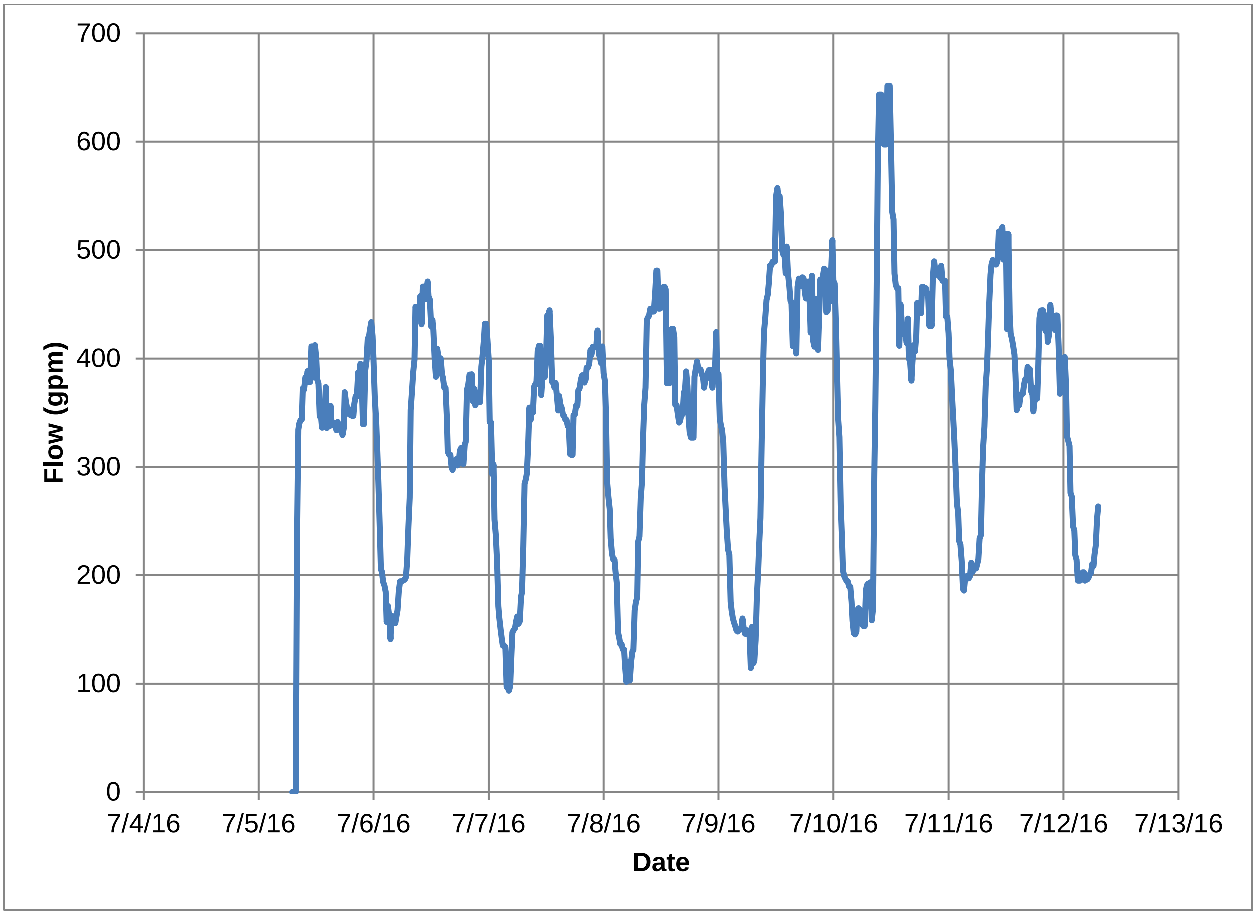
SSMH1628

Site Location: 300 N and 400 W
Maximum Flow: 676 gpm
Minimum Flow: 187 gpm
Average Flow: 421 gpm
Peaking Factor: 1.6



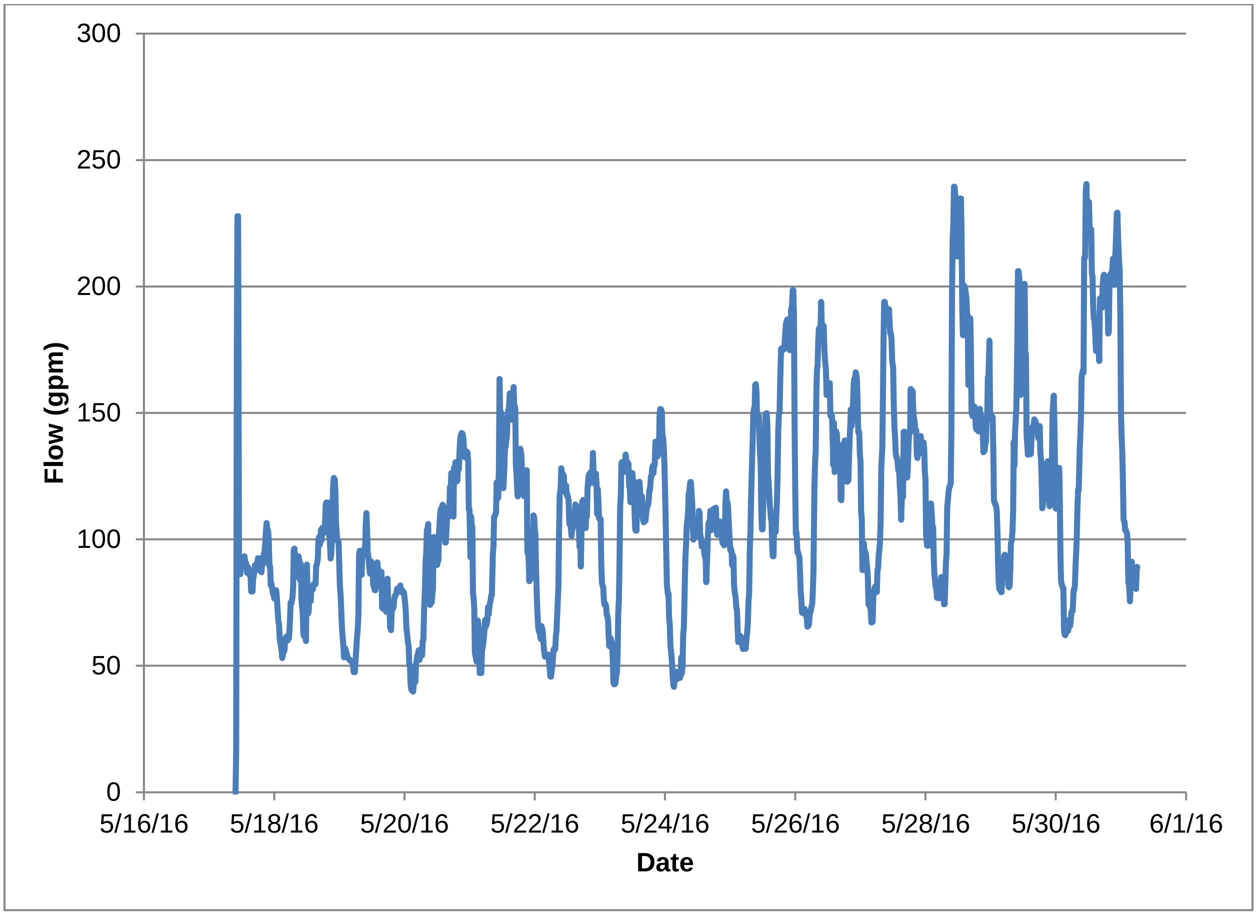
SSMH1799

Site Location: 400 N and 200 W
Maximum Flow: 652 gpm
Minimum Flow: 93 gpm
Average Flow: 345 gpm
Peaking Factor: 1.9



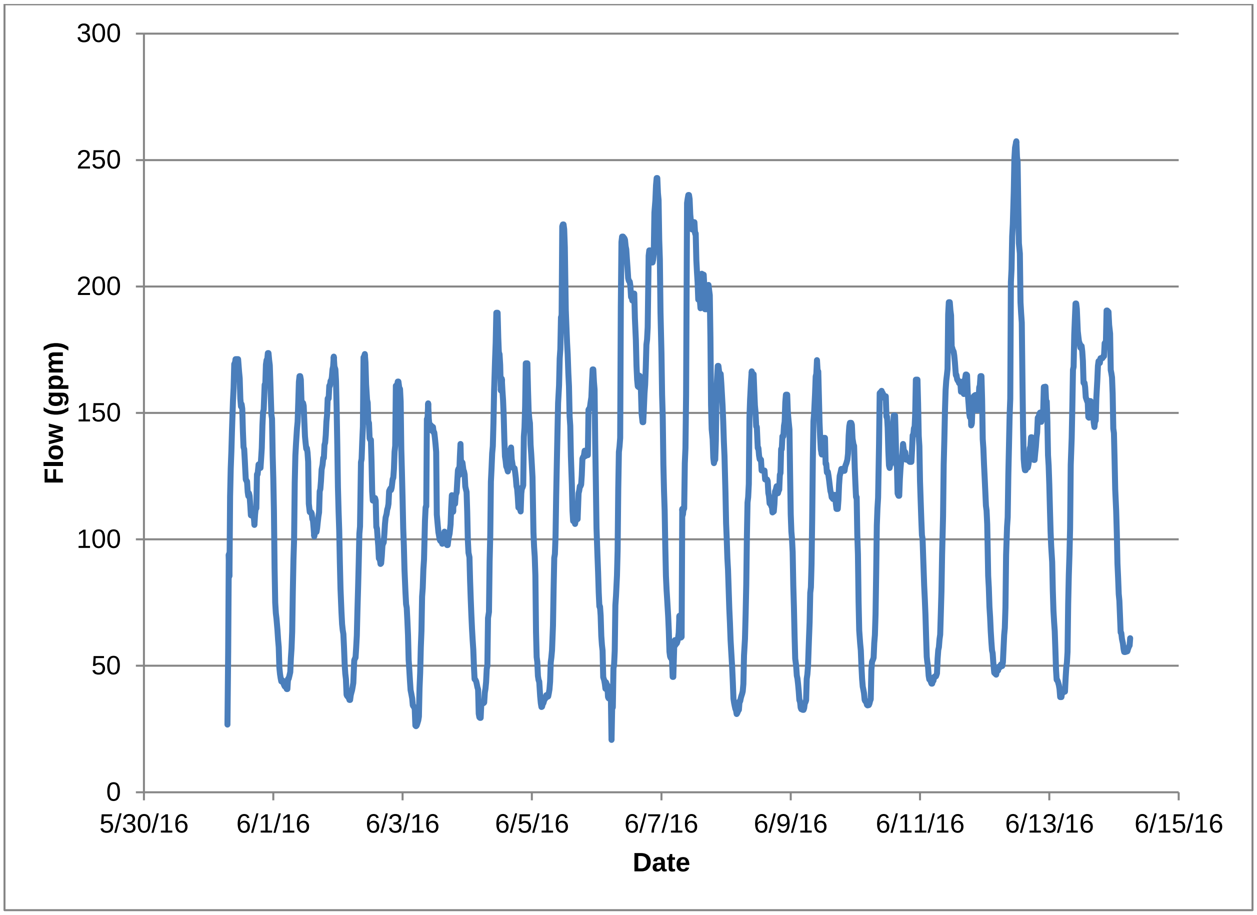
SSMH2356

Site Location: 500 N and 1750 W
Maximum Flow: 241 gpm
Minimum Flow: 16 gpm
Average Flow: 112 gpm
Peaking Factor: 2.2



SSMH2382

Site Location: 850 N 1500 W
Maximum Flow: 257 gpm
Minimum Flow: 21 gpm
Average Flow: 119 gpm
Peaking Factor: 2.2



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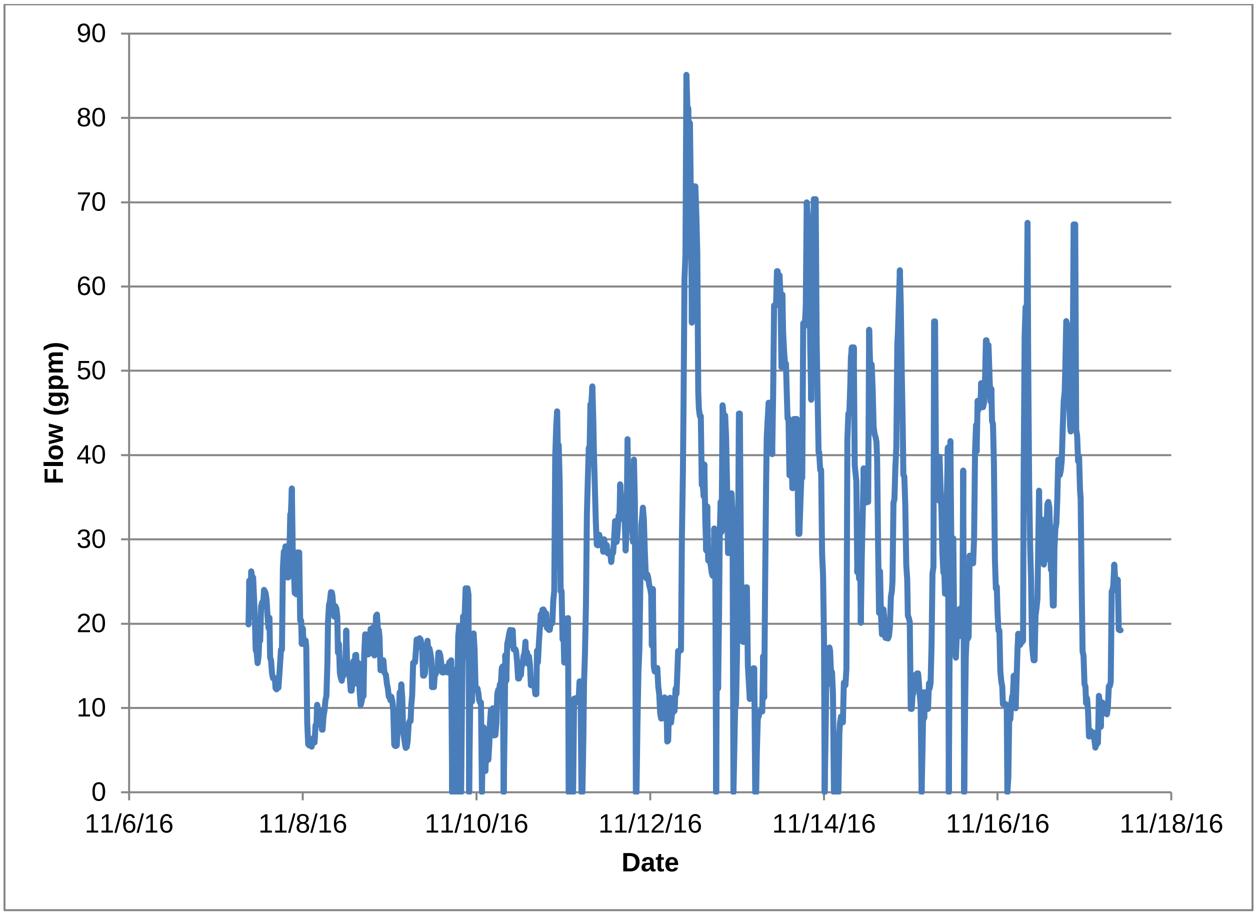
SSMH2739

Site Location: 650 S 2600 W
Maximum Flow: 85 gpm
Minimum Flow: 2 gpm
Average Flow: 24 gpm
Peaking Factor: 3.5



APPENDIX C

Growth Projections and Projected ERUs

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Growth Projections and Projected ERUs

Year	Projected ERUs				Annual ERU Growth
	Residential	Non Residential	Nestle	Total	
2025	11,397	4,555	4,842	20,794	-
2026	11,699	4,676	4,842	21,216	2.6%
2027	12,008	4,799	4,842	21,650	2.6%
2028	12,326	4,926	4,842	22,095	2.6%
2029	12,652	5,057	4,842	22,551	2.6%
2030	12,987	5,191	4,842	23,020	2.6%
2031	13,291	5,312	4,842	23,445	2.3%
2032	13,601	5,436	4,842	23,880	2.3%
2033	13,919	5,563	4,842	24,324	2.3%
2034	14,245	5,693	4,842	24,780	2.3%
2035	14,578	5,826	4,842	25,246	2.3%
2036	14,883	5,948	4,842	25,673	2.1%
2037	15,194	6,073	4,842	26,109	2.1%
2038	15,512	6,200	4,842	26,554	2.1%
2039	15,837	6,329	4,842	27,008	2.1%
2040	16,168	6,462	4,842	27,472	2.1%
2041	16,461	6,579	4,842	27,882	1.8%
2042	16,759	6,698	4,842	28,299	1.8%
2043	17,063	6,819	4,842	28,724	1.8%
2044	17,372	6,943	4,842	29,157	1.8%
2045	17,687	7,069	4,842	29,598	1.8%
2046	18,007	7,197	4,842	30,046	1.8%
2047	18,334	7,327	4,842	30,503	1.8%
2048	18,666	7,460	4,842	30,968	1.8%
2049	19,004	7,595	4,842	31,442	1.8%
2050	19,349	7,733	4,842	31,924	1.8%
2051	19,471	7,782	4,842	32,095	0.6%
2052	19,595	7,831	4,842	32,268	0.6%
2053	19,719	7,881	4,842	32,442	0.6%
2054	19,844	7,931	4,842	32,617	0.6%
2055	19,970	7,981	4,842	32,793	0.6%
2056	20,096	8,032	4,842	32,970	0.6%
2057	20,224	8,083	4,842	33,148	0.6%
2058	20,352	8,134	4,842	33,328	0.6%
2059	20,481	8,186	4,842	33,508	0.6%
2060	20,611	8,237	4,842	33,690	0.6%
2061	20,741	8,290	4,842	33,873	0.6%
2062	20,873	8,342	4,842	34,057	0.6%
2063	21,005	8,395	4,842	34,242	0.6%
2064	21,138	8,448	4,842	34,429	0.6%
2065	21,272	8,502	4,842	34,616	0.6%
2066	21,407	8,556	4,842	34,805	0.6%
2067	21,543	8,610	4,842	34,995	0.6%
2068	21,679	8,665	4,842	35,186	0.6%
2069	21,817	8,719	4,842	35,378	0.6%
2070	21,955	8,775	4,842	35,572	0.6%

APPENDIX D
Cost Estimates

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Springville City Capital Facility Plan
Wastewater Existing Recommended Improvements
Preliminary Engineers Cost Estimates

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	Item	Unit	Unit Price	Quantity	Total Price	City Price	City %	Developer Price	Developer %
E-1.	***Oakbrook/North Lift Station Upgrades***								
	Upgrade lift station with Overwatch system	LS	$ 400,000	1	$ 400,000	$ 400,000	100%	$ -	0%
				Total	$ 400,000	$ 400,000	100%	$ -	0%
				Engineering & Admin. (10%)	$ 40,000	$ 40,000	100%	$ -	0%
				Contingency (20%)	$ 80,000	$ 80,000	100%	$ -	0%
				Total to Oakbrook/North Lift Station Upgrades	**$ 520,000**	**$ 520,000**	100%	**$ -**	0%
				Total Costs	**$ 520,000**	**$ 520,000**		**$ -**	

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	Item	Unit	Unit Price	Quantity	Total Price	City Price	City %	Developer Price	Developer %
10-1.	***Westfields Lift Station***								
	Replace one lift station pump	LS	$ 75,000	1	$ 75,000	$ 75,000	100%	$ -	0%
				Total	$ 75,000	$ 75,000	100%	$ -	0%
				Engineering & Admin. (10%)	$ 7,500	$ 7,500	100%	$ -	0%
				Contingency (20%)	$ 15,000	$ 15,000	100%	$ -	0%
				Total to Westfields Lift Station	**$ 98,000**	**$ 98,000**	100%	**$ -**	0%
10-2.	***Westfields Lift Station***								
	Install New Pumps	EA	$ 200,000	3	$ 600,000	$ 600,000	100%	$ -	0%
	Upgrade pump bases	EA	$ 10,000	4	$ 40,000	$ 40,000	100%	$ -	0%
	Upgrade lift station electrical components	LS	$ 400,000	1	$ 400,000	$ 400,000	100%	$ -	0%
	Install new VFD	EA	$ 100,000	4	$ 400,000	$ 400,000	100%	$ -	0%
	Upgrade discharge pipes and valves	LS	$ 500,000	1	$ 500,000	$ 500,000	100%	$ -	0%
	Evaluate/clean the existing 10" force main	LS	$ 245,000	1	$ 245,000	$ 245,000	100%	$ -	0%
				Total	$ 2,185,000	$ 2,185,000	100%	$ -	0%
				Engineering & Admin. (10%)	$ 218,500	$ 218,500	100%	$ -	0%
				Contingency (20%)	$ 437,000	$ 437,000	100%	$ -	0%
				Total to Westfields Lift Station	**$ 2,841,000**	**$ 2,841,000**	100%	**$ -**	0%
10-3.	***New Lift Station Near Spring Pointe***								
	Construct new lift station	LS	$ 3,000,000	1	$ 3,000,000	$ 3,000,000	100%	$ -	0%
	Install 8" force main pipe in same trench as 10"	LF	$ 35	10600	$ 371,000	$ 371,000	100%	$ -	0%
	Install 10" force main pipe	LF	$ 290	10600	$ 3,074,000	$ 3,074,000	100%	$ -	0%
	Bore under I-15 with 30" casing	LF	$ 3,000	240	$ 720,000	$ 720,000	100%	$ -	0%
	Bore under Railroad with 30" casing	LF	$ 3,000	400	$ 1,200,000	$ 1,200,000	100%	$ -	0%
	Bore under Hobble Creek with 30" casing	LF	$ 3,000	75	$ 225,000	$ 225,000	100%	$ -	0%
				Total	$ 8,590,000	$ 8,590,000	100%	$ -	0%
				Engineering & Admin. (10%)	$ 859,000	$ 859,000	100%	$ -	0%
				Contingency (20%)	$ 1,718,000	$ 1,718,000	100%	$ -	0%
				Total to New Lift Station Near Spring Pointe	**$ 11,167,000**	**$ 11,167,000**	100%	**$ -**	0%
10-4.	***Decommission Spring Pointe Lift Station***								
	Decommission Spring Pointe Lift Station	LS	$ 35,000	1	$ 35,000	$ 35,000	100%	$ -	0%
				Total	$ 35,000	$ 35,000	100%	$ -	0%
				Engineering & Admin. (10%)	$ 3,500	$ 3,500	100%	$ -	0%
				Contingency (20%)	$ 7,000	$ 7,000	100%	$ -	0%
				Total to Decommission Spring Pointe Lift Station	**$ 46,000**	**$ 46,000**	100%	**$ -**	0%

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	Item	Unit	Unit Price	Quantity	Total Price	City Price	City %	Developer Price	Developer %
10-5.	***Bore under I-15***								
	Install 10" gravity line	LF	$ 400	1700	$ 680,000	$ 680,000	100%	$ -	0%
	Install 24" casing with bore under I-15	LF	$ 2,400	275	$ 660,000	$ 660,000	100%	$ -	0%
				Total	$ 1,340,000	$ 1,340,000	100%	$ -	0%
				Engineering & Admin. (10%)	$ 134,000	$ 134,000	100%	$ -	0%
				Contingency (20%)	$ 268,000	$ 268,000	100%	$ -	0%
				Total to Bore under I-15	**$ 1,742,000**	**$ 1,742,000**	100%	**$ -**	0%
10-6.	***1000 N Bore Underneath Hobble Creek***								
	Install 15" gravity line	LF	$ 480	450	$ 216,000	$ 216,000	100%	$ -	0%
	Bore 30" casing for 15" parallel pipe	LF	$ 3,000	75	$ 225,000	$ 225,000	100%	$ -	0%
				Total	$ 441,000	$ 441,000	100%	$ -	0%
				Engineering & Admin. (10%)	$ 44,100	$ 44,100	100%	$ -	0%
				Contingency (20%)	$ 88,200	$ 88,200	100%	$ -	0%
				Total to 1000 N Bore Underneath Hobble Creek	**$ 573,000**	**$ 573,000**	100%	**$ -**	0%
10-7.	***1500 W Lift Station***								
	Install new 1,500 gpm pump	LS	$ 100,000	1	$ 100,000	$ 100,000	100%	$ -	0%
				Total	$ 100,000	$ 100,000	100%	$ -	0%
				Engineering & Admin. (10%)	$ 10,000	$ 10,000	100%	$ -	0%
				Contingency (20%)	$ 20,000	$ 20,000	100%	$ -	0%
				Total to 1500 W Lift Station	**$ 130,000**	**$ 130,000**	100%	**$ -**	0%
10-8.	***2000 W and 500 N***								
	Install 15" parallel gravity line	LF	$ 480	450	$ 216,000	$ 216,000	100%	$ -	0%
				Total	$ 216,000	$ 216,000	100%	$ -	0%
				Engineering & Admin. (10%)	$ 21,600	$ 21,600	100%	$ -	0%
				Contingency (20%)	$ 43,200	$ 43,200	100%	$ -	0%
				Total to 2000 W and 500 N	**$ 281,000**	**$ 281,000**	100%	**$ -**	0%
10-9.	***800 S Sewer Line***								
	Remove and upgrade sewer to 12" gravity line	LF	$ 440	1900	$ 836,000	$ 836,000	100%	$ -	0%
				Total	$ 836,000	$ 836,000	100%	$ -	0%
				Engineering & Admin. (10%)	$ 83,600	$ 83,600	100%	$ -	0%
				Contingency (20%)	$ 167,200	$ 167,200	100%	$ -	0%
				Total to 800 S Sewer Line	**$ 1,087,000**	**$ 1,087,000**	100%	**$ -**	0%

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	Item	Unit	Unit Price	Quantity	Total Price	City Price	City %	Developer Price	Developer %
10-10.	***950 W Sewer Line***								
	Install 10" gravity line	LF	$ 400	2100	$ 840,000	$ 21,000	2%	$ 819,000	98%
				Total	$ 840,000	$ 21,000	2%	$ 819,000	98%
				Engineering & Admin. (10%)	$ 84,000	$ 2,100	2%	$ 81,900	98%
				Contingency (20%)	$ 168,000	$ 4,200	2%	$ 163,800	98%
				Total to 950 W Sewer Line	**$ 1,092,000**	**$ 27,000**	2%	**$ 1,065,000**	98%
10-11.	***2600 W Sewer Line***								
	Install 12" gravity line	LF	$ 440	1400	$ 616,000	$ 70,000	11%	$ 546,000	89%
	Install 15" gravity line	LF	$ 480	2800	$ 1,344,000	$ 252,000	19%	$ 1,092,000	81%
				Total	$ 1,960,000	$ 322,000	16%	$ 1,638,000	84%
				Engineering & Admin. (10%)	$ 196,000	$ 32,200	16%	$ 163,800	84%
				Contingency (20%)	$ 392,000	$ 64,400	16%	$ 327,600	84%
				Total to 2600 W Sewer Line	**$ 2,548,000**	**$ 419,000**	16%	**$ 2,129,000**	84%
				Total Costs	**$ 21,605,000**	**$ 18,411,000**		**$ 3,194,000**	

Springville City Capital Facility Plan
Wastewater 20-Year Recommended Improvements
Preliminary Engineers Cost Estimates

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	Item	Unit	Unit Price	Quantity	Total Price	City Price	City %	Developer Price	Developer %
20-1.	***1750 W and ~400 N***								
	Replace existing 15" gravity line with 21" gravity line	LF	$ 580	300	$ 174,000	$ 174,000	100%	$ -	0%
				Total	$ 174,000	$ 174,000	100%	$ -	0%
				Engineering & Admin. (10%)	$ 17,400	$ 17,400	100%	$ -	0%
				Contingency (20%)	$ 34,800	$ 34,800	100%	$ -	0%
				Total to 1750 W and ~400 N	**$ 226,000**	**$ 226,000**	100%	**$ -**	0%
20-2.	***1750 W from 1300 S to ~400 S***								
	Replace existing 12" gravity line with 15" gravity line	LF	$ 480	1200	$ 576,000	$ 576,000	100%	$ -	0%
	Replace existing 12" gravity line with 18" gravity line	LF	$ 530	3700	$ 1,961,000	$ 1,961,000	100%	$ -	0%
				Total	$ 2,537,000	$ 2,537,000	100%	$ -	0%
				Engineering & Admin. (10%)	$ 253,700	$ 253,700	100%	$ -	0%
				Contingency (20%)	$ 507,400	$ 507,400	100%	$ -	0%
				Total to 1750 W from 1300 S to ~400 S	**$ 3,298,000**	**$ 3,298,000**	100%	**$ -**	0%
20-3.	***1600 S and 1700 W***								
	Replace existing 12" gravity line with 15" gravity line	LF	$ 480	350	$ 168,000	$ 168,000	100%	$ -	0%
				Total	$ 168,000	$ 168,000	100%	$ -	0%
				Engineering & Admin. (10%)	$ 16,800	$ 16,800	100%	$ -	0%
				Contingency (20%)	$ 33,600	$ 33,600	100%	$ -	0%
				Total to 1600 S and 1700 W	**$ 218,000**	**$ 218,000**	100%	**$ -**	0%
				Total Costs	**$ 3,742,000**	**$ 3,742,000**		**$ -**	

Pipe Unit Costs
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Gravity Pipe Diameter (in)	Unit Cost/LF
6	$ 370.00
8	$ 390.00
10	$ 400.00
12	$ 440.00
15	$ 480.00
18	$ 530.00
21	$ 580.00

Pressurized Force Main (in)	Unit Cost/LF
4	$ 230.00
6	$ 250.00
8	$ 270.00
10	$ 290.00
16	$ 370.00
18	$ 400.00

APPENDIX E

Lakeside Landing Master Plan

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NOTES:
1. SEE PAGE 6 FOR 2600 WEST SEWER CAPACITY CALCULATIONS
2. SEE PAGE 7 FOR 2250 WEST SEWER CAPACITY CALCULATIONS
3. SEE PAGE 8 FOR CENTER STREET AND 400 SOUTH SEWER CAPACITY CALCULATIONS
4. FLOWS AT EACH JUNCTION SHOW THE TOTAL COMBINED FLOWS OF ALL UPSTREAM PIPES AND FLOWS FROM TRIBUTARY AREAS AS SEEN ON EXHIBIT 1

LAKESIDE LANDING SEWER MASTER SCHEMATIC PLAN

SPRINGVILLE, UTAH
10/4/2024
20-0442
EXHIBIT 2

Note: This plan is for illustrative purposes only. Boundaries may be based on parcels obtained through public GIS data. It is recommended that a survey be performed to determine actual boundary size and dimensions as well as other potential boundary conflicts.