Enoch City

WASTEWATER IMPACT FEE FACILITIES PLAN & IMPACT FEE ANALYSIS

June 2017

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1 EXECUTIVE SUMMARY

1.1 Introduction

Enoch City commissioned Sunrise Engineering to create an Impact Fee Facilities Plan and Impact Fee Analysis for the wastewater system. This plan evaluates the existing system and recommends improvements for a 6-year planning horizon and a 20-year planning horizon. Enoch bonded the initial construction of the wastewater system in 1994 with a $3.125M bond. Enoch is a stakeholder in the Cedar City Regional Wastewater Treatment Facility.

1.2 System User Analysis

Enoch City's projected growth rate is expected to increase gradually over the next several years.

- Growth Rate of 1.5% to 5%
    - 2015 Census estimated population was 6,265
    - 2017 estimated population is 6,454
    - 6-year planning horizon estimated population is 7,595
    - 20-year planning horizon estimated population is 14,750
- Commercial Connections are defined as 4.11 Equivalent Residential Units
    - 2017 estimated total ERUs is 2,234
    - 6-year planning horizon estimated total ERUs is 2,628
    - 20-year planning horizon estimated total ERUs is 5,105
- Wastewater Flow Projections are directly proportional to population growth
    - 2016 metered peak flow was 462 gpm
    - 2017 estimated peak flow is 462 gpm
    - 6-year planning horizon estimated peak flow is 544 gpm
    - 20-year planning horizon estimated peak flow is 1,056 gpm

1.3 Wastewater System Facilities

Enoch City maintains a gravity wastewater system that has approximately 49.4 miles of gravity pipe, of which 44.6 miles are active. The system was divided into ten collection basins of similar size according to network connectivity. Enoch constructed one lift station and accompanying gravity collection area and force main. The lift station and force main are not used at the time of publishing this IFFPA. Enoch City conveys wastewater to the Cedar City Regional Wastewater Treatment Facility and pays for treatment based on metered flow through the existing wastewater flow meter.

1.4 System Model

Sunrise Engineering collected field data for the wastewater system to provide required data for the system model. This represents a significant investment for this IFFPA. Collection basins were delineated by following the branches of the system network and dividing the system into similar sized collection basins. The results are ten collection basins shown in Appendix A (Map 2).

Demands for the model were calculated by dividing the peak flow projection for a planning horizon by the number of manholes in the model. The demand used for the existing system model was 0.691 gpm per manhole. The modeling software used to model the system is H2OMAP Sewer® by Innovyze. Model output and results are presented in Appendix C.

1.5 Recommended Improvements

- Wastewater Flow Meters Installation
  - To calibrate wastewater model and validate existing meter data
- Pay off Utah Water Quality General Obligation Bond
  - No impact fees have been used thus far for bond payments
  - Partially impact fee eligible due to excess capacity in design
- Monitor pipe segment that was modeled at capacity
  - A short, flat pipe segment was modeled at capacity (Pipe ID I-41DG-1), near 5400 N Minersville Hwy
- Outfall Line Replacement
  - Nearly half of the pipe segments are projected to be at or beyond capacity in the 20-year planning horizon
- Grimshaw Lane & 5200 N Replacement
  - Five pipe segments are projected to be at or beyond capacity in the 20-year planning horizon
- Update the Impact Fee Facilities Plan and Analysis every five years or as growth patterns dictate

1.6 Financial Viability

An Engineer's Opinion of Probable Cost shows that construction related costs could total $1,440,700 in 2017 dollars, with another $160,000 for Impact Fee Facilities Plan updates.

A city utility must be able to sustain itself financially through monthly user rates and impact fees. User rates cover operations and maintenance and includes existing debt not covered by impact fees. Impact fees are calculated and charged to pay for improvements that are needed because of growth. Impact fees may also pay for portions of debt service if that debt was used to construct a system with "excess capacity".

A user rate based on 2016 audit numbers and engineering judgment was calculated. Engineer's Opinion of Probable Cost values are reflected in the maximum allowable impact fee.

- Existing User Rate - $24.00 per month per ERU
- Existing Impact Fee - $1,900.00 per ERU
- Proposed User Rate - **$24.00** per month per ERU
- Maximum Allowable Impact Fee - **$738.38** per ERU

A cash flow using these proposed rates shows the system's financial viability for the next 20 years is available in Appendix D.

2 INTRODUCTION

2.1 Purpose and Scope

Enoch City commissioned Sunrise Engineering, Inc. to create an Impact Fee Facilities Plan. Also, included in the plan is an Impact Fee Analysis, establishment of a system model, and a User Rate Analysis. The purpose of the study is to provide an Impact Fee Facilities Plan and Analysis (IFFPA) that can be used as a valuable tool by the City for the following:

1. Provide an updated understanding of the key elements of the system including existing gravity network attributes, scope, and collection points.
2. Provide a digital system map for planning and maintenance.
3. Define wastewater collection basins.
4. Develop and quantify peak wastewater flow rates for existing conditions, 6-year planning horizon, and 20-year planning horizon.
5. Create a model of the existing and future wastewater collection system to evaluate capacity and conveyance.
6. Develop an infrastructure plan for recommended improvements for existing conditions, 6-year planning horizon, and 20-year planning horizon.
7. Provide an Engineer's Opinion of Probable Cost for recommended improvements in the 20-year planning horizon.
8. Provide an impact fee analysis and maximum allowable impact fee for new improvements that are needed to accommodate growth within the wastewater system.
9. Provide a user rate analysis and cash flow analysis for financial operations and management of the wastewater system.

The items to be discussed in this master plan will focus on the existing system in 2017 followed by a 6-year (2023) and 20-year (2037) planning horizons. Project costs and impact fee calculations will be based on the 20-year planning horizon. Public input was sought during an open house regarding this project in April 2017 and input was taken from City staff and public comments.

2.2 Background Information

Enoch City is a growing rural community in Iron County, just north of Cedar City. Its current and future economic status benefits heavily from I-15 bordering the City to the east. Enoch City embraces its foundation and pioneer heritage from the 1800's as evident from the City's seal. Growth has been steady for the past few decades, the latest Census estimate from 2015 shows a population of 6,265. This IFFPA equates the 2015 population to 2,168 equivalent residential units (ERUs). Population growth is projected to increase in the coming years, resulting in a population projection in 2037 to be 14,750 residents and 5,105 ERUs.

Previous to 1994, Enoch City was served by individual septic systems for wastewater treatment. In 1994, a $3,125,000 bond provided the City the ability to construct a gravity sewer system to convey wastewater to the Cedar City Regional Wastewater Treatment Facility. Additions to the system have been made to service new development within the City. An initial analysis of the

system as a whole shows that it is in good condition, and should service the community into the near future.

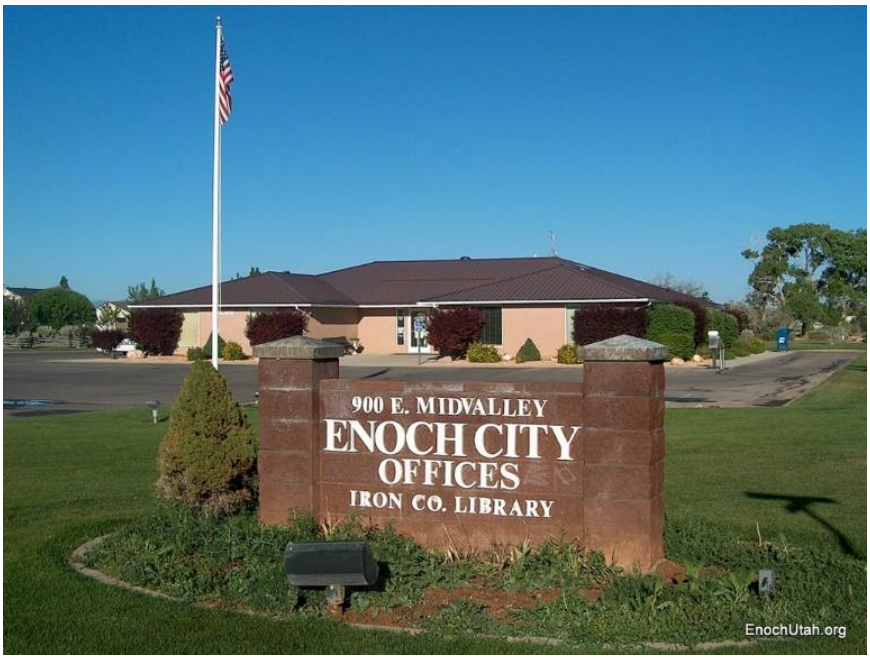


Figure 2-1: Enoch City Offices

3 SYSTEM USER ANALYSIS

3.1 Planning Horizon

The agreement between Sunrise Engineering and Enoch City identified two planning horizons where the model results would dictate recommended improvements. A 6-year planning horizon was established to identify immediate needs for the wastewater system that could be paid for by impact fees per Utah State Code within 6 years of receipt. A longer planning horizon of 20-years was established to identify long term needs for the wastewater system.

3.2 Projected Growth Rate

Table 3-1: Enoch City Historic Growth

Data Type	Year	Population	Annual Growth Rate
Census Est.	2015	6,265	1.5%
Census	2010	5,803	5.3%
Census	2000	3,467	5.9%
Census	1990	1,947	11.1%
Census	1980	678	-

An essential element in the development of a facilities plan is the projection of the City's population growth rate. Projecting the number of future connections with any degree of accuracy can be a very subjective process. This plan uses several resources including Census figures and sewer connection data from the City's billing summaries to evaluate the growth trends and to provide a projection of how growth will occur in the future. Table 3-1 shows historic growth rates based on census counts from 1980 through 2010 and a census estimate from 2015. This data is also available in Appendix B.

It is expected that the number of new connections per year will increase at a moderate rate for the duration of the planning horizons. For this IFFPA and to prepare for the future wastewater requirements it is assumed that 1.5%-5% growth will occur for the next 20 years. If the number of system connections is reached earlier or later than projected, then future improvements to support growth may either come earlier or later as needed. Impact fee revenue is directly related to the assumed growth rates. Table 3-2 shows the projected ERUs, connections, and population growth.

Table 3-2: Population and ERU Growth Projections

Year	Est. Growth Rate	*Estimated Residential ERU's	*Estimated Commercial ERU's	*Estimated Total ERU's	*Estimated Total Conn.	**Estimated Population
2015	-	2,119	49	2,168	2,131	6,265
2016	1.5%	2,151	50	2,201	2,163	6,359
2017	1.5%	2,183	51	2,234	2,195	6,454
2018	1.5%	2,216	52	2,267	2,228	6,551
2019	3.0%	2,282	53	2,335	2,295	6,748
2020	3.0%	2,351	55	2,405	2,364	6,950
2021	3.0%	2,421	56	2,478	2,435	7,159
2022	3.0%	2,494	58	2,552	2,508	7,373
2023	3.0%	2,569	60	2,628	2,583	7,595
2024	3.0%	2,646	62	2,707	2,661	7,822
2025	5.0%	2,778	65	2,843	2,794	8,214
2026	5.0%	2,917	68	2,985	2,933	8,624
2027	5.0%	3,063	71	3,134	3,080	9,055
2028	5.0%	3,216	75	3,291	3,234	9,508
2029	5.0%	3,377	79	3,455	3,396	9,984
2030	5.0%	3,546	83	3,628	3,566	10,483
2031	5.0%	3,723	87	3,810	3,744	11,007
2032	5.0%	3,909	91	4,000	3,931	11,557
2033	5.0%	4,104	96	4,200	4,128	12,135
2034	5.0%	4,310	100	4,410	4,334	12,742
2035	5.0%	4,525	105	4,630	4,551	13,379
2036	5.0%	4,751	111	4,862	4,778	14,048
2037	5.0%	4,989	116	5,105	5,017	14,750

* Estimated ERU's and Connections are based on City billing data.

** Estimated Population is based on the 2015 census data and the projected growth rates.

The number of future wastewater connections and future population estimates are calculated using the compound interest formula and inserting the existing population value, projected growth rate, and the number of years of each planning horizon.

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

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

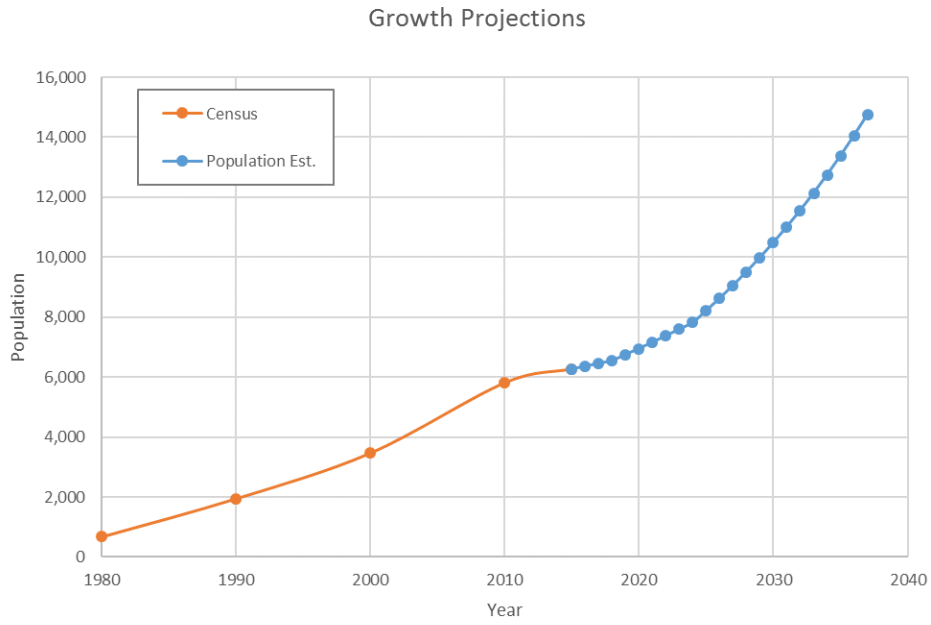


Figure 3-1: Growth Projections

3.3 Equivalent Residential Units

Each residential connection is defined as 1 ERU. Each commercial connection is defined as 4.11 ERUs. This number was calculated in the previous Water Capital Facilities Plan. The data required to recalculate this value was not provided. This means that the average commercial connection produces more wastewater than the average residential connection. The system should be designed for the total number of ERUs that convey wastewater to the system.

Table 3-3: Planning Horizon ERU Calculation Summary

Planning Horizon	Year	Estimated Residential ERU's	Estimated Commercial ERU's	Estimated Total ERU's
-	2017	2,183	51	2,234
6-Year	2023	2,569	60	2,628
20-Year	2037	4,989	116	5,105

The total number of ERUs for 2017 and each planning horizon is summarized in Table 3-3.

3.4 Wastewater Flow Projections

Enoch provided wastewater flow data from the existing flow meter which consisted of a time-date value and a measured flow value. The flow summary in Table 3-4 shows pertinent statistical information for each year that the provided meter data was collected.

Table 3-4: Flow Meter Data Summary

Year	Max Flow [gpm]	Min Flow [gpm]	Average Flow [gpm]	Total Flow [mgal]
2014	462	16	161.7	84.57
2015	462	14	165.5	86.70
2016	462	18	173.5	91.22

Maximum flow data, or peak flows were used in projecting the flows in the model because a wastewater system is expected to function properly during peak flows. Peak flow projections were proportionally based on ERU growth. For example, it was assumed that the 2017 population would produce the same peak flow as 2016, the 6-year planning horizon peak flow would be 543.6 gpm. Figure 3-2 shows the projections of the peak flows from 2017 through the 20-year planning horizon.

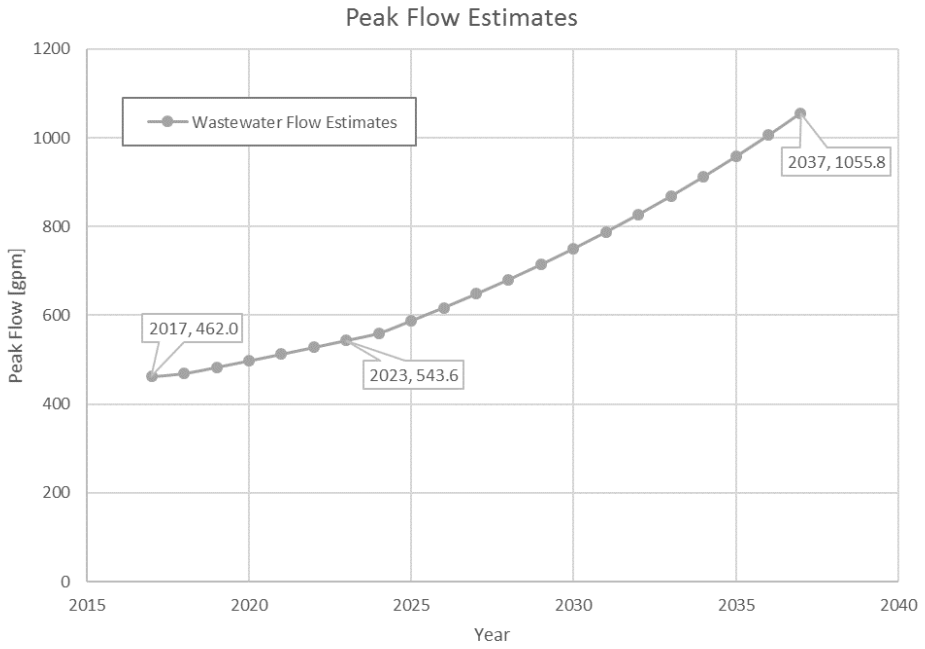


Figure 3-2: Peak Wastewater Flow Projections

The entirety of the flow meter data is shown in Figure 3-3. While the average flow does increase slightly, the maximum flow for each year is the same. It was observed that there are multiple maximum flow data points each year. Also, it is evident that the flow meter was not operational for periods of time during 2015. A variation of the flow meter data figure as well as tables documenting all peak flow data points are shown in Appendix B.

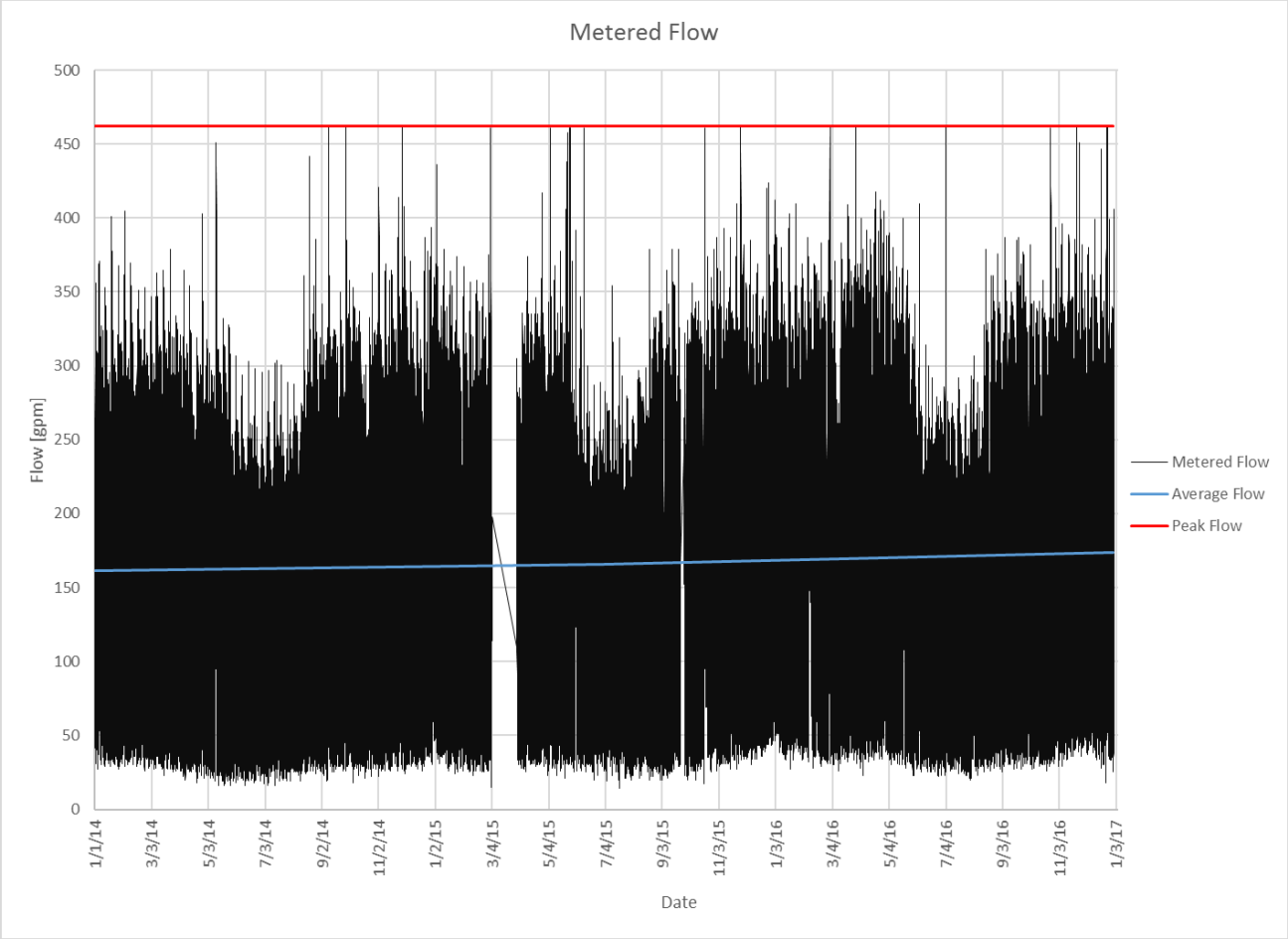


Figure 3-3: Flow Meter Data

4 WASTEWATER SYSTEM FACILITIES

4.1 Gravity Pipe Network

Wastewater collection systems are generally made up of a network of discharge and flow lines, drains, inlets, valve works and connections for transporting domestic and industrial wastewater flows to regional treatment facilities. The most obvious component of any wastewater system is the gravity collection pipe network. Flow through gradually sloping gravity wastewater pipes is the most cost effective and desirable means of moving wastewater effluent since pumping energy is not required. See Appendix A (Map 1 & 1a) for a visual representation of the existing wastewater gravity pipe network.

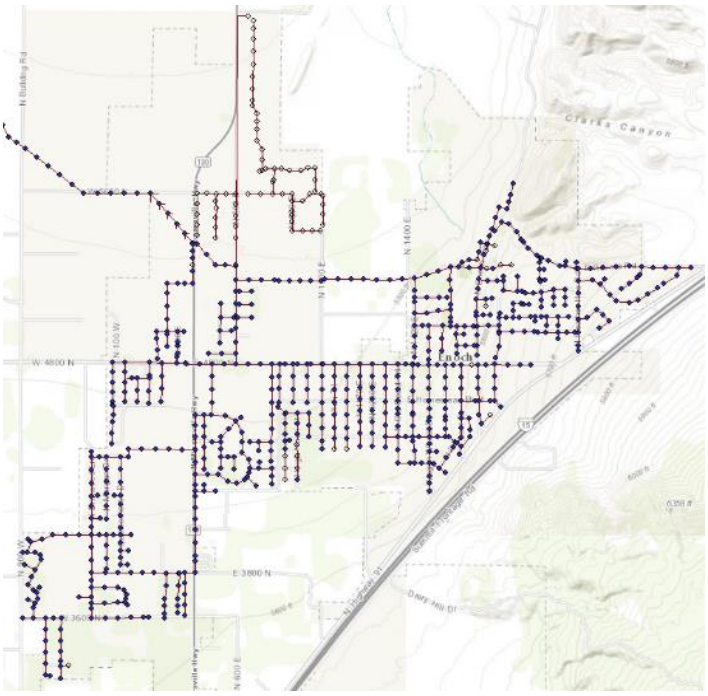


Figure 4-1: Existing Wastewater System

A summary of the active system pipe sizes and pipe lengths are given in Table 4-1.

Table 4-1: Gravity Pipe Summary

Pipe Diameter [in]	Total Length [mi]
8	35.5
10	1.1
12	2.6
15	1.5
18	4.0
TOTAL	**44.6**

4.2 Collection Basins

Wastewater collection basins are developed by planning and the established system network. These areas are best established in the planning stages to better anticipate system improvement needs and to evaluate system health. While the basin delineation did not have any effect on the model via system demands or otherwise, they do factor into proposed recommendations. See Appendix A (Map 2) for a visual representation of the existing wastewater collection basins. The City has ten collection basins.

4.3 Force Mains & Lift Stations

In locations where topography, density of existing utilities, lack of adequate rights-of-way or other circumstances limit the continuation of a gravity wastewater system, it becomes necessary to construct pressurized force mains to route wastewater over or around the existing obstacles. Force mains are associated with wastewater lift stations; the two are normally designed in conjunction with one another. Because of the perpetual pumping energy required to operate lift stations, these facilities are normally avoided if possible.

Enoch City constructed a force main and accompanying lift station in the northern section of the City that is lower in elevation compared to the existing gravity system. The development within the service area of the lift station has ceased because of unstable ground conditions. Development is not assumed to resume in this area. The lift station and force main remain unused.

4.4 City Wastewater Treatment Systems

Enoch City does not operate its own wastewater treatment plant, but are stakeholders in the Cedar City Regional Wastewater Treatment Facility (CCRWTF). A monthly fee based on metered flow is paid to fund Enoch's portion of the facility operation costs. It is not recommended that Enoch City construct and operate their own treatment plant.

4.5 Wastewater Metered Flow Rate

An existing meter is located in the middle of the outfall line, outside of the City limits. The meter takes a measurement of the flow every 15 minutes. More meters throughout the wastewater system would allow for the model to be calibrated and would double check the existing meter data measurements. The peak flow measured by the existing meter is 462 gpm and was measured multiple times each year from 2014-2016. The data from the meter was presented in Figure 3-3.

5 SYSTEM MODEL

5.1 Field Collection

To accurately model the wastewater system, field measurements were collected for each manhole and pipe. Each manhole rim elevation was recorded with survey grade GPS equipment. Then the depth to the flow, or invert elevation was measured. The diameter of the pipe was verified at the same time as the invert elevation measurement. These critical parameter values were included in the GIS data of the wastewater system. This field collected data was critical for the creation and accurate function of the model.

5.2 Demand Calculations

The demands for the model were based on metered flow provided by the City. After evaluating meter flow data from 2014-2016, the peak flow of 462 gpm was used to model the system under existing conditions.

Existing flow demands were calculated by dividing the peak flow by the number of manholes in the area contributing to the flow. The demand per manhole for the existing system is calculated:

$$462\ gpm \div 669\ manholes = 0.691\ gpm/mh$$

Future flow demands were based on the peak flow projections in Figure 3-2. New gravity pipe and new manholes were modeled for each planning horizon so future demands could be inserted into the model. These new network branches are for modeling purposes only and are not intended to be a design of the future wastewater network. Model demands for each planning horizon are shown in Table 5-1 and Appendix B.

Table 5-1: Model Demand Calculations

Date	Total Peak Flow [gpm]	No. Existing MH	No. Future 6-yr MH	No. Future 20-yr MH	Demand per Existing MH	Demand Per Future 6-yr MH	Demand Per Future 20-yr MH
2017	462.00	669	0	0	0.691	0.000	0.000
2023	543.62	669	17	0	0.760	2.065	0.000
2037	1055.83	669	17	31	1.140	3.098	7.750

5.3 Basin Delineation

Wastewater collection basins are determined or delineated by the network. The area that is serviced by a particular pipe can be regarded as a collection basin. Enoch City was divided into ten basins of similar size based on the connectivity and flow of wastewater through the gravity pipes. The basins help sub-divide the network for organizing recommendations and to calibrate the system model. These basins were used to determine ideal locations for proposed wastewater flow meters. See Appendix A (Map 2) for the basin delineation results.

5.4 Computer Model

The modeling software used to model the system is H2OMAP Sewer® by Innovyze. The wastewater model is a numerical model with a spatially representative viewer for data input and output. GIS data collected by Sunrise Engineering was processed in a GIS format to allow a more streamlined import into the model. Elevations, lengths, connecting nodes or manholes, and any other information required of the model was calculated as attributes to pipe and manhole objects in GIS.

Design criteria entered into the computer model assumes that the pipe system will flow at 2/3 full capacity and the Manning's roughness was set at 0.013. The wastewater modeling software is shown in Figure 5-1.

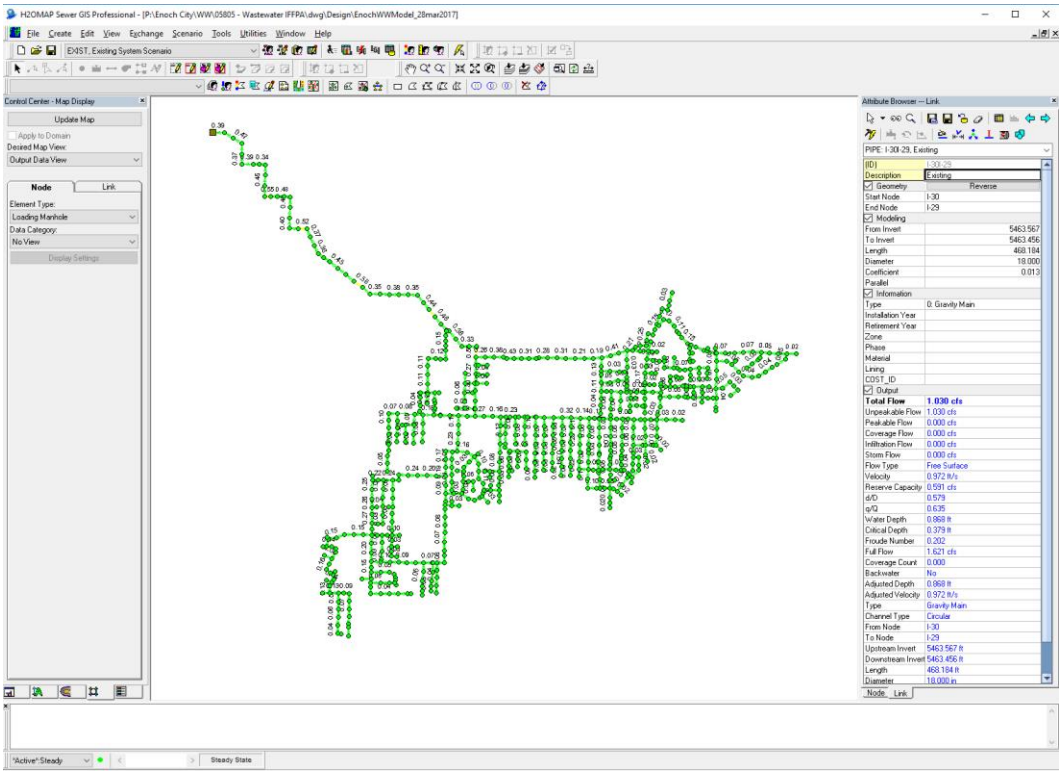


Figure 5-1: Wastewater Modeling Environment

6 RECOMMENDED IMPROVEMENTS

6.1 Assumptions

Recommended improvements have been made with several assumptions. It is assumed that a pipe has reached capacity when the depth of flow in the pipe is two-thirds (66.7%) full, which represents a pipe at 80% of its flow capacity. Figure 6-1 shows this relationship with the assumed depth of 66.7% of the pipe diameter. Recommendations will be to replace existing pipes with ones of a larger size. Another option to increase system capacity is to construct a parallel pipe side-by-side to the existing pipe, however, this was not chosen as the course of action for recommended pipe improvements.

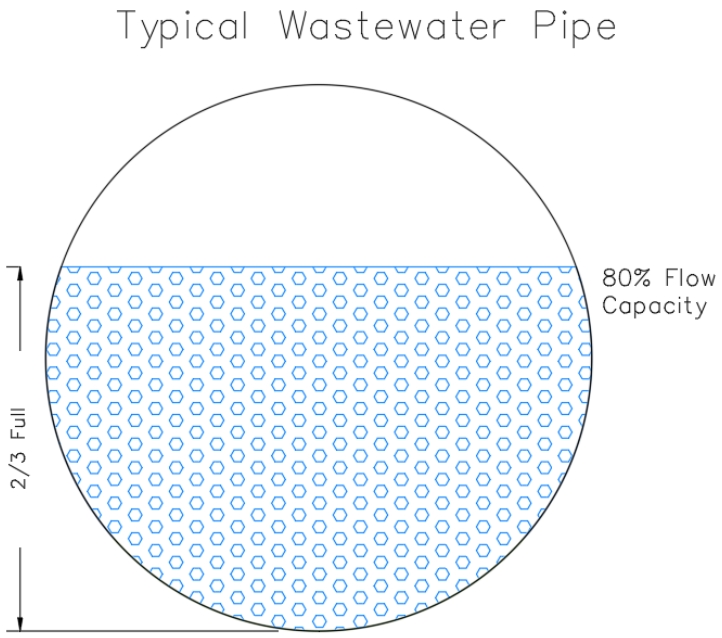


Figure 6-1: Flow Depth vs. Flow Capacity Representation

The following sub-sections illustrate the replacement of gravity wastewater lines and their location as part of the wastewater network and provide a more detailed explanation of each improvement recommended for each planning horizon. It should be noted that the shown location of each line or facility is conceptual only. Actual development and real site conditions may require improvements to be constructed in alternate locations or include adjacent pipes and manholes.

6.2 0-6 Year Recommended Improvements

The modeling work completed on the distribution system and the flow data provided by Enoch City have identified several deficiencies that should be remedied. Recommendations to address these deficiencies are summarized below. A map outlining these improvements is included in Appendix A (Map 3).

- Install Wastewater Flow Meters – These meters are to be installed at basin outlets to measure the flow at critical locations and verify the data from the existing meter on the outfall line.
- Verify Pipe Capacity in Pipe ID I-41DG-1 – The model results show this pipe to be at capacity because the slope of the pipe is flat. It is located near 5400 N Minersville Hwy. It is recommended that the City monitor the depth of flow through this pipe then replace it when the outfall line replacement project commences.
- Pay off the 1994 General Obligation Bond – Use impact fees to pay off the bond used to construct the original wastewater system. The City has not used impact fees to pay for this bond, yet it is impact fee eligible. The validation is presented in Section 7.3 but is included here to have a complete set of recommendations.
- Update this IFFPA – A plan update should occur every five years to maintain current impact fees and update the impact fee facilities plan or as growth dictates.

6.3 6-20 Year Recommended Improvements

Modeling work for the 20-year planning horizon has identified deficiencies that should be planned for according to future development. Recommendations to address these deficiencies are summarized below. A map outlining these improvements is included in Appendix A (Map 3).

- Outfall Line Replacement Project – Approximately half of the pipe segments on the outfall line are shown to be at capacity. It is assumed that only the deficient pipes will be replaced for the sake of opinions of probable costs and project phasing. The first pipe to be at capacity is estimated to occur in the year 2024. It may be best to break this project up into smaller projects by phasing the replacement of the capacity pipe segments.
- Grimshaw Lane & 5200 N Replacement Project – Five pipe segments are shown to be at capacity throughout the rest of the City. These five pipes are in Grimshaw Lane and 5200 N, near the outfall line. These pipes are shown at capacity because of the increased demand to the system and shallow slopes.
- Update this IFFPA – A plan update should occur every five years to maintain current impact fees and update the impact fee facilities plan or as growth dictates.

7 FINANCIAL VIABILITY

7.1 Project Phasing

Recommended improvements were given a time frame in which the projects are expected to be needed based on growth projections, localized growth, and available impact fee funds as shown in the cash flow. Table 7-1 shows the recommended improvement projects with the estimated year of construction.

Table 7-1: Project Construction Phasing

Project Name	Year
Wastewater Flow Meters	2017
Outfall Line Replacement	2025
Grimshaw Lane & 5200 N Replacement	2032
Impact Fee Facilities Plan Updates	2022, 2027, 2032, 2037

In all cases, the improvements are planned to support continuing growth within the next twenty years and are planned for implementation at times when the growing population base can theoretically generate enough revenue to fund the projects. It should be noted that growth in the study area may occur at a rate faster or slower than that predicted in the cash flow analysis. If growth occurs at a faster rate, more funds will be available to construct the projects at an earlier schedule than that specified by the phasing projections. On the other hand, if growth slows more than expected, implementation of the projects should be delayed until the population base can fund the improvements.

7.2 Opinion of Probable Cost

An Engineer's Opinion of Probable Cost (EOPC) has been prepared outlining the anticipated project costs of all recommended improvements. The proposed improvements have taken into consideration the projected demands on the system throughout the duration of the 20-year planning horizon and are expected to take the system beyond this planning horizon.

Included in the EOPC are anticipated construction costs, a contingency budget, and budgets for other typical project costs such as survey, administration, engineering, legal services, fiscal costs, permitting, GIS conversion, etc. The EOPC is organized into separate projects with itemized costs. Professional Services and Incidentals as described above are to be shared by each project.

The total opinion of probable cost for all projects in 2017 dollars is approximately $1,600,700. See Appendix D for the EOPC of all projects.

7.3 Existing Impact Fee Analysis

Enoch City currently charges a wastewater system impact fee of $1,900 per residential connection or ERU. Enoch has significant debt in the form of a USDA General Obligation Bond

($3.125M), from the initial construction of the sewer system in 1994. Utah's Impact Fee Law allows the City to charge impact fees for "excess capacity" designed and built into the existing system.

Assuming a thirty-year life of the system (which results in a conservative analysis) the additional ERUs shown in Table 7-2 between 1994 and 2024 should pay for a portion of the wastewater system bond costs. Using the same demands per ERU as calculated for the model, demands for the City in 1994 were calculated and inserted into the model. Figure 7-1 shows the flow depth and volume capacity of a typical pipe segment from the outfall line in 1994 and at capacity. Therefore the system was designed with excess capacity.

Table 7-2: USDA Bond Impact Fee Eligible Calculation

Year	Est. ERUs
1994	865
2024	2680
% IF Eligible	67.7%

The General Obligation Bond is calculated to be 67.7% impact fee eligible. This means that 68.0% of the estimated 2,680 ERUs in 2024 came in after initial construction of the wastewater system and should pay 67.7% of the associated costs.

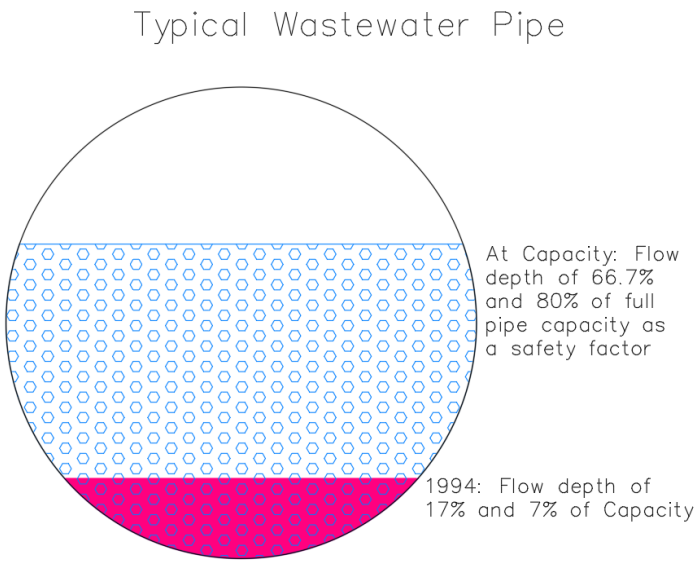


Figure 7-1: Excess Capacity Representation

The impact fee eligible portion of the $3.125M bond is $2.125M. As Enoch City has not used impact fees to pay for the bond in the past, it is recommended that Enoch pay off the bond in the next fiscal year as it has impact fee funds sufficient to cover the remainder of the bond. The remaining amount of the bond is approximately $1.08M.

It's apparent that the 1994 bond amount was used for construction of a new wastewater system for the City. For this study it was assumed that the entire bond amount was the actual cost of all improvements. It may be in the best interest of the City to verify actual costs prior to paying off the bond.

7.4 Proposed Impact Fee Analysis

A proposed impact fee was calculated based on the EOPC, estimated construction year, inflation, and impact fee eligibility. One project is partially impact fee eligible. The Outfall Line Replacement Project impact fee eligibility was calculated by subtracting the cost associated to replace the one pipe segment that is at capacity from the project's total costs. This calculation resulted in an impact fee eligible amount of 99.1%. Proposed impact fee calculations are shown in Table 7-3.

Table 7-3: Impact Fee Calculation

Project Name	Probable Project Cost	Year	Inflated Costs (3.0%)	% Impact Fee Eligible	Impact Fee Eligible Costs
Wastewater Flow Meters	$ 71,300	2017	$ 71,300	100.0%	$ 71,300
Outfall Line Replacement	$ 1,056,444	2025	$ 1,338,271	99.1%	$ 1,326,389
Grimshaw Lane & 5200 N Replacement	$ 312,911	2032	$ 487,504	100.0%	$ 487,504
Impact Fee Facilities Plan Updates	$ 160,000	2022, 2027, 2032, 2037	$ 234,691	100.0%	$ 234,691
				Total Impact Fee Eligible	$ 2,119,884
				New ERUs	2,871
				Impact Fee Amount	**$ 738.38**

The maximum allowable impact fee for the wastewater system is **$738.38**. This was calculated by multiplying the inflated probable costs by the impact fee eligible percentage and then dividing that total impact fee eligible cost by the number of new ERUs to the system in the 20-year planning horizon.

7.5 User Rate Analysis

The existing monthly user rate for wastewater services is $24.00 per ERU. A new user rate was calculated by adding annual operating expenses of the system and existing debt service then dividing the total expenses amount by the number of ERUs currently serviced by the system. Values from the 2016 City audit, 2017 budget, and engineering judgment were used to achieve final values for salaries, materials, and capital expenses shown in the user rate analysis.

The 2016 audit also shows that the Sewer Revenue Bond, financed through USDA has an annual payment of $22,140 that must be paid for by user fees because it is not impact fee eligible. This is included in the existing debt service section of the analysis.

The total annual expenses based on the 2016 audit, 2017 budget, and engineering judgment

Table 7-4: User Rate Analysis

OPERATING EXPENSES		
Salaries, Wages, and Benefits	$	203,500
Materials, Supplies, and Services	$	188,300
Capital Expenses	$	220,000
Total	**$**	**611,800**
EXISTING DEBT SERVICE		
Utah Water Quality Bond (1994; $3,125,000; 0%)	$	-
USDA-RD Bond (1997; $375,000; 5.125%)	$	22,140.00
Estimated Percentage Not Impact Fee Eligible		100%
	$	**22,140.00**
NEW DEBT SERVICE		
Bond A	$	-
Reserve for Bond A	$	-
Estimated Percentage Not Impact Fee Eligible		0%
	$	-
GRAND TOTAL EXPENSES	**$**	**633,940**
ANNUAL INCOME		
Total Number of ERUs (2017)		**2,201**
Average Monthly Wastewater User Rate/ERU	**$**	**24.00**

summed to $633,940. Dividing this value by the number of ERUs estimated in 2017 and dividing that annual payment by 12 into a monthly payment results in an average monthly wastewater user rate of **$24.00**.

7.6 Cash Flow Analysis

A wastewater utility cash flow analysis for a 20-year planning horizon was completed to show how the 20-year planning horizon improvement projects could be implemented, to analyze the continued viability of proposed user rates, and to show possible trends in impact fee and cash fund balances. Initial data for the cash flow analysis was taken from fiscal years 2012-2016 Enoch City audits. Values projected through the analysis are based on growth, interest, and inflation trends determined during the process of the study. It should be noted that the analysis is a general forecast only and will vary with the speed and pattern of development in the City. The entire cash flow analysis printout is given in Appendix D.

The upper section of the cash flow printout, entitled “Wastewater System Data”, contains the basic data upon which many of the values in the cash flow spreadsheet are generated. Of note are the projected population growth trends, the assumed inflation rates, user rates, impact fees and inspection fees, and the projected ERU quantities for the coming fiscal years. Most of the revenue and expense increases in later parts of the cash flow spreadsheet are generated from the impact fees, rates, and ERU values based on the assumed growth and inflation rates.

The next section of the cash flow spreadsheet is the utilities revenues section. This section seeks to quantify all revenues generated by the utility, whether through impact fees, user rate assessments, interest earned on deposited funds, etc.

The following section is the utility expenses section which seeks to quantify all the expenses incurred by the wastewater utility. Included in the expenses section are the operation and maintenance costs, existing debt service costs and new debt service costs. The difference between the total revenues and total expenses is the net cash flow for the utility.

Total revenues and total expenses are then broken down into impact fee and cash fund categories. This was done to help show adequate funds would be available over the course of the projection period.

Included at the end of the cash flow analysis is a system improvement implementation schedule for the next twenty years which shows how the IFFPA improvement projects were incorporated into the cash flow analysis.

7.7 Impact Fee Related Items

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

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

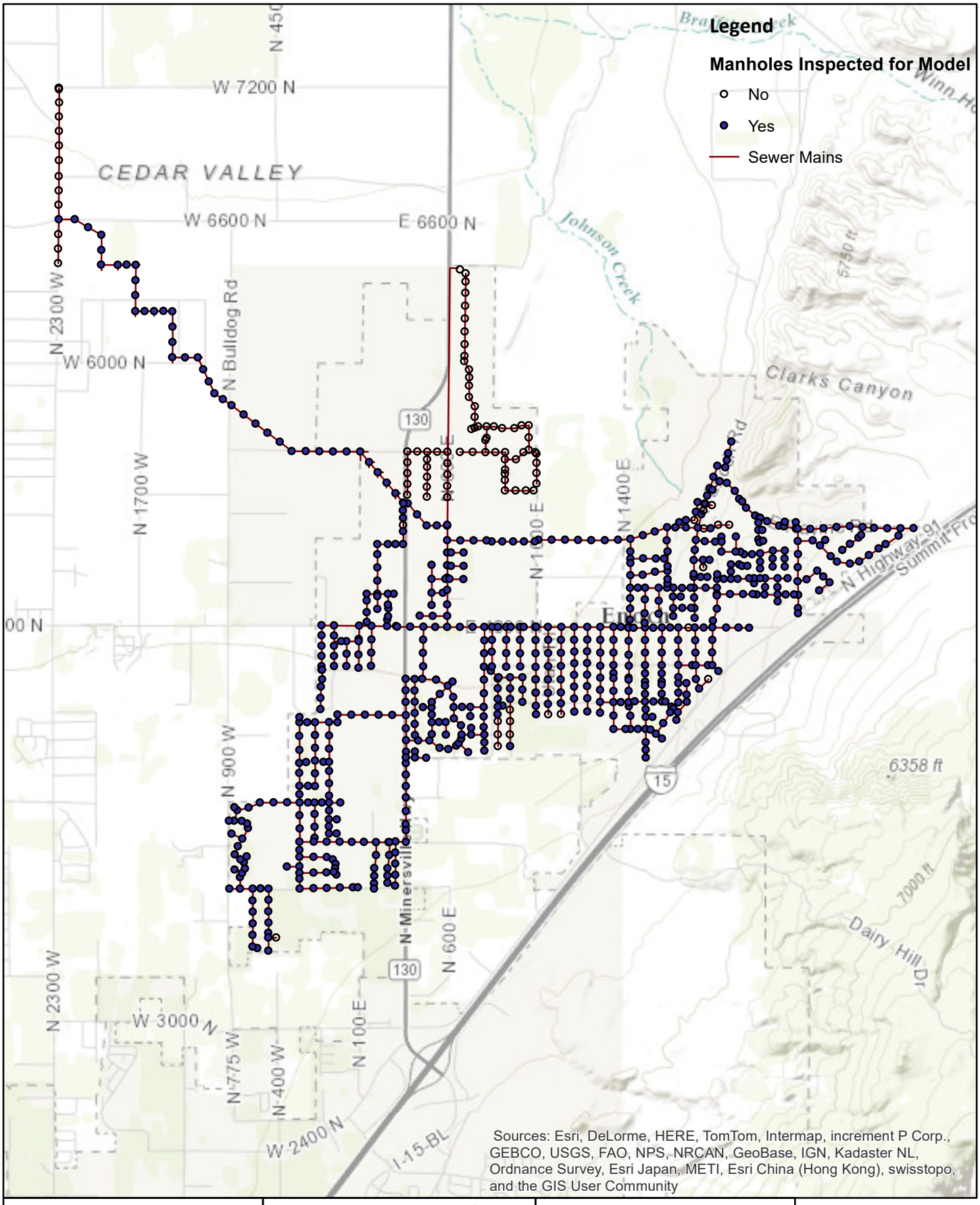
City staff must understand that impact fees can only be expended for a system improvement that is identified in the Impact Fee Facilities Plan and that it is for the specific facility type for which the fee was collected. Impact fees must be expended or encumbered for a permissible use within six years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

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

APPENDIX A

Maps

Map 1	Existing Facilities
Map 1a	Existing Facilities Detailed Map
Map 2	Model Results by Basin
Map 3	Proposed Facilities



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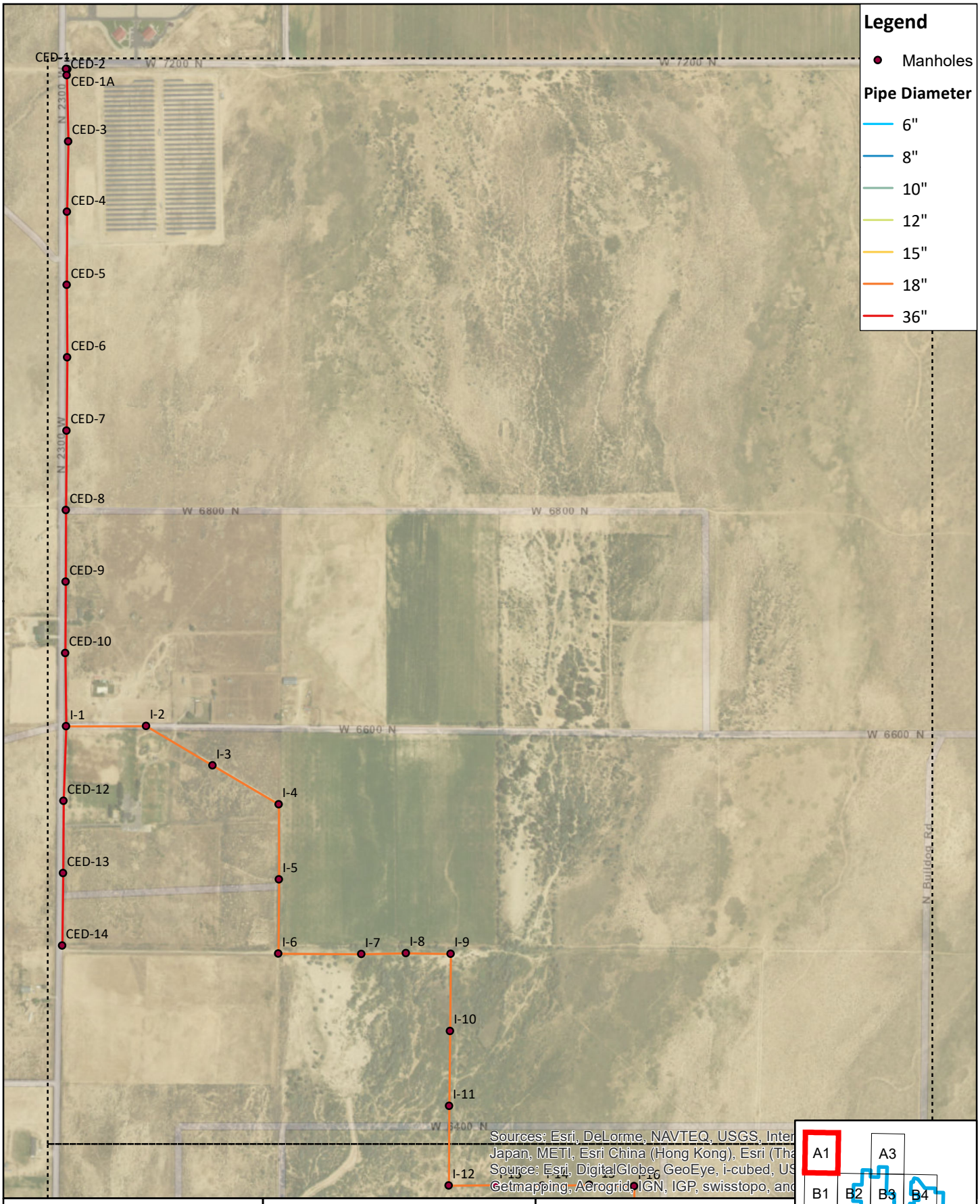
ENOCH CITY

SUNRISE ENGINEERING

WASTEWATER IMPACT FEE FACILITIES PLAN

EXISTING FACILITIES

Map 1



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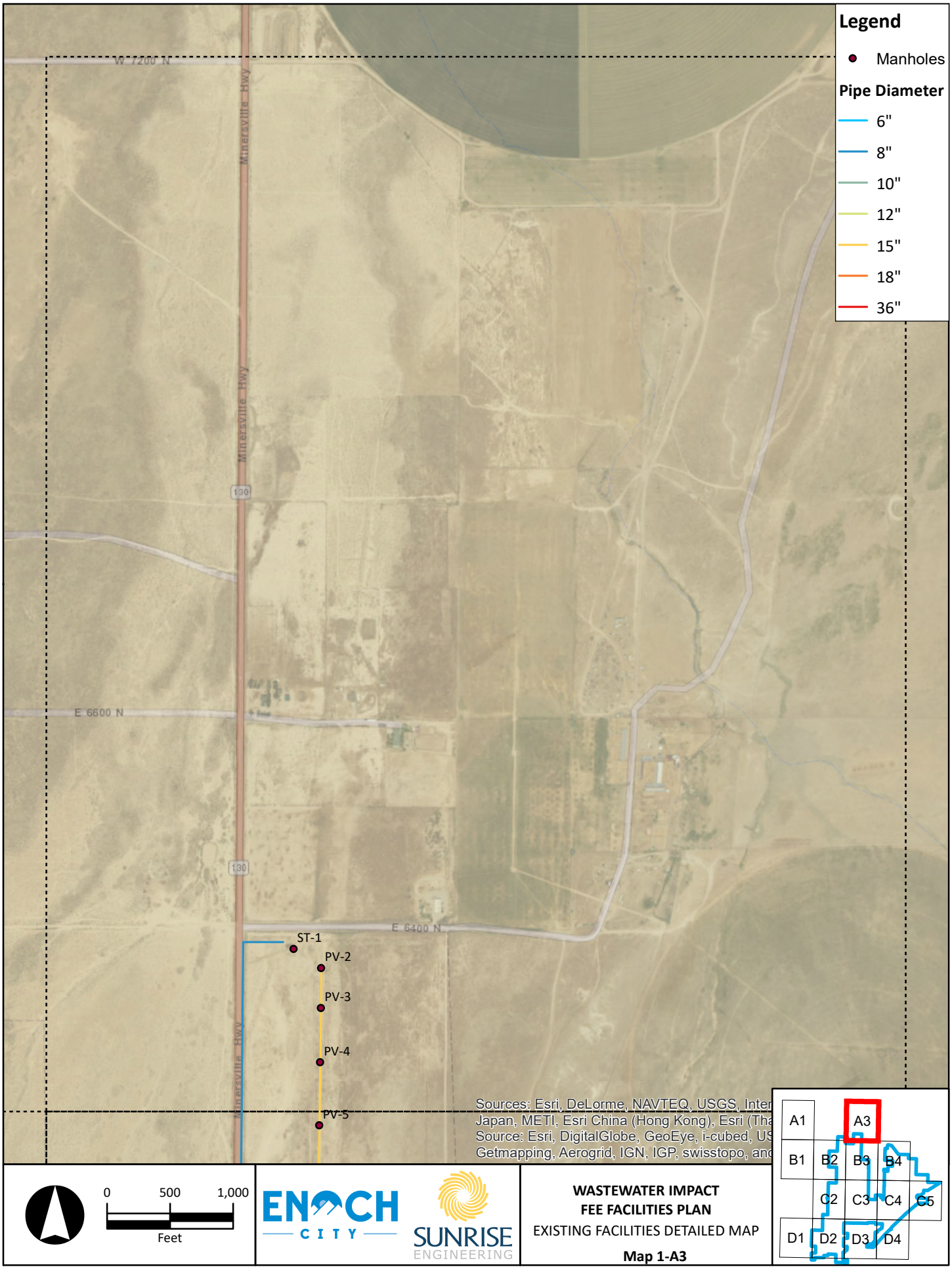
ENOCH CITY

SUNRISE ENGINEERING

WASTEWATER IMPACT FEE FACILITIES PLAN

EXISTING FACILITIES DETAILED MAP

Map 1-A1



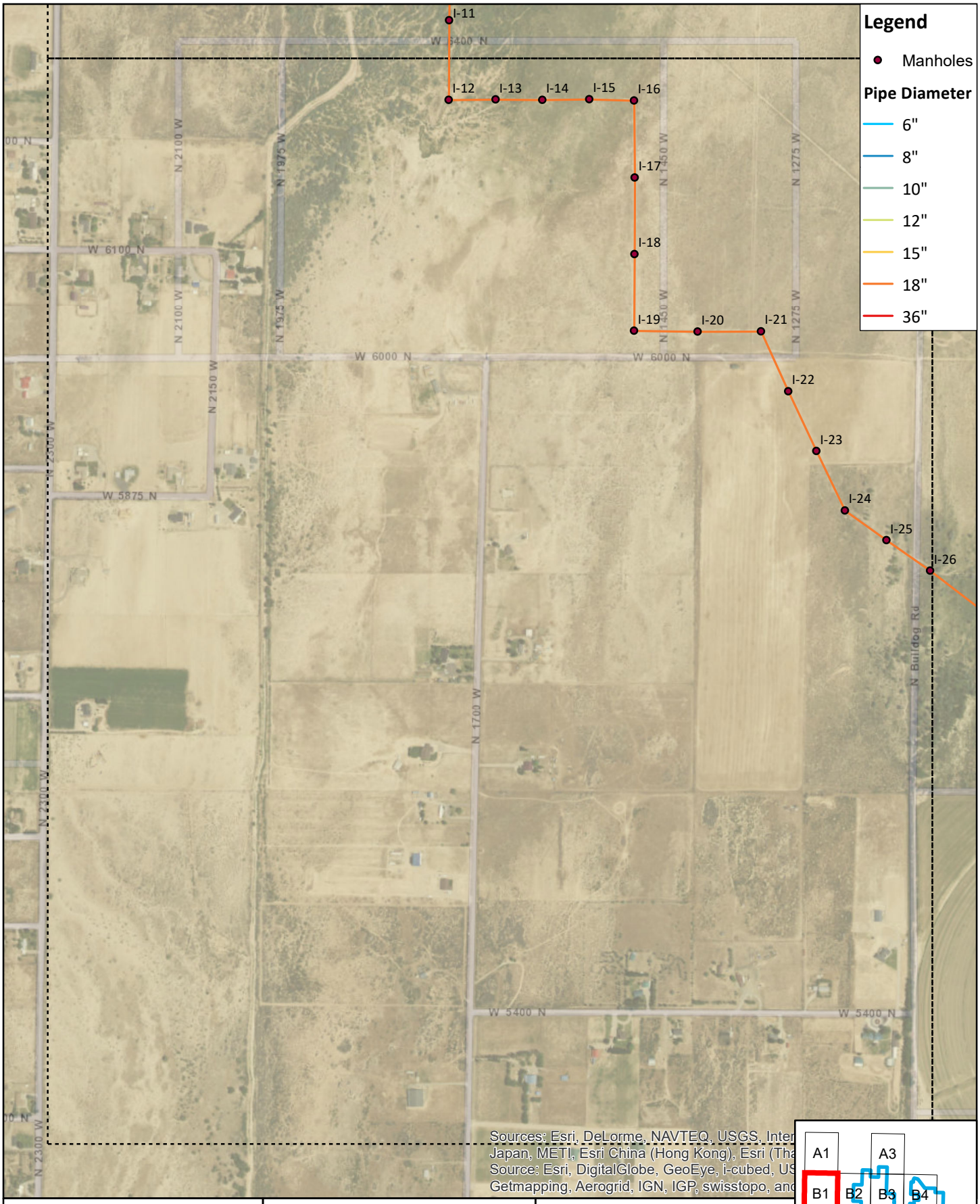
ENOCH CITY

SUNRISE ENGINEERING

WASTEWATER IMPACT FEE FACILITIES PLAN

EXISTING FACILITIES DETAILED MAP

Map 1-A3



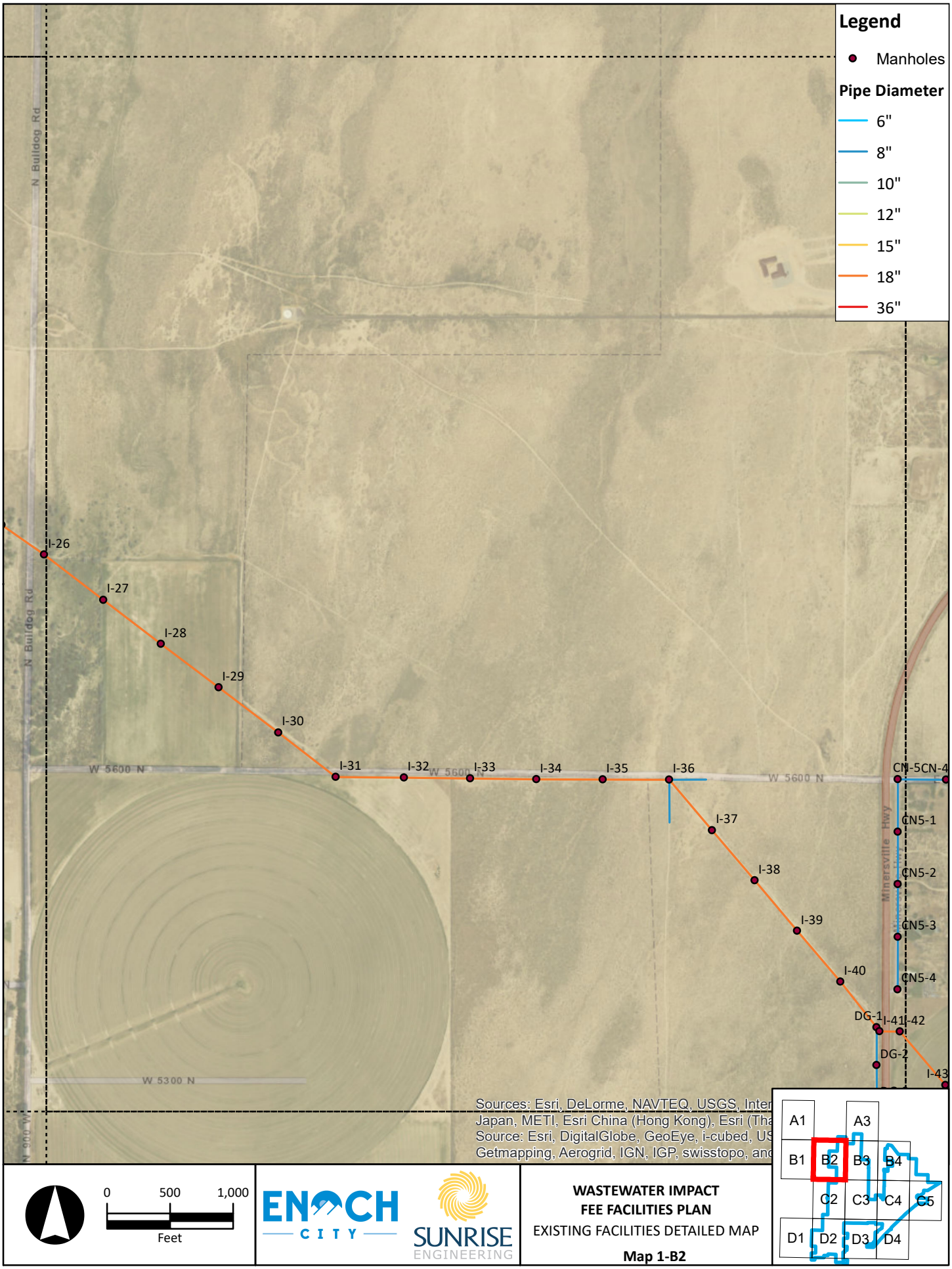
ENOCH CITY

SUNRISE ENGINEERING

WASTEWATER IMPACT FEE FACILITIES PLAN

EXISTING FACILITIES DETAILED MAP

Map 1-B1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Source: Esri, DigitalGlobe, GeoEye, i-cubed, US
Getmapping, Aerogrid, IGN, IGP, swisstopo, and
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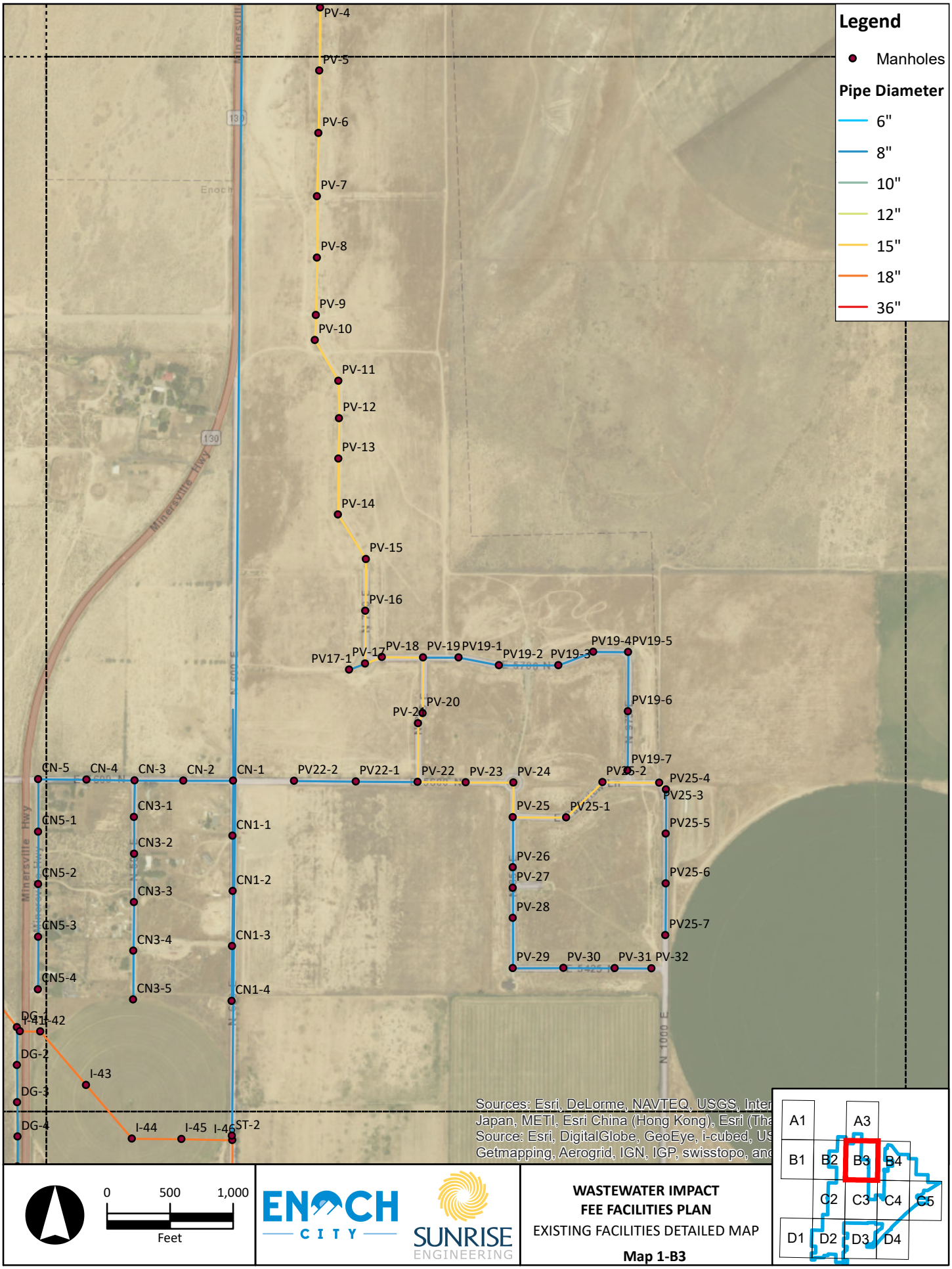
SUNRISE ENGINEERING
WASTEWATER IMPACT FEE FACILITIES PLAN
EXISTING FACILITIES DETAILED MAP
Map 1-B2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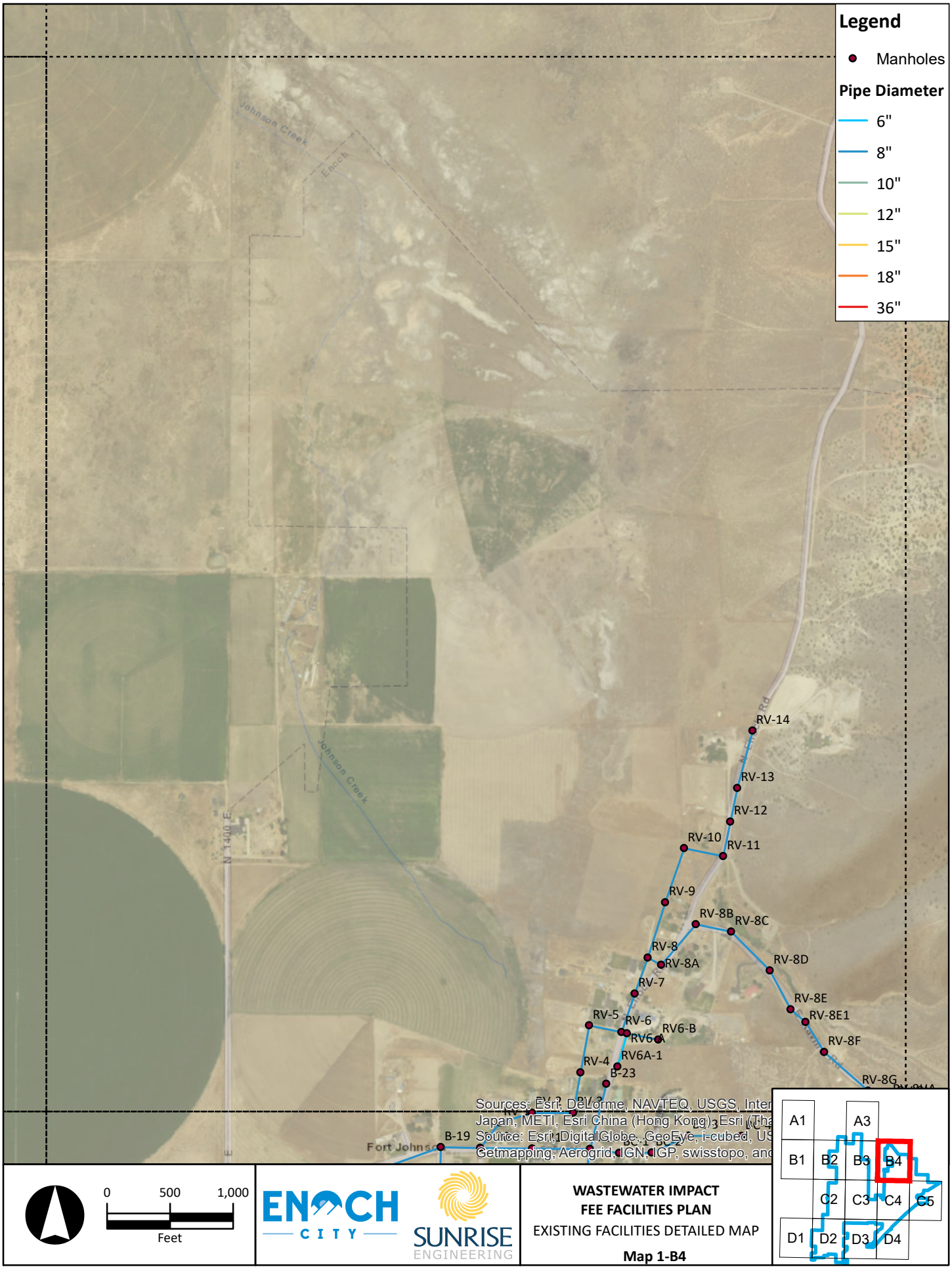
SUNRISE ENGINEERING
WASTEWATER IMPACT
FEE FACILITIES PLAN
EXISTING FACILITIES DETAILED MAP
Map 1-B3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WASTEWATER IMPACT
FEE FACILITIES PLAN
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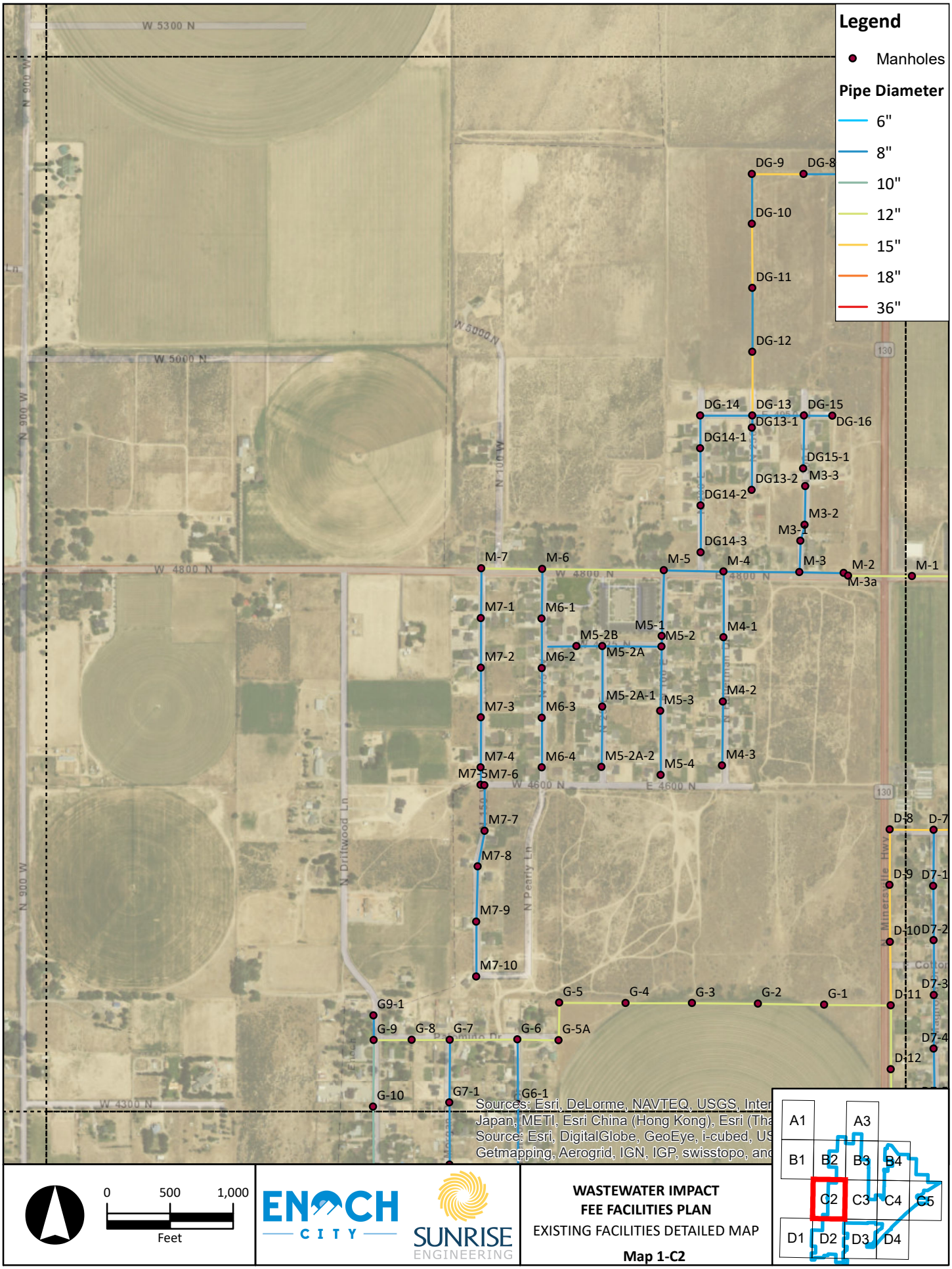
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Getmapping, Aerogrid, IGN, IGP, swisstopo, and
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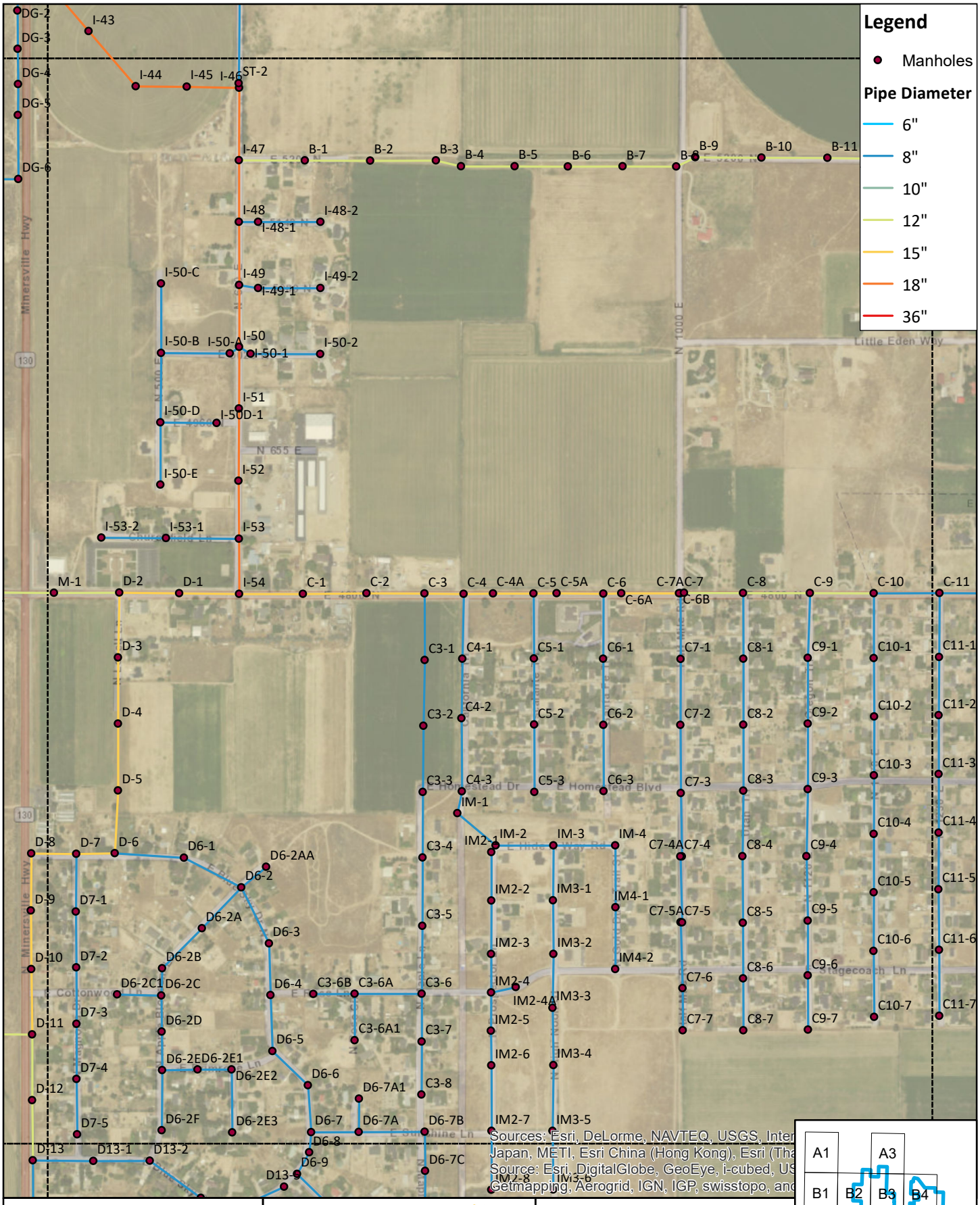
WASTEWATER IMPACT
FEE FACILITIES PLAN
EXISTING FACILITIES DETAILED MAP
Map 1-C2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Sources: Esri, DeLorme, NAVTEQ, USGS, Inter
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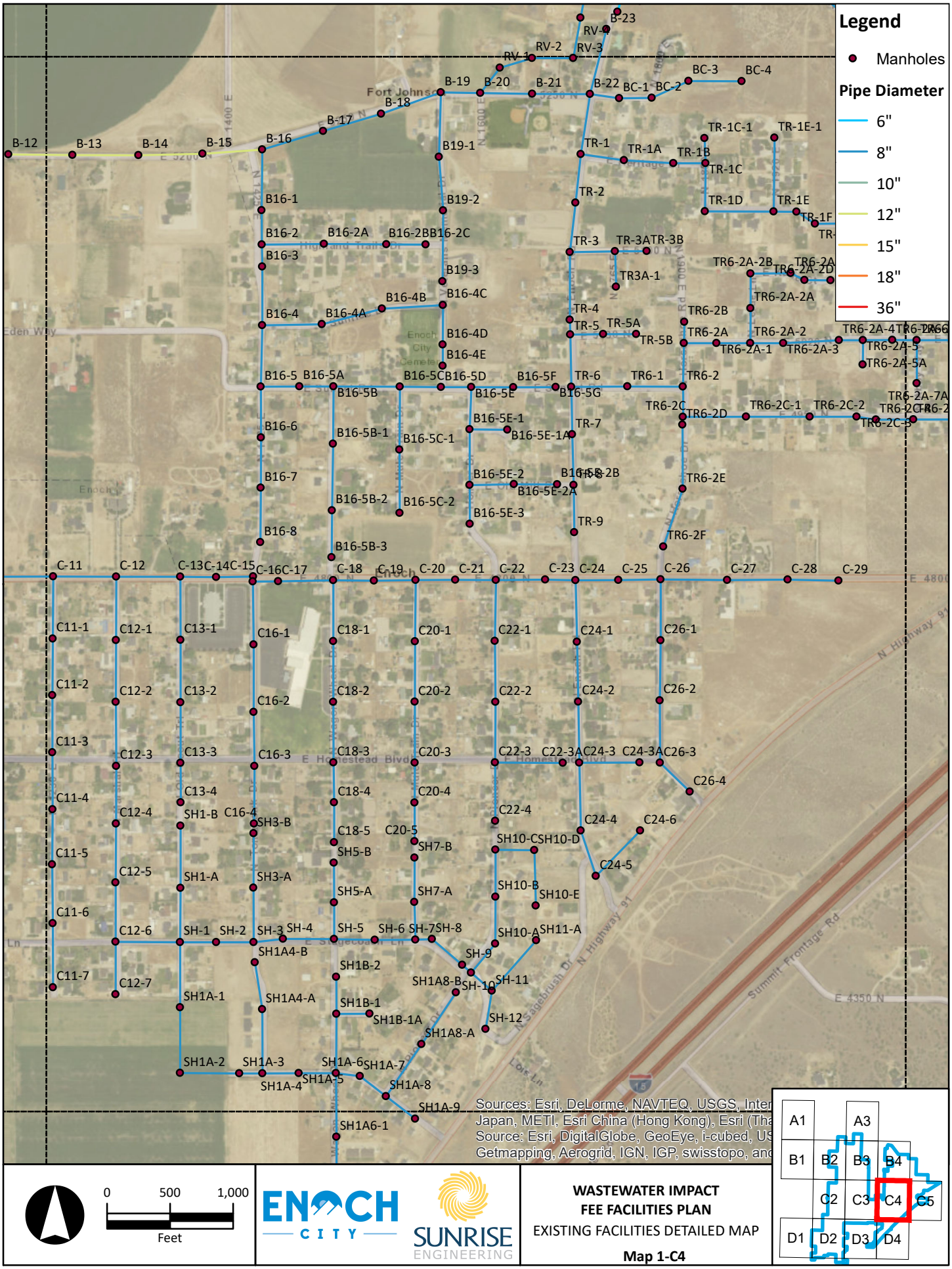
SUNRISE ENGINEERING
WASTEWATER IMPACT
FEE FACILITIES PLAN
EXISTING FACILITIES DETAILED MAP
Map 1-C3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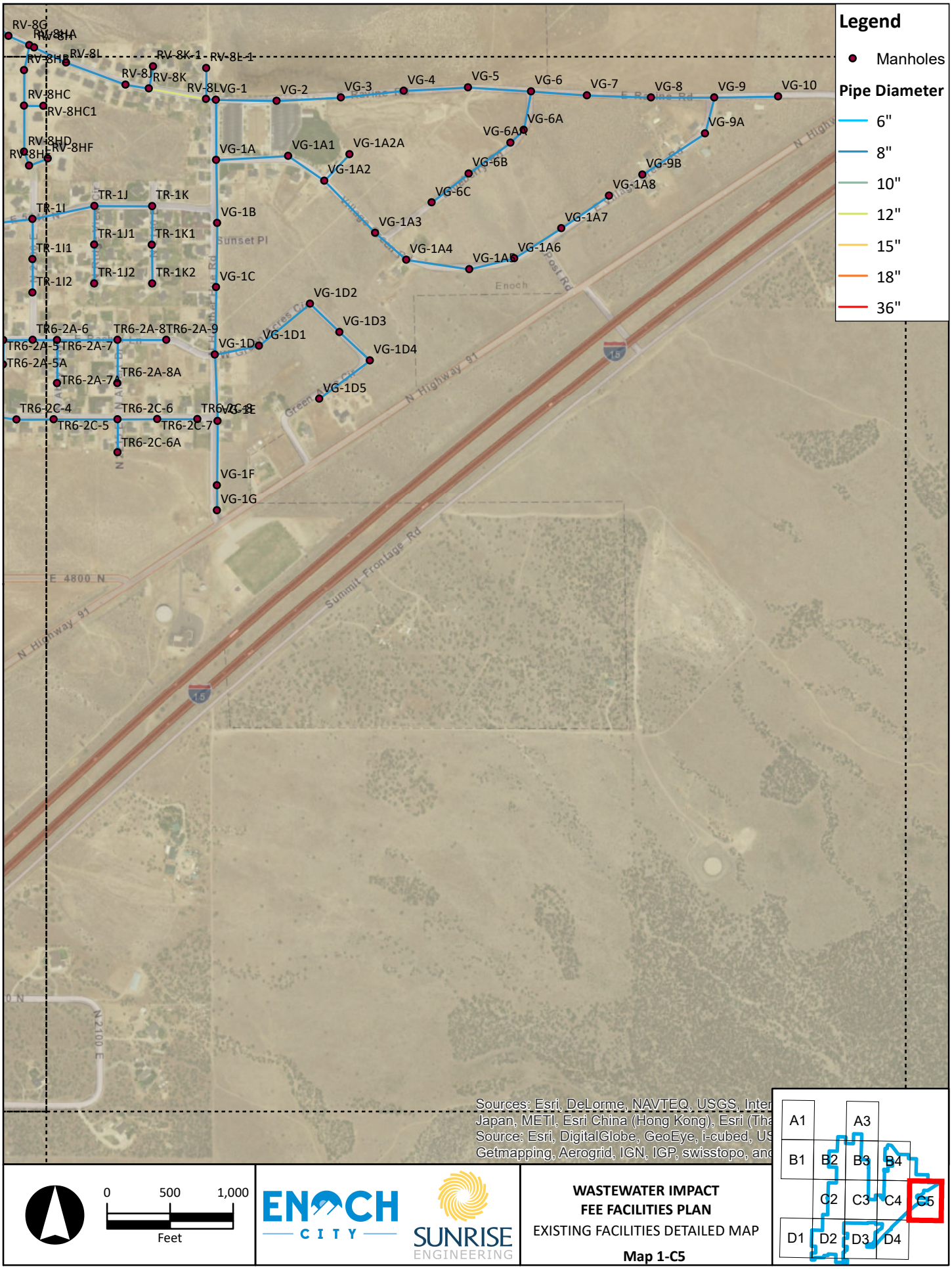
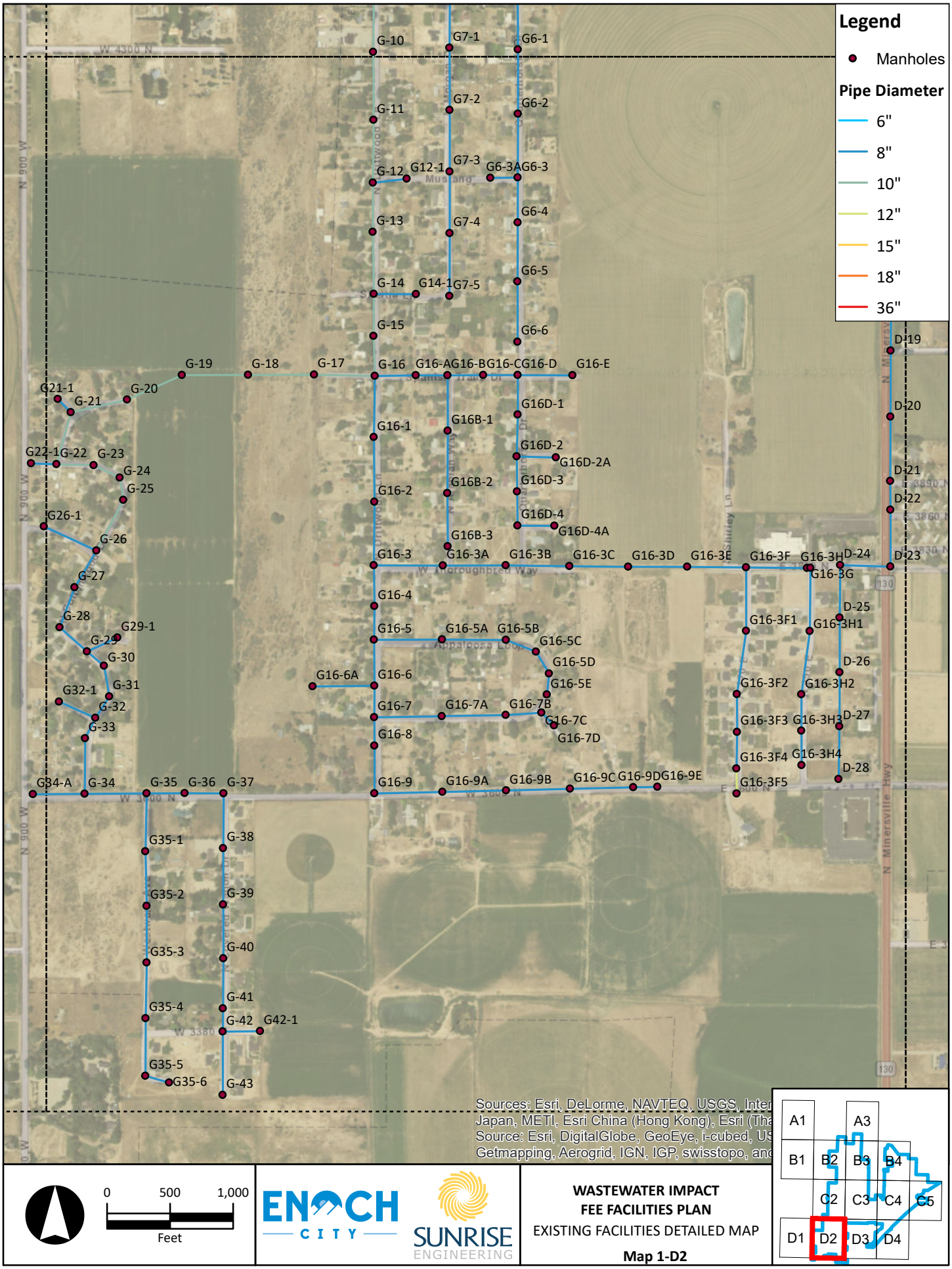
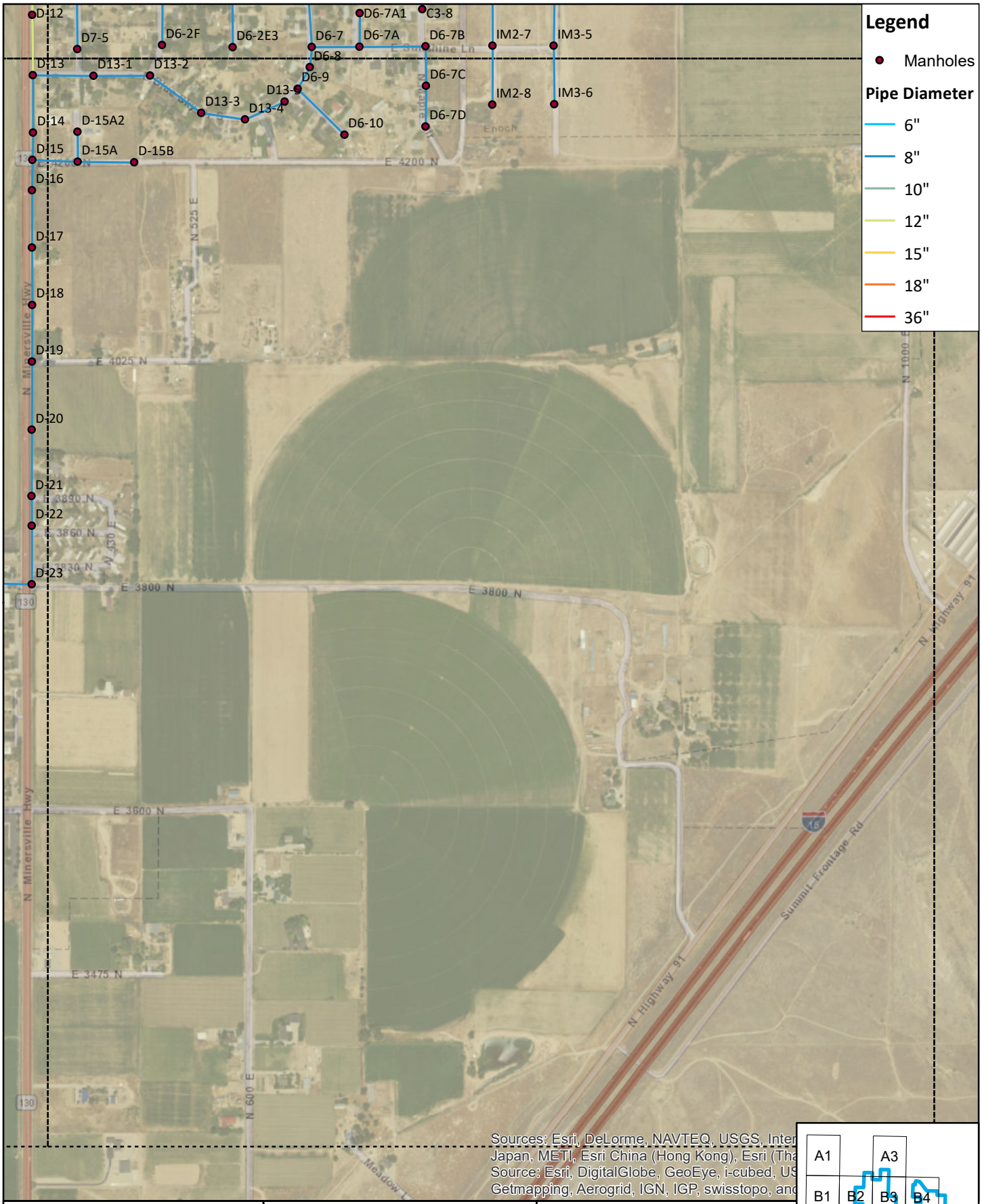
Japan, METI, Esri China (Hong Kong), Esri (Tha
Source: Esri, DigitalGlobe, GeoEye, i-cubed, US
Getmapping, Aerogrid, IGN, IGP, swisstopo, and
A1
A3
B1
B2
B3
B4
C2
C3
C4
C5
D1
D2
D3
D4
0
500
1,000
Feet
ENOCH CITY
SUNRISE ENGINEERING
WASTEWATER IMPACT FEE FACILITIES PLAN
EXISTING FACILITIES DETAILED MAP
Map 1-C4

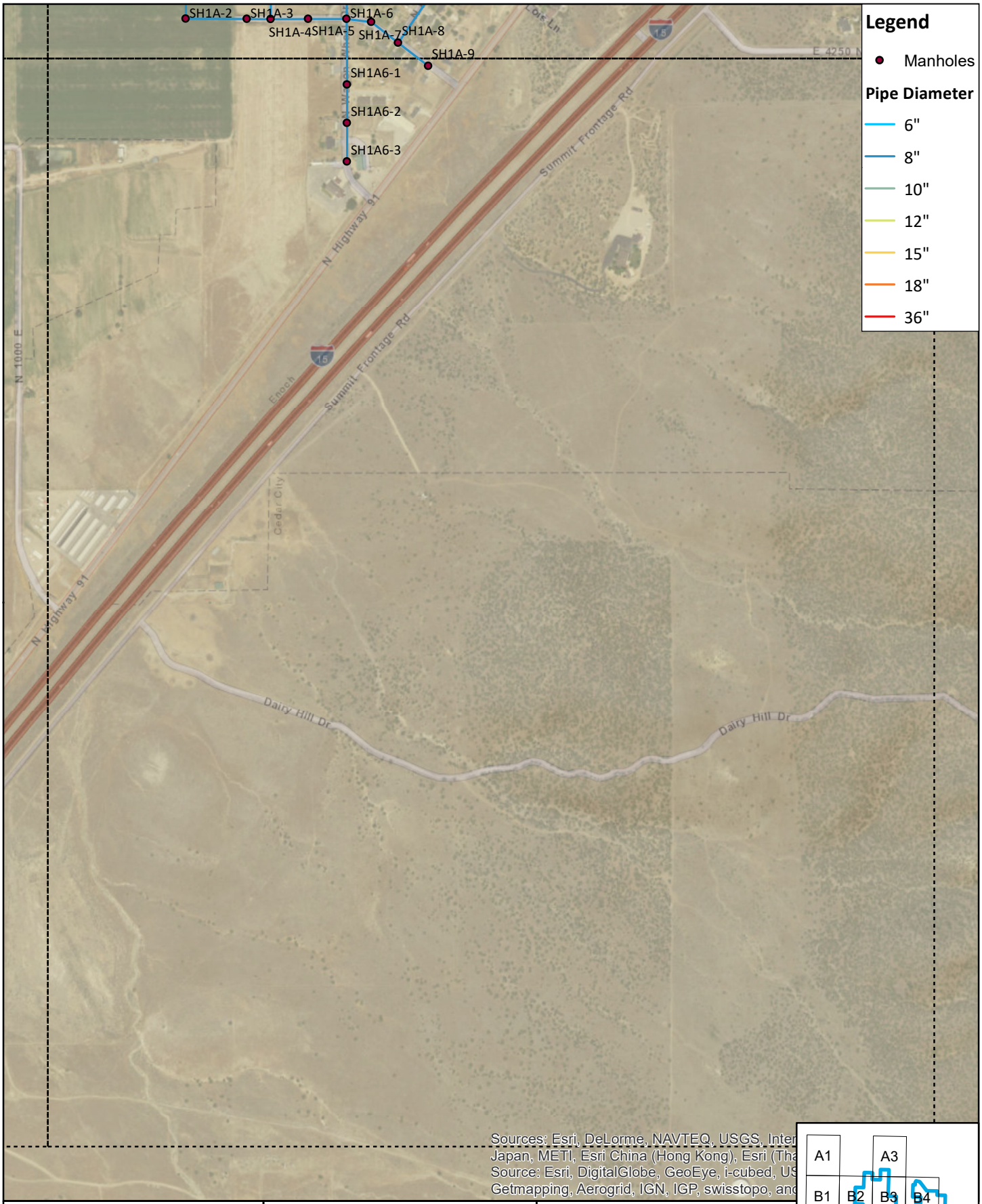

Legend
Manholes
Pipe Diameter
6"
8"
10"
12"
15"
18"
36"
RV-8G
RV-8HA
RV-8H
RV-8HB
RV-8I
RV-8J
RV-8K-1
RV-8L-1
RV-8K
RV-8L
VG-1
VG-2
VG-3
VG-4
VG-5
VG-6
VG-7
VG-8
VG-9
VG-10
RV-8HC
RV-8HC1
RV-8HD
RV-8HE
RV-8HF
VG-1A
VG-1A1
VG-1A2A
VG-1A2
VG-6A
VG-6AA
VG-6B
VG-6C
VG-9A
VG-9B
VG-1A8
VG-1A7
VG-1A6
VG-1A5
VG-1A4
VG-1A3
TR-1J
TR-1K
TR-1I
TR-1J1
TR-1K1
TR-1I1
TR-1J2
TR-1K2
TR-1I2
VG-1B
VG-1C
VG-1D2
VG-1D3
VG-1D1
VG-1D
VG-1D4
VG-1D5
TR6-2A-6
TR6-2A-8
TR6-2A-9
TR6-2A-5
TR6-2A-7
TR6-2A-5A
TR6-2A-7A
TR6-2A-8A
TR6-2C-4
TR6-2C-6
TR6-2C-5
TR6-2C-7
TR6-2C-6A
VG-1E
VG-1F
VG-1G
Sunset Pl
Enoch
N Highway 91
Summit Frontage Rd
E 4800 N
N 2100 E
Sources: Esri, DeLorme, NAVTEQ, USGS, Inter
Japan, METI, Esri China (Hong Kong), Esri (Tha
Source: Esri, DigitalGlobe, GeoEye, i-cubed, US
Getmapping, Aerogrid, IGN, IGP, swisstopo, and
0
500
1,000
Feet
ENOCH CITY
SUNRISE ENGINEERING
WASTEWATER IMPACT
FEE FACILITIES PLAN
EXISTING FACILITIES DETAILED MAP
Map 1-C5
A1
A3
B1
B2
B3
B4
C2
C3
C4
C5
D1
D2
D3
D4


Legend
Manholes
Pipe Diameter
6"
8"
10"
12"
15"
18"
36"
W 4300 N
W 4175 N
W 4025 N
W 4000 N
Baver Rd
Carlson Ave
N 2300 W
N Monarch Dr
W 3400 N
N 2275 W
W 3325 N
W 3225
W 3750 N
W 3695 N
N 600 W
G21-1
G-21
G22-1
G-22
G26-1
G-27
G-28
G-29
G32-1
G-33
G34-AG-34
N 1050 W
W 3450 N
Sources: Esri, DeLorme, NAVTEQ, USGS, Inter
Japan, METI, Esri China (Hong Kong), Esri (Tha
Source: Esri, DigitalGlobe, GeoEye, i-cubed, US
Getmapping, Aerogrid, IGN, IGP, swisstopo, and
A1
A3
B1
B2
B3
B4
C2
C3
C4
C5
D1
D2
D3
D4
0
500
1,000
Feet
ENOCH CITY
SUNRISE ENGINEERING
WASTEWATER IMPACT
FEE FACILITIES PLAN
EXISTING FACILITIES DETAILED MAP
Map 1-D1


Legend
Manholes
Pipe Diameter
6"
8"
10"
12"
15"
18"
36"
G-10
G7-1
G6-1
G-11
G7-2
G6-2
G-12
G12-1
G7-3
G6-3A
G6-3
G-13
G7-4
G6-4
G-14
G14-1
G7-5
G6-5
G-15
G6-6
G-19
G-18
G-17
G-16
G16-A
G16-B
G16-C
G16-D
G16-E
G21-1
G-21
G-20
G16D-1
G16-1
G16B-1
G22-1
G-22
G-23
G16D-2
G16D-2A
G-24
G-25
G16B-2
G16D-3
G16-2
G26-1
G16D-4
G16D-4A
G-26
G16B-3
G16-3
G16-3A
G16-3B
G16-3C
G16-3D
G16-3E
G16-3F
G16-3H
G16-3G
G-27
G16-4
G-28
G29-1
G16-5
G16-5A
G16-5B
G16-5C
G-29
G-30
G16-5D
G16-6A
G16-6
G16-5E
G32-1
G-31
G16-7
G16-7A
G16-7B
G16-7C
G-32
G-33
G16-7D
G16-8
G34-A
G-34
G-35
G-36
G-37
G16-9
G16-9A
G16-9B
G16-9C
G16-9D
G16-9E
G35-1
G-38
G35-2
G-39
G35-3
G-40
G-41
G35-4
G-42
G42-1
G35-5
G35-6
G-43
D-19
D-20
D-21
D-22
D-23
D-24
D-25
G16-3F1
G16-3H1
D-26
G16-3F2
G16-3H2
G16-3F3
G16-3H3
D-27
G16-3F4
G16-3H4
D-28
G16-3F5
N 900 W
W 4300 N
W 3800 N
W 3600 N
E 3600 N
N Minersville Hwy
Sources: Esri, DeLorme, NAVTEQ, USGS, Inter
Japan, METI, Esri China (Hong Kong), Esri (Tha
Source: Esri, DigitalGlobe, GeoEye, i-cubed, US
Getmapping, Aerogrid, IGN, IGP, swisstopo, and
A1
A3
B1
B2
B3
B4
C2
C3
C4
C5
D1
D2
D3
D4
0
500
1,000
Feet
ENOCH CITY
SUNRISE ENGINEERING
WASTEWATER IMPACT
FEE FACILITIES PLAN
EXISTING FACILITIES DETAILED MAP
Map 1-D2



Sources: Esri, DeLorme, NAVTEQ, USGS, Inter
Japan, METI, Esri China (Hong Kong), Esri (Tha
Source: Esri, DigitalGlobe, GeoEye, i-cubed, US
Getmapping, Aerogrid, IGN, IGP, swisstopo, and



0 500 1,000
Feet

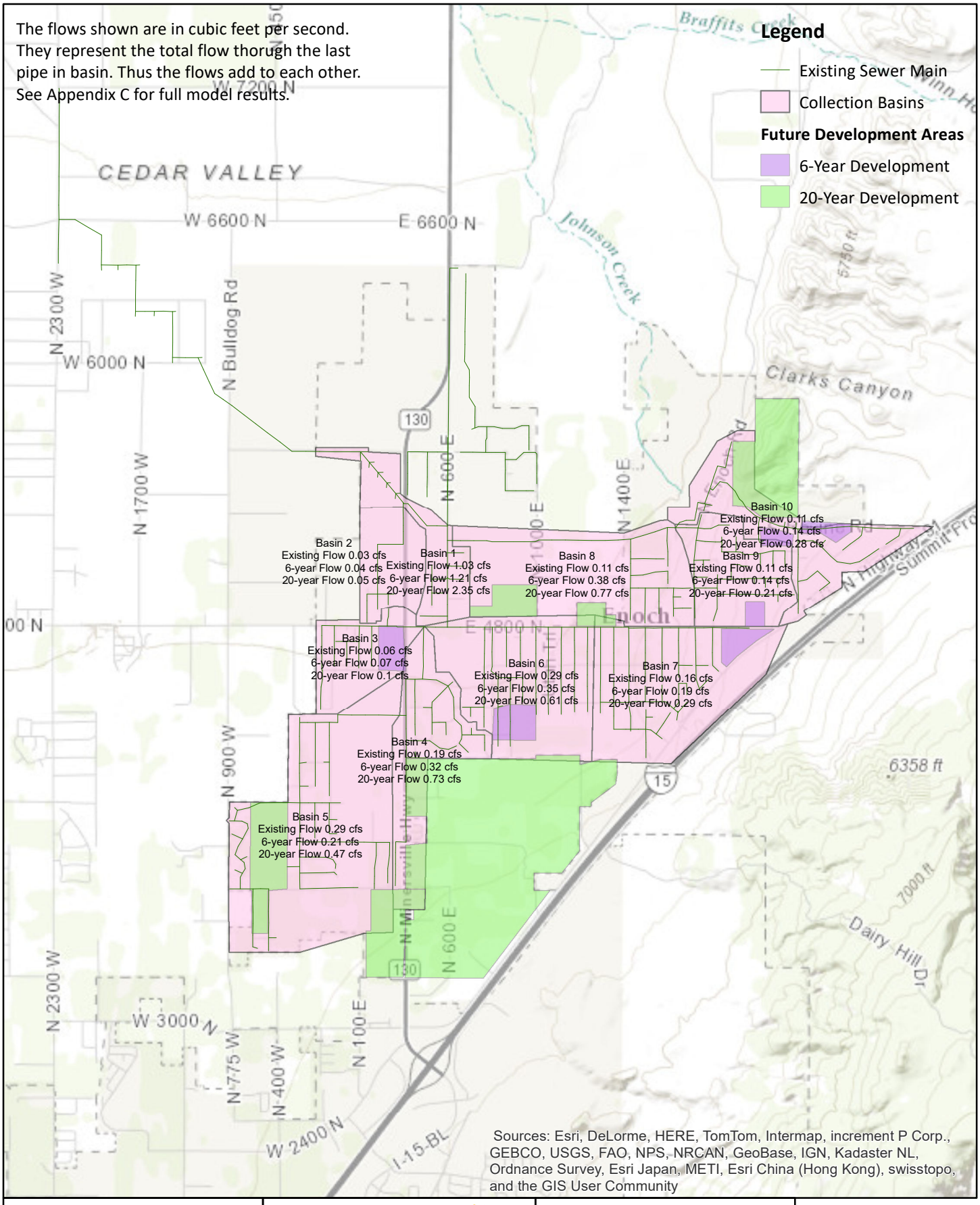
ENOCH CITY

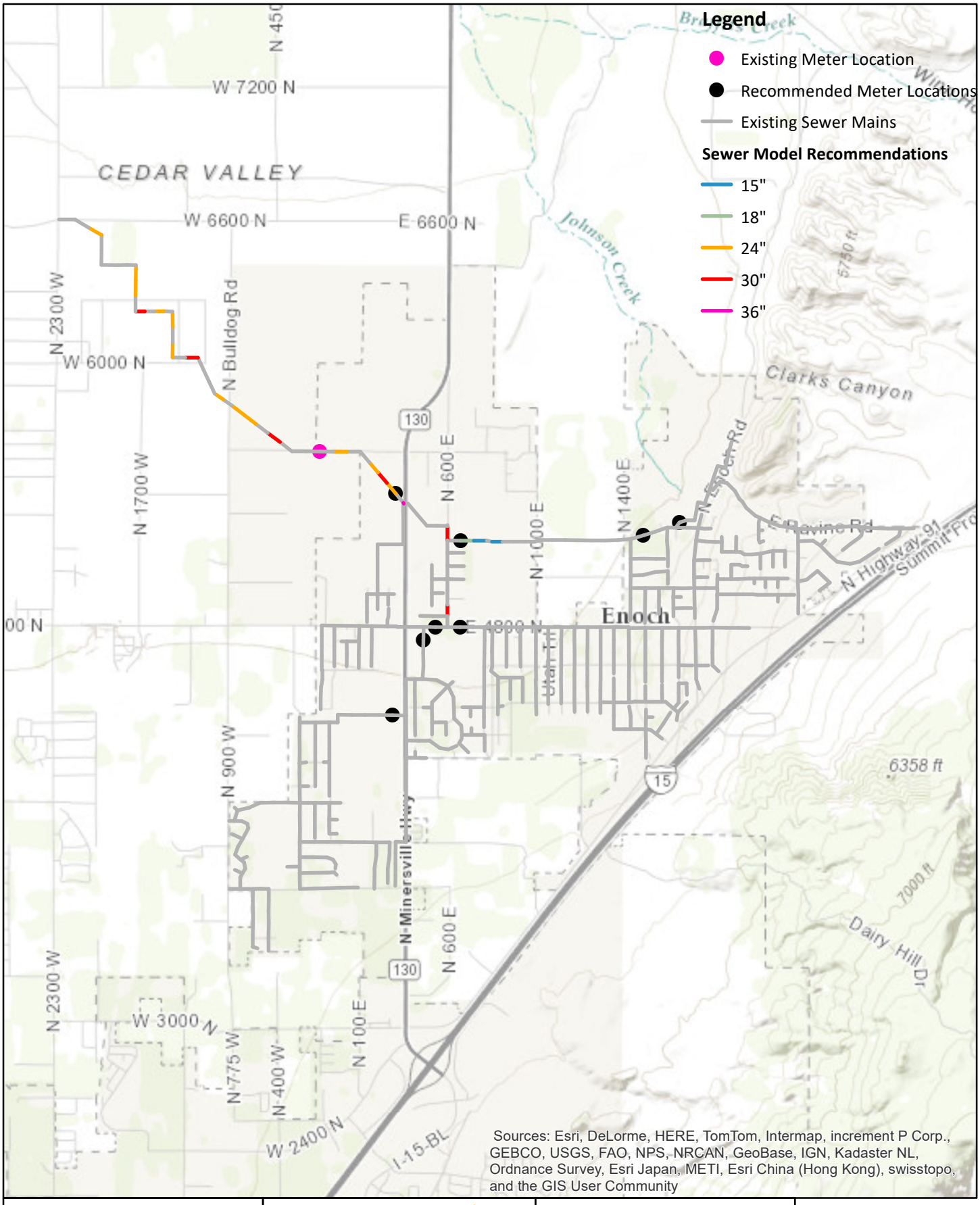
SUNRISE ENGINEERING

WASTEWATER IMPACT FEE FACILITIES PLAN

EXISTING FACILITIES DETAILED MAP

Map 1-D4


The flows shown are in cubic feet per second. They represent the total flow thorugh the last pipe in basin. Thus the flows add to each other. See Appendix C for full model results.
Legend
Existing Sewer Main
Collection Basins
Future Development Areas
6-Year Development
20-Year Development
CEDAR VALLEY
W 6600 N
E 6600 N
W 6000 N
W 7200 N
N 2300 W
N 1700 W
N Bulldog Rd
N 600 E
N 1000 E
N 1400 E
130
Johnson Creek
Clarks Canyon
Basin 1
Existing Flow 1.03 cfs
6-year Flow 1.21 cfs
20-year Flow 2.35 cfs
Basin 2
Existing Flow 0.03 cfs
6-year Flow 0.04 cfs
20-year Flow 0.05 cfs
Basin 3
Existing Flow 0.06 cfs
6-year Flow 0.07 cfs
20-year Flow 0.1 cfs
Basin 4
Existing Flow 0.19 cfs
6-year Flow 0.32 cfs
20-year Flow 0.73 cfs
Basin 5
Existing Flow 0.29 cfs
6-year Flow 0.21 cfs
20-year Flow 0.47 cfs
Basin 6
Existing Flow 0.29 cfs
6-year Flow 0.35 cfs
20-year Flow 0.61 cfs
Basin 7
Existing Flow 0.16 cfs
6-year Flow 0.19 cfs
20-year Flow 0.29 cfs
Basin 8
Existing Flow 0.11 cfs
6-year Flow 0.38 cfs
20-year Flow 0.77 cfs
Basin 9
Existing Flow 0.11 cfs
6-year Flow 0.14 cfs
20-year Flow 0.21 cfs
Basin 10
Existing Flow 0.11 cfs
6-year Flow 0.14 cfs
20-year Flow 0.28 cfs
Enoch
E 4800 N
N Highway 91
Summit Pro
N 900 W
N Minersville Hwy
15
6358 ft
7000 ft
Dairy Hill Dr
N 2300 W
W 3000 N
N 775 W
N 400 W
N 100 E
W 2400 N
I-15-BL
Sources: Esri, DeLorme, HERE, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community
0
2,500
5,000
Feet
ENOCH CITY
SUNRISE ENGINEERING
WASTEWATER IMPACT FEE FACILITIES PLAN
MODEL RESULTS BY BASIN
Map 2



0 2,500 5,000
Feet

ENOCH CITY

SUNRISE ENGINEERING

WASTEWATER IMPACT FEE FACILITIES PLAN

PROPOSED FACILITIES

Map 3

APPENDIX B
Tables & Figures

Census Population Data

Growth Projections Table

Growth Projections Chart with Peak Flow Estimates

Model Demand Calculations

Metered Flow Chart (2014-2016)

Metered Flow Chart Overlaid by Year

Peak Flow Data Values

Near Peak Flow Data Values

Census Population Data

Data Type	Year	Population	Annual Growth Rate
Census Est.	2015	6,265	1.5%
Census	2010	5,803	5.3%
Census	2000	3,467	5.9%
Census	1990	1,947	11.1%
Census	1980	678	-

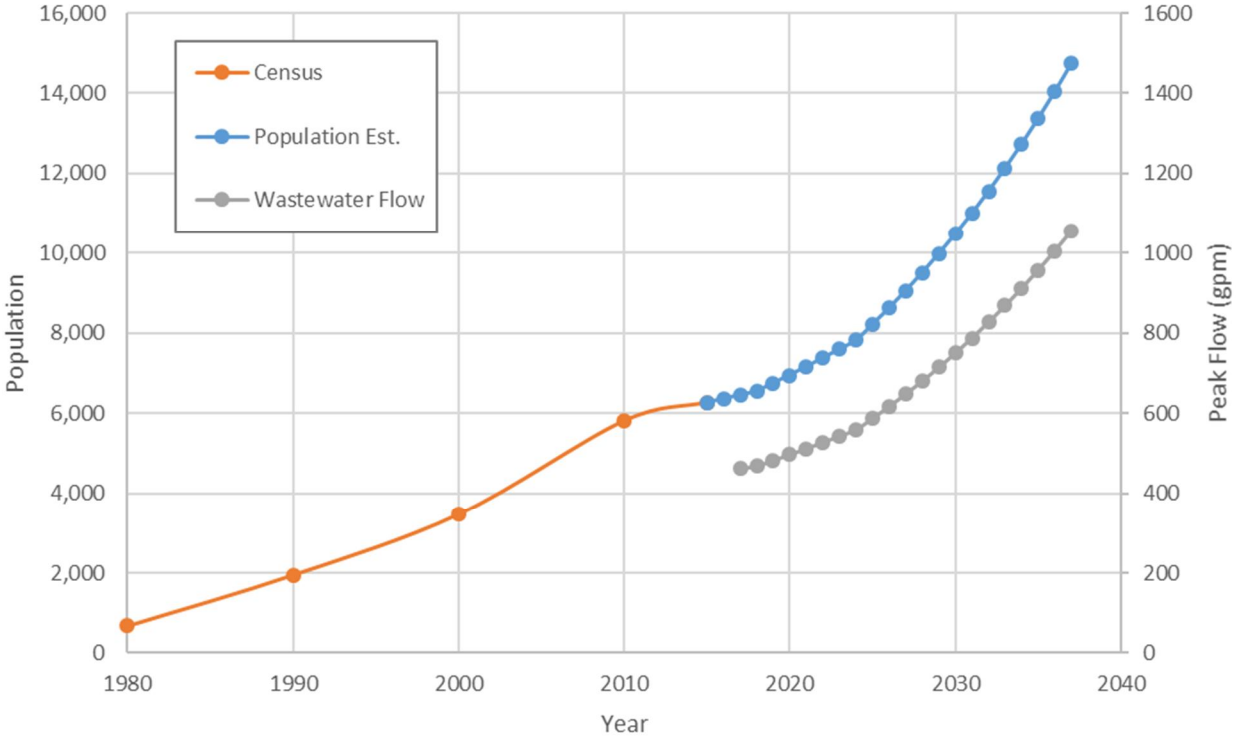
Growth Projections Table

Year	Est. Growth Rate	*Estimated Residential ERU's	*Estimated Commercial ERU's	*Estimated Total ERU's	*Estimated Total Conn.	**Estimated Population
2015	-	2,119	49	2,168	2,131	6,265
2016	1.5%	2,151	50	2,201	2,163	6,359
2017	1.5%	2,183	51	2,234	2,195	6,454
2018	1.5%	2,216	52	2,267	2,228	6,551
2019	3.0%	2,282	53	2,335	2,295	6,748
2020	3.0%	2,351	55	2,405	2,364	6,950
2021	3.0%	2,421	56	2,478	2,435	7,159
2022	3.0%	2,494	58	2,552	2,508	7,373
2023	3.0%	2,569	60	2,628	2,583	7,595
2024	3.0%	2,646	62	2,707	2,661	7,822
2025	5.0%	2,778	65	2,843	2,794	8,214
2026	5.0%	2,917	68	2,985	2,933	8,624
2027	5.0%	3,063	71	3,134	3,080	9,055
2028	5.0%	3,216	75	3,291	3,234	9,508
2029	5.0%	3,377	79	3,455	3,396	9,984
2030	5.0%	3,546	83	3,628	3,566	10,483
2031	5.0%	3,723	87	3,810	3,744	11,007
2032	5.0%	3,909	91	4,000	3,931	11,557
2033	5.0%	4,104	96	4,200	4,128	12,135
2034	5.0%	4,310	100	4,410	4,334	12,742
2035	5.0%	4,525	105	4,630	4,551	13,379
2036	5.0%	4,751	111	4,862	4,778	14,048
2037	5.0%	4,989	116	5,105	5,017	14,750

* Estimated ERU's and Connections are based on City billing data.

** Estimated Population is based on the 2015 census data and the projected growth rates.

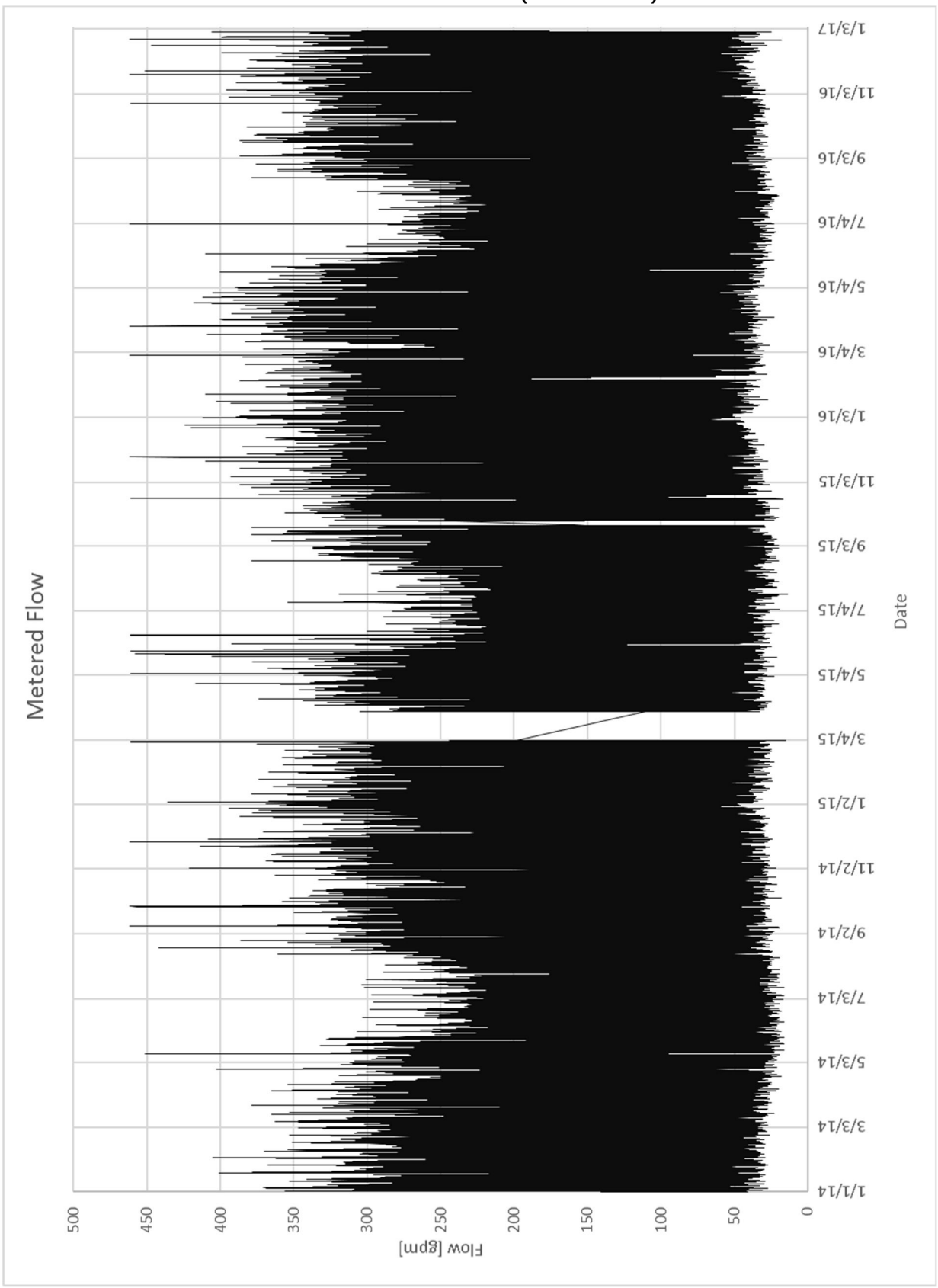
Growth Projections Chart with Peak Flow Estimates



Model Demand Calculations

Date	Total Peak Flow [gpm]	No. Existing MH	Flow per Ext MH	No. Future 6-yr MH	Flow Per Fut 6-yr MH	Future 20-yr MH	Flow Per Fut 20-yr MH	Double Check
2017	462.00	669	0.691	0	0.000	0	0.000	462.28
2023	543.62	669	0.760	17	2.065	0	0.000	543.61
2037	1055.83	669	1.140	17	3.098	31	7.750	1055.67

Metered Flow Chart (2014-2016)



Metered Flow Chart Overlaid by Year

Peak Flow Data Values

Cells with the max flow

Flow [gpm]	Date
462	9/9/14 5:49 AM
462	9/27/14 2:37 PM
462	11/27/14 11:52 AM
462	11/26/15 11:46 AM
462	3/1/16 8:52 AM
462	3/1/16 9:07 AM
462	3/1/16 9:22 AM
462	3/1/16 9:37 AM
462	3/28/16 10:37 PM
462	3/28/16 10:52 PM
462	3/28/16 11:07 PM
462	7/3/16 2:06 PM
462	11/21/16 10:05 AM
462	11/21/16 10:20 AM
462	11/21/16 10:35 AM
462	11/21/16 10:50 AM
462	11/21/16 11:05 AM
462	11/21/16 11:20 AM
462	11/21/16 11:35 AM
462	11/21/16 11:50 AM
462	11/21/16 12:20 PM
462	12/24/16 11:47 AM
462	12/24/16 12:02 PM
462	12/24/16 12:47 PM
462	12/24/16 1:02 PM
462	12/24/16 1:32 PM

Near Peak Flow Data Values

Cells with the near max flow

Flow [gpm]	Date
461	9/8/14 6:34 PM
461	9/8/14 6:49 PM
461	9/8/14 7:04 PM
461	9/8/14 7:19 PM
461	9/8/14 7:34 PM
461	9/8/14 7:49 PM
461	9/8/14 8:04 PM
461	9/8/14 8:19 PM
461	9/8/14 8:34 PM
461	9/8/14 8:49 PM
461	9/8/14 9:04 PM
461	9/8/14 9:19 PM
461	9/8/14 9:34 PM
461	9/9/14 5:34 AM
461	9/27/14 11:22 AM
461	9/27/14 11:37 AM
461	9/27/14 11:52 AM
461	9/27/14 12:07 PM
461	9/27/14 12:22 PM
461	9/27/14 12:37 PM
461	9/27/14 12:52 PM
461	9/27/14 1:07 PM
461	9/27/14 1:22 PM
461	9/27/14 1:37 PM
461	9/27/14 1:52 PM
461	9/27/14 2:07 PM
461	9/27/14 2:22 PM
461	9/27/14 2:52 PM
461	9/27/14 3:07 PM
461	9/27/14 3:22 PM
461	9/27/14 3:37 PM
461	9/27/14 3:52 PM
461	9/27/14 4:07 PM
461	3/2/15 12:16 AM
461	3/2/15 10:54 AM
461	3/2/15 11:09 AM
461	5/5/15 7:13 PM
461	5/5/15 7:28 PM
461	5/5/15 7:43 PM
461	5/5/15 7:58 PM
461	5/5/15 8:13 PM
461	5/5/15 8:28 PM
461	5/5/15 8:43 PM
461	5/5/15 8:58 PM
461	5/5/15 9:13 PM
461	5/5/15 9:28 PM
461	5/5/15 9:43 PM
461	5/5/15 9:58 PM
461	5/5/15 10:13 PM
461	5/5/15 10:28 PM
461	5/5/15 10:43 PM
461	5/5/15 10:58 PM
461	5/5/15 11:13 PM
461	5/5/15 11:28 PM
461	5/26/15 5:17 PM
461	5/26/15 5:32 PM
461	5/26/15 5:47 PM
461	5/26/15 6:02 PM
461	5/26/15 6:17 PM
461	5/26/15 6:32 PM
461	5/26/15 6:47 PM
461	5/26/15 7:02 PM
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461	6/10/15 8:23 PM
461	6/10/15 8:38 PM
461	6/10/15 8:53 PM
461	6/10/15 9:08 PM
461	6/10/15 9:23 PM
461	6/10/15 9:38 PM
461	10/18/15 8:46 PM
461	10/18/15 9:01 PM
461	10/18/15 9:16 PM
461	10/18/15 9:31 PM
461	10/18/15 9:46 PM
461	10/18/15 10:01 PM
461	10/18/15 10:16 PM
461	11/26/15 11:31 AM
461	11/26/15 12:01 PM
461	11/26/15 12:16 PM
461	3/28/16 10:22 PM
461	10/24/16 7:50 PM
461	10/24/16 8:05 PM
461	10/24/16 8:20 PM
461	10/24/16 8:35 PM
461	10/24/16 8:50 PM
461	11/21/16 9:50 AM
461	11/21/16 12:05 PM
461	12/24/16 1:17 PM

APPENDIX C
Model Output

Existing System Model Results

20-Year Projected Model Results

ID	From ID	To ID	Diameter (in)	Length (ft)	Slope	Total Flow (cfs)	Unpeakable Flow (cfs)	Flow Type	Velocity (ft/s)	d/D	q/Q	Water Depth (ft)	Critical Depth (ft)	Froude Number	Full Flow (cfs)	Backwater Adjustment	Adjusted Depth (ft)	Adjusted Velocity (ft/s)
B-10B-9	B-10	B-9	12	403.167	0.002	0.296	0.296	Free Surface	1.631	0.281	0.173	0.281	0.224	0.64	1.711	No	0.281	1.631
B-11B-10	B-11	B-10	12	403.137	0.002	0.294	0.294	Free Surface	1.571	0.288	0.181	0.288	0.223	0.609	1.626	No	0.288	1.571
B-12B-11	B-12	B-11	12	401.614	0.001	0.293	0.293	Free Surface	1.383	0.314	0.214	0.314	0.223	0.511	1.364	No	0.314	1.383
B-13B-12	B-13	B-12	12	402.334	0.002	0.291	0.291	Free Surface	1.625	0.279	0.17	0.279	0.222	0.641	1.713	No	0.279	1.625
B-14B-13	B-14	B-13	12	414.403	0.007	0.289	0.289	Free Surface	2.372	0.213	0.099	0.213	0.221	1.083	2.922	No	0.213	2.372
B-15B-14	B-15	B-14	12	402.727	0.01	0.288	0.288	Free Surface	2.726	0.192	0.081	0.192	0.221	1.312	3.566	No	0.192	2.726
B-16B-15	B-16	B-15	12	375.267	0.009	0.286	0.286	Free Surface	2.659	0.195	0.083	0.195	0.22	1.271	3.449	No	0.195	2.659
B-17B-16	B-17	B-16	8	399.65	0.015	0.232	0.232	Free Surface	3.061	0.27	0.159	0.18	0.222	1.506	1.46	No	0.18	3.061
B-18B-17	B-18	B-17	8	379.194	0.003	0.231	0.231	Free Surface	1.713	0.41	0.353	0.273	0.221	0.666	0.655	No	0.273	1.713
B-19B-18	B-19	B-18	8	397.679	0.016	0.229	0.229	Free Surface	3.186	0.26	0.148	0.173	0.221	1.6	1.553	Yes	0.173	3.182
B-20B-19	B-20	B-19	8	248.555	0.048	0.223	0.223	Free Surface	4.634	0.196	0.084	0.13	0.218	2.706	2.665	No	0.13	4.634
B-21B-20	B-21	B-20	8	325.834	0.042	0.109	0.109	Free Surface	3.561	0.143	0.044	0.095	0.151	2.448	2.475	No	0.095	3.561
B-22B-21	B-22	B-21	8	362.401	0.022	0.108	0.108	Free Surface	2.834	0.166	0.06	0.111	0.15	1.804	1.799	No	0.111	2.834
B-23B-22	B-23	B-22	8	418.951	0.005	0.002	0.002	Free Surface	0.464	0.032	0.002	0.021	0.018	0.686	0.849	No	0.021	0.464
B-2B-1	B-2	B-1	12	397.626	0	0.308	0.308	Free Surface	0.81	0.487	0.479	0.487	0.229	0.232	0.643	No	0.487	0.81
B-3B-2	B-3	B-2	12	400.827	0.001	0.306	0.306	Free Surface	1.11	0.382	0.31	0.382	0.228	0.367	0.989	Yes	0.385	1.1
B-4B-3	B-4	B-3	12	157.612	0.001	0.305	0.305	Free Surface	1.331	0.333	0.24	0.333	0.227	0.476	1.273	Yes	0.358	1.208
B-5B-4	B-5	B-4	12	327.966	0.001	0.303	0.303	Free Surface	0.947	0.427	0.38	0.427	0.227	0.293	0.799	No	0.427	0.947
B-6B-5	B-6	B-5	12	324.445	0.002	0.302	0.302	Free Surface	1.51	0.302	0.198	0.302	0.226	0.57	1.523	Yes	0.364	1.167
B-7B-6	B-7	B-6	12	332.678	0.002	0.3	0.3	Free Surface	1.417	0.315	0.215	0.315	0.226	0.523	1.396	No	0.315	1.417
B-8B-7	B-8	B-7	12	327.516	0.001	0.299	0.299	Free Surface	1.264	0.341	0.25	0.341	0.225	0.446	1.194	No	0.341	1.264
B-9B-8	B-9	B-8	12	128.856	0.002	0.297	0.297	Free Surface	1.482	0.303	0.199	0.303	0.224	0.559	1.492	No	0.303	1.482
B16-1B-16	B16-1	B-16	8	380.524	0.015	0.052	0.052	Free Surface	2.006	0.128	0.035	0.085	0.104	1.461	1.494	Yes	0.09	1.855
B16-2AB16-2	B16-2A	B16-2	8	390.301	0.018	0.005	0.005	Free Surface	1.016	0.039	0.003	0.026	0.03	1.352	1.619	No	0.026	1.016
B16-2B16-1	B16-2	B16-1	8	213.978	0.013	0.051	0.051	Free Surface	1.9	0.13	0.036	0.087	0.102	1.372	1.401	No	0.087	1.9
B16-2BB16-2A	B16-2B	B16-2A	8	391.708	0.02	0.003	0.003	Free Surface	0.934	0.032	0.002	0.021	0.025	1.384	1.713	No	0.021	0.934
B16-2CB16-2B	B16-2C	B16-2B	8	246.69	0.022	0.002	0.002	Free Surface	0.78	0.022	0.001	0.015	0.018	1.374	1.793	No	0.015	0.78
B16-3B16-2	B16-3	B16-2	8	137.223	0.013	0.045	0.045	Free Surface	1.819	0.123	0.032	0.082	0.095	1.354	1.391	No	0.082	1.819
B16-4AB16-4	B16-4A	B16-4	8	375.354	0.019	0.008	0.008	Free Surface	1.225	0.049	0.005	0.033	0.039	1.459	1.692	No	0.033	1.225
B16-4B16-3	B16-4	B16-3	8	366.85	0.01	0.043	0.043	Free Surface	1.645	0.128	0.035	0.086	0.094	1.197	1.224	No	0.086	1.645
B16-4BB16-4A	B16-4B	B16-4A	8	388.703	0.021	0.006	0.006	Free Surface	1.175	0.043	0.004	0.029	0.035	1.489	1.758	No	0.029	1.175
B16-4CB16-4B	B16-4C	B16-4B	8	383.523	0.026	0.005	0.005	Free Surface	1.162	0.036	0.002	0.024	0.03	1.618	1.964	No	0.024	1.162
B16-4DB16-4C	B16-4D	B16-4C	8	247.69	0.022	0.003	0.003	Free Surface	0.971	0.031	0.002	0.021	0.025	1.458	1.811	No	0.021	0.971
B16-4EB16-4D	B16-4E	B16-4D	8	132.586	0.022	0.002	0.002	Free Surface	0.775	0.023	0.001	0.015	0.018	1.362	1.777	No	0.015	0.775
B16-5AB16-5	B16-5A	B16-5	8	242.327	0.018	0.028	0.028	Free Surface	1.744	0.091	0.017	0.061	0.075	1.511	1.608	No	0.061	1.744
B16-5B-1B16-5B	B16-5B-1	B16-5B	8	358.102	0.017	0.005	0.005	Free Surface	0.997	0.04	0.003	0.026	0.03	1.317	1.574	No	0.026	0.997
B16-5B-2B16-5B-1	B16-5B-2	B16-5B-1	8	416.317	0.015	0.003	0.003	Free Surface	0.845	0.034	0.002	0.023	0.025	1.21	1.482	No	0.023	0.845
B16-5B-3B16-5B-2	B16-5B-3	B16-5B-2	8	293.519	0.013	0.002	0.002	Free Surface	0.647	0.025	0.001	0.017	0.018	1.071	1.372	No	0.017	0.647
B16-5B16-4	B16-5	B16-4	8	384.141	0.014	0.034	0.034	Free Surface	1.699	0.107	0.024	0.071	0.083	1.36	1.42	No	0.071	1.699
B16-5BB16-5A	B16-5B	B16-5A	8	213.632	0.025	0.026	0.026	Free Surface	1.942	0.082	0.014	0.054	0.073	1.781	1.923	No	0.054	1.942
B16-5C-1B16-5C	B16-5C-1	B16-5C	8	394.362	0.017	0.005	0.005	Free Surface	0.996	0.04	0.003	0.026	0.03	1.315	1.572	No	0.026	0.996
B16-5C-2B16-5C-1	B16-5C-2	B16-5C-1	8	394.597	0.009	0.003	0.003	Free Surface	0.697	0.038	0.003	0.026	0.025	0.936	1.124	No	0.026	0.697
B16-5CB16-5B	B16-5C	B16-5B	8	417.293	0.03	0.02	0.02	Free Surface	1.913	0.069	0.009	0.046	0.064	1.915	2.115	No	0.046	1.913
B16-5DB16-5C	B16-5D	B16-5C	8	258.24	0.026	0.014	0.014	Free Surface	1.627	0.06	0.007	0.04	0.053	1.747	1.968	No	0.04	1.627
B16-5E-1AB16-5E-1	B16-5E-1A	B16-5E-1	8	237.8	0.069	0.002	0.002	Free Surface	1.16	0.017	0	0.011	0.018	2.336	3.18	No	0.011	1.16
B16-5E-1B16-5E	B16-5E-1	B16-5E	8	263.502	0.003	0.008	0.008	Free Surface	0.643	0.075	0.011	0.05	0.039	0.614	0.67	No	0.05	0.643

ID	From ID	To ID	Diameter (in)	Length (ft)	Slope	Total Flow (cfs)	Unpeakable Flow (cfs)	Flow Type	Velocity (ft/s)	d/D	q/Q	Water Depth (ft)	Critical Depth (ft)	Froude Number	Full Flow (cfs)	Backwater Adjustment	Adjusted Depth (ft)	Adjusted Velocity (ft/s)
B16-5E-2AB16-5E-2	B16-5E-2A	B16-5E-2	8	277.78	0.041	0.003	0.003	Free Surface	1.202	0.027	0.001	0.018	0.025	1.94	2.465	No	0.018	1.202
B16-5E-2B16-5E-1	B16-5E-2	B16-5E-1	8	348.692	0.025	0.005	0.005	Free Surface	1.143	0.036	0.002	0.024	0.03	1.581	1.916	No	0.024	1.143
B16-5E-2BB16-5E-2A	B16-5E-2B	B16-5E-2A	8	272.148	0.041	0.002	0.002	Free Surface	0.967	0.019	0.001	0.013	0.018	1.832	2.447	No	0.013	0.967
B16-5E-3B16-5E-2	B16-5E-3	B16-5C-2	8	242.835	0.017	0.002	0.002	Free Surface	0.716	0.024	0.001	0.016	0.018	1.225	1.585	No	0.016	0.716
B16-5EB16-5D	B16-5E	B16-5D	8	190.325	0.057	0.012	0.012	Free Surface	2.049	0.047	0.004	0.032	0.05	2.478	2.886	No	0.032	2.049
B16-5FB16-5E	B16-5F	B16-5E	8	263.193	0.051	0.003	0.003	Free Surface	1.289	0.025	0.001	0.017	0.025	2.13	2.726	No	0.017	1.289
B16-6B16-5	B16-6	B16-5	8	317.867	0.014	0.005	0.005	Free Surface	0.927	0.042	0.003	0.028	0.03	1.195	1.419	No	0.028	0.927
B16-7B16-6	B16-7	B16-6	8	314.138	0.012	0.003	0.003	Free Surface	0.786	0.035	0.002	0.024	0.025	1.098	1.335	No	0.024	0.786
B16-8B16-7	B16-8	B16-7	8	340.152	0.014	0.002	0.002	Free Surface	0.668	0.025	0.001	0.017	0.018	1.117	1.435	No	0.017	0.668
B16-GB16-5F	B16-5G	B16-5F	8	266.105	0.037	0.002	0.002	Free Surface	0.933	0.02	0.001	0.013	0.018	1.746	2.324	No	0.013	0.933
B19-1B-19	B19-1	B-19	8	403.024	0.022	0.005	0.005	Free Surface	1.087	0.037	0.003	0.025	0.03	1.479	1.783	Yes	0.049	0.399
B19-2B19-1	B19-2	B19-1	8	336.736	0.021	0.003	0.003	Free Surface	0.949	0.031	0.002	0.021	0.025	1.415	1.754	No	0.021	0.949
B19-3B19-2	B19-3	B19-2	8	441.848	0.022	0.002	0.002	Free Surface	0.777	0.022	0.001	0.015	0.018	1.368	1.785	No	0.015	0.777
B1I48	B-1	I-47	12	402.228	0.003	0.309	0.309	Free Surface	1.877	0.263	0.151	0.263	0.229	0.765	2.045	Yes	0.331	1.363
BC-1B-22	BC-1	B-22	8	184.789	0.074	0.003	0.003	Free Surface	1.467	0.023	0.001	0.016	0.025	2.532	3.285	No	0.016	1.467
BC-2BC-1	BC-2	BC-1	8	204.715	0.067	0.002	0.002	Free Surface	1.149	0.017	0	0.012	0.018	2.306	3.137	No	0.012	1.149
C-10C-9	C-10	C-9	12	389.196	0.006	0.183	0.183	Free Surface	2.03	0.172	0.065	0.172	0.175	1.035	2.836	No	0.172	2.03
C-11C-10	C-11	C-10	8	401.091	0.004	0.171	0.171	Free Surface	1.76	0.322	0.224	0.215	0.19	0.785	0.762	No	0.215	1.76
C-12C-11	C-12	C-11	8	395.438	0.023	0.159	0.159	Free Surface	3.224	0.199	0.086	0.132	0.182	1.868	1.837	No	0.132	3.224
C-13C-12	C-13	C-12	8	402.187	0.026	0.077	0.077	Free Surface	2.732	0.135	0.039	0.09	0.126	1.936	1.969	No	0.09	2.732
C-14C-13	C-14	C-13	8	225.092	0.019	0.069	0.069	Free Surface	2.359	0.139	0.041	0.093	0.119	1.648	1.671	No	0.093	2.359
C-15C-14	C-15	C-14	8	232.551	0.03	0.068	0.068	Free Surface	2.764	0.123	0.032	0.082	0.118	2.058	2.114	No	0.082	2.764
C-16C-15	C-16	C-15	8	31.318	0.038	0.066	0.066	Free Surface	2.963	0.115	0.028	0.077	0.117	2.279	2.359	No	0.077	2.963
C-17C-16	C-17	C-16	8	159.331	0.022	0.059	0.059	Free Surface	2.368	0.123	0.032	0.082	0.11	1.758	1.806	No	0.082	2.368
C-18C-17	C-18	C-17	8	345.487	0.032	0.057	0.057	Free Surface	2.669	0.112	0.026	0.074	0.108	2.086	2.167	No	0.074	2.669
C-19C-18	C-19	C-18	8	256.382	0.029	0.048	0.048	Free Surface	2.443	0.105	0.023	0.07	0.099	1.97	2.061	No	0.07	2.443
C-1I-54	C-1	I-54	15	389.067	0.001	0.289	0.289	Free Surface	1.107	0.266	0.155	0.332	0.208	0.401	1.872	Yes	0.34	1.073
C-20C-19	C-20	C-19	8	261.528	0.027	0.046	0.046	Free Surface	2.362	0.105	0.023	0.07	0.097	1.904	1.991	No	0.07	2.362
C-21C-20	C-21	C-20	8	249.07	0.049	0.037	0.037	Free Surface	2.723	0.082	0.014	0.055	0.087	2.492	2.689	No	0.055	2.723
C-22C-21	C-22	C-21	8	253.832	0.038	0.035	0.035	Free Surface	2.456	0.085	0.015	0.057	0.085	2.201	2.362	No	0.057	2.456
C-23C-22	C-23	C-22	8	310.76	0.032	0.026	0.026	Free Surface	2.107	0.077	0.012	0.051	0.073	1.988	2.162	No	0.051	2.107
C-24C-23	C-24	C-23	8	190.14	0.053	0.025	0.025	Free Surface	2.463	0.067	0.009	0.044	0.071	2.504	2.778	No	0.044	2.463
C-25C-24	C-25	C-24	8	269.286	0.049	0.014	0.014	Free Surface	2.021	0.052	0.005	0.034	0.053	2.337	2.688	No	0.034	2.021
C-26C-25	C-26	C-25	8	265.161	0.036	0.012	0.012	Free Surface	1.745	0.053	0.005	0.035	0.05	1.999	2.292	No	0.035	1.745
C-27C-26	C-27	C-26	8	417.651	0.043	0.005	0.005	Free Surface	1.374	0.032	0.002	0.021	0.03	2.023	2.498	No	0.021	1.374
C-28C-27	C-28	C-27	8	380.269	0.036	0.003	0.003	Free Surface	1.148	0.028	0.001	0.018	0.025	1.824	2.306	No	0.018	1.148
C-29C-28	C-29	C-28	8	319.237	0.04	0.002	0.002	Free Surface	0.961	0.019	0.001	0.013	0.018	1.815	2.423	No	0.013	0.961
C-2C-1	C-2	C-1	15	387.516	0.008	0.288	0.288	Free Surface	2.488	0.15	0.049	0.188	0.208	1.218	5.903	Yes	0.21	2.117
C-3C-2	C-3	C-2	15	353.689	0.006	0.286	0.286	Free Surface	2.194	0.163	0.058	0.204	0.207	1.029	4.947	No	0.204	2.194
C-4BC-4	C-4A	C-4	15	179.269	0.003	0.24	0.24	Free Surface	1.717	0.171	0.064	0.214	0.189	0.785	3.76	No	0.214	1.717
C-4C-3	C-4	C-3	15	238.529	0.005	0.268	0.268	Free Surface	1.994	0.167	0.06	0.208	0.2	0.925	4.442	No	0.208	1.994
C-5AC-5	C-5A	C-5	15	141.59	0.001	0.232	0.232	Free Surface	0.946	0.254	0.142	0.318	0.186	0.351	1.642	No	0.318	0.946
C-5C-4B	C-5	C-4A	15	247.377	0.001	0.239	0.239	Free Surface	1.148	0.226	0.112	0.282	0.189	0.454	2.133	No	0.282	1.148
C-6BC-6	C-6A	C-6	15	109.7	0.001	0.225	0.225	Free Surface	1.201	0.21	0.096	0.262	0.183	0.494	2.329	Yes	0.277	1.112
C-6C-5A	C-6	C-5A	15	283.853	0.001	0.231	0.231	Free Surface	1.062	0.233	0.119	0.291	0.186	0.413	1.936	No	0.291	1.062
C-6CC-6B	C-6B	C-6A	15	352.426	0.001	0.223	0.223	Free Surface	1.017	0.235	0.121	0.293	0.182	0.394	1.847	No	0.293	1.017

ID	From ID	To ID	Diameter (in)	Length (ft)	Slope	Total Flow (cfs)	Unpeakable Flow (cfs)	Flow Type	Velocity (ft/s)	d/D	q/Q	Water Depth (ft)	Critical Depth (ft)	Froude Number	Full Flow (cfs)	Backwater Adjustment	Adjusted Depth (ft)	Adjusted Velocity (ft/s)
C-7AC-7	C-7A	C-7	12	22.499	0.003	0.206	0.206	Free Surface	1.652	0.216	0.102	0.216	0.186	0.747	2.015	No	0.216	1.652
C-7C-6C	C-7	C-6B	15	8.447	0.016	0.222	0.222	Free Surface	2.878	0.114	0.027	0.142	0.182	1.627	8.121	Yes	0.227	1.457
C-8C-7A	C-8	C-7A	12	360.017	0	0.205	0.205	Free Surface	0.726	0.388	0.319	0.388	0.186	0.238	0.641	No	0.388	0.726
C-9C-8	C-9	C-8	12	407.448	0.003	0.194	0.194	Free Surface	1.558	0.216	0.102	0.216	0.181	0.706	1.904	Yes	0.252	1.249
C10-1C-10	C10-1	C-10	8	393.509	0.003	0.011	0.011	Free Surface	0.742	0.086	0.015	0.057	0.047	0.664	0.712	No	0.057	0.742
C10-2C10-1	C10-2	C10-1	8	355.112	0.003	0.009	0.009	Free Surface	0.696	0.081	0.013	0.054	0.043	0.642	0.694	No	0.054	0.696
C10-3C10-2	C10-3	C10-2	8	357.478	0.004	0.008	0.008	Free Surface	0.699	0.071	0.01	0.047	0.039	0.687	0.755	No	0.047	0.699
C10-4C10-3	C10-4	C10-3	8	355.862	0.008	0.006	0.006	Free Surface	0.834	0.054	0.006	0.036	0.035	0.941	1.074	No	0.036	0.834
C10-5C10-4	C10-5	C10-4	8	354.651	0.004	0.005	0.005	Free Surface	0.622	0.055	0.006	0.036	0.03	0.7	0.799	No	0.036	0.622
C10-6C10-5	C10-6	C10-5	8	355.258	0.004	0.003	0.003	Free Surface	0.552	0.045	0.004	0.03	0.025	0.684	0.803	No	0.03	0.552
C10-7C10-6	C10-7	C10-6	8	401.916	0.015	0.002	0.002	Free Surface	0.687	0.024	0.001	0.016	0.018	1.161	1.496	No	0.016	0.687
C11-1C-11	C11-1	C-11	8	388.374	0.004	0.011	0.011	Free Surface	0.806	0.081	0.013	0.054	0.047	0.741	0.801	Yes	0.084	0.42
C11-2C11-1	C11-2	C11-1	8	354.392	0.005	0.009	0.009	Free Surface	0.817	0.072	0.011	0.048	0.043	0.796	0.873	No	0.048	0.817
C11-3C11-2	C11-3	C11-2	8	356.49	0.005	0.008	0.008	Free Surface	0.786	0.066	0.009	0.044	0.039	0.804	0.894	No	0.044	0.786
C11-4C11-3	C11-4	C11-3	8	356.359	0.007	0.006	0.006	Free Surface	0.782	0.057	0.006	0.038	0.035	0.863	0.98	No	0.038	0.782
C11-5C11-4	C11-5	C11-4	8	343.676	0.005	0.005	0.005	Free Surface	0.636	0.054	0.006	0.036	0.03	0.722	0.825	No	0.036	0.636
C11-6C11-5	C11-6	C11-5	8	368.489	0.006	0.003	0.003	Free Surface	0.604	0.042	0.003	0.028	0.025	0.772	0.914	No	0.028	0.604
C11-7C11-6	C11-7	C11-6	8	399.906	0.011	0.002	0.002	Free Surface	0.622	0.026	0.001	0.017	0.018	1.016	1.295	No	0.017	0.622
C12-1C-12	C12-1	C-12	8	396.643	0.011	0.08	0.08	Free Surface	2.052	0.169	0.062	0.113	0.128	1.294	1.289	No	0.113	2.052
C12-2C12-1	C12-2	C12-1	8	386.026	0.003	0.079	0.079	Free Surface	1.324	0.226	0.112	0.151	0.127	0.715	0.698	No	0.151	1.324
C12-3C12-2	C12-3	C12-2	8	400.447	0.003	0.077	0.077	Free Surface	1.266	0.23	0.116	0.154	0.126	0.678	0.662	No	0.154	1.266
C12-4C12-3	C12-4	C12-3	8	360.347	0.003	0.075	0.075	Free Surface	1.247	0.23	0.116	0.153	0.125	0.669	0.652	No	0.153	1.247
C12-5C12-4	C12-5	C12-4	8	367.561	0.003	0.074	0.074	Free Surface	1.283	0.222	0.108	0.148	0.123	0.701	0.685	No	0.148	1.283
C12-6C12-5	C12-6	C12-5	8	370.222	0.003	0.072	0.072	Free Surface	1.261	0.221	0.107	0.148	0.122	0.69	0.674	No	0.148	1.261
C12-7C12-6	C12-7	C12-6	8	328.778	0.011	0.002	0.002	Free Surface	0.609	0.026	0.001	0.018	0.018	0.988	1.257	Yes	0.033	0.244
C13-1C-13	C13-1	C-13	8	394.413	0.005	0.006	0.006	Free Surface	0.733	0.059	0.007	0.04	0.035	0.791	0.892	No	0.04	0.733
C13-2C13-1	C13-2	C13-1	8	390.698	0.005	0.005	0.005	Free Surface	0.666	0.052	0.005	0.035	0.03	0.767	0.881	No	0.035	0.666
C13-3C13-2	C13-3	C13-2	8	378.164	0.007	0.003	0.003	Free Surface	0.652	0.04	0.003	0.027	0.025	0.856	1.021	No	0.027	0.652
C13-4C13-3	C13-4	C13-3	8	246.605	0.005	0.002	0.002	Free Surface	0.478	0.031	0.002	0.021	0.018	0.714	0.886	No	0.021	0.478
C16-1C-16	C16-1	C-16	8	394.303	0.004	0.006	0.006	Free Surface	0.635	0.065	0.008	0.044	0.035	0.652	0.726	No	0.044	0.635
C16-2C16-1	C16-2	C16-1	8	421.685	0.008	0.005	0.005	Free Surface	0.765	0.047	0.004	0.032	0.03	0.924	1.076	No	0.032	0.765
C16-3C16-2	C16-3	C16-2	8	337.053	0.008	0.003	0.003	Free Surface	0.671	0.039	0.003	0.026	0.025	0.889	1.064	No	0.026	0.671
C16-4C16-3	C16-4	C16-3	8	360.152	0.008	0.002	0.002	Free Surface	0.552	0.028	0.001	0.019	0.018	0.865	1.089	No	0.019	0.552
C18-1C-18	C18-1	C-18	8	380.615	0.011	0.008	0.008	Free Surface	0.993	0.056	0.006	0.037	0.039	1.101	1.251	No	0.037	0.993
C18-2C18-1	C18-2	C18-1	8	380.561	0.009	0.006	0.006	Free Surface	0.873	0.053	0.005	0.035	0.035	1	1.146	No	0.035	0.873
C18-3C18-2	C18-3	C18-2	8	377.26	0.005	0.005	0.005	Free Surface	0.641	0.053	0.006	0.036	0.03	0.728	0.834	No	0.036	0.641
C18-4C18-3	C18-4	C18-3	8	249.675	0.002	0.003	0.003	Free Surface	0.43	0.053	0.005	0.035	0.025	0.49	0.561	No	0.035	0.43
C18-5C18-4	C18-5	C18-4	8	249.789	0.004	0.002	0.002	Free Surface	0.425	0.034	0.002	0.022	0.018	0.609	0.747	No	0.022	0.425
C20-1C-20	C20-1	C-20	8	384.391	0.004	0.008	0.008	Free Surface	0.689	0.072	0.01	0.048	0.039	0.675	0.741	No	0.048	0.689
C20-2C20-1	C20-2	C20-1	8	376.708	0.015	0.006	0.006	Free Surface	1.042	0.047	0.004	0.031	0.035	1.268	1.479	No	0.031	1.042
C20-3C20-2	C20-3	C20-2	8	381.088	0.003	0.005	0.005	Free Surface	0.564	0.058	0.007	0.039	0.03	0.614	0.694	No	0.039	0.564
C20-4C20-3	C20-4	C20-3	8	249.145	0.003	0.003	0.003	Free Surface	0.497	0.048	0.004	0.032	0.025	0.595	0.691	No	0.032	0.497
C20-5C20-4	C20-5	C20-4	8	241.401	0.024	0.002	0.002	Free Surface	0.809	0.022	0.001	0.015	0.018	1.442	1.89	No	0.015	0.809
C22-1C-22	C22-1	C-22	8	381.746	0.005	0.008	0.008	Free Surface	0.744	0.068	0.009	0.046	0.039	0.747	0.826	No	0.046	0.744
C22-2C22-1	C22-2	C22-1	8	380.816	0.015	0.006	0.006	Free Surface	1.053	0.046	0.004	0.031	0.035	1.286	1.502	No	0.031	1.053
C22-3AC22-3	C22-3A	C22-3	8	425.723	0.049	0.002	0.002	Free Surface	1.028	0.019	0.001	0.012	0.018	1.988	2.672	No	0.012	1.028

ID	From ID	To ID	Diameter (in)	Length (ft)	Slope	Total Flow (cfs)	Unpeakable Flow (cfs)	Flow Type	Velocity (ft/s)	d/D	q/Q	Water Depth (ft)	Critical Depth (ft)	Froude Number	Full Flow (cfs)	Backwater Adjustment	Adjusted Depth (ft)	Adjusted Velocity (ft/s)
C22-3C22-2	C22-3	C22-2	8	377.679	0.004	0.005	0.005	Free Surface	0.58	0.057	0.006	0.038	0.03	0.637	0.722	No	0.038	0.58
C22-4C22-3	C22-4	C22-3	8	365.776	0.004	0.002	0.002	Free Surface	0.415	0.034	0.002	0.023	0.018	0.592	0.723	No	0.023	0.415
C24-1C-24	C24-1	C-24	8	385.078	0.008	0.009	0.009	Free Surface	0.955	0.065	0.008	0.043	0.043	0.982	1.093	No	0.043	0.955
C24-2C24-1	C24-2	C24-1	8	374.413	0.007	0.008	0.008	Free Surface	0.846	0.063	0.008	0.042	0.039	0.888	0.994	No	0.042	0.846
C24-3AC24-3	C24-3A	C24-3	8	378.266	0.049	0.002	0.002	Free Surface	1.03	0.019	0.001	0.012	0.018	1.994	2.681	No	0.012	1.03
C24-3C24-2	C24-3	C24-2	8	381.594	0.011	0.006	0.006	Free Surface	0.934	0.05	0.005	0.034	0.035	1.094	1.263	No	0.034	0.934
C24-4C24-3	C24-4	C24-3	8	423.8	0.007	0.003	0.003	Free Surface	0.651	0.04	0.003	0.027	0.025	0.853	1.018	No	0.027	0.651
C24-5C24-4	C24-5	C24-4	8	299.837	0.019	0.002	0.002	Free Surface	0.745	0.023	0.001	0.015	0.018	1.293	1.681	No	0.015	0.745
C26-1C-26	C26-1	C-26	8	380.196	0.011	0.006	0.006	Free Surface	0.941	0.05	0.005	0.033	0.035	1.106	1.277	No	0.033	0.941
C26-2C26-1	C26-2	C26-1	8	376.177	0.015	0.005	0.005	Free Surface	0.967	0.041	0.003	0.027	0.03	1.264	1.506	No	0.027	0.967
C26-3C26-2	C26-3	C26-2	8	389.37	0.005	0.003	0.003	Free Surface	0.576	0.044	0.004	0.029	0.025	0.725	0.855	No	0.029	0.576
C26-4C26-3	C26-4	C26-3	8	261.013	0.029	0.002	0.002	Free Surface	0.862	0.021	0.001	0.014	0.018	1.571	2.073	No	0.014	0.862
C3-1C-3	C3-1	C-3	8	404.067	0.005	0.017	0.017	Free Surface	0.992	0.096	0.019	0.064	0.058	0.838	0.886	Yes	0.084	0.665
C3-2C3-1	C3-2	C3-1	8	399.029	0.004	0.015	0.015	Free Surface	0.865	0.099	0.02	0.066	0.056	0.721	0.76	No	0.066	0.865
C3-3C3-2	C3-3	C3-2	8	403.182	0.003	0.014	0.014	Free Surface	0.751	0.101	0.021	0.067	0.053	0.618	0.649	No	0.067	0.751
C3-4C3-3	C3-4	C3-3	8	396.856	0.004	0.012	0.012	Free Surface	0.796	0.09	0.017	0.06	0.05	0.696	0.742	No	0.06	0.796
C3-5C3-4	C3-5	C3-4	8	415.099	0.004	0.011	0.011	Free Surface	0.774	0.083	0.014	0.056	0.047	0.702	0.756	Yes	0.108	0.295
C3-6A1C3-6A	C3-6A1	C3-6A	8	281.694	0.004	0.002	0.002	Free Surface	0.432	0.033	0.002	0.022	0.018	0.624	0.766	No	0.022	0.432
C3-6AC3-6	C3-6A	C3-6	8	408.484	0.003	0.005	0.005	Free Surface	0.571	0.058	0.007	0.039	0.03	0.625	0.707	No	0.039	0.571
C3-6BC3-6A	C3-6B	C3-6A	8	252.047	0.003	0.002	0.002	Free Surface	0.409	0.035	0.002	0.023	0.018	0.58	0.709	No	0.023	0.409
C3-6C3-5	C3-6	C3-5	8	413.737	0.004	0.009	0.009	Free Surface	0.718	0.079	0.013	0.053	0.043	0.669	0.726	Yes	0.104	0.265
C3-7C3-6	C3-7	C3-6	8	289.532	0.004	0.003	0.003	Free Surface	0.51	0.047	0.004	0.032	0.025	0.617	0.718	No	0.032	0.51
C3-8C3-7	C3-8	C3-7	8	321.915	0.007	0.002	0.002	Free Surface	0.524	0.029	0.002	0.02	0.018	0.807	1.011	No	0.02	0.524
C4-1C-4	C4-1	C-4	8	394.356	0.005	0.026	0.026	Free Surface	1.067	0.123	0.032	0.082	0.073	0.794	0.816	Yes	0.095	0.858
C4-2C4-1	C4-2	C4-1	8	360.196	0.004	0.025	0.025	Free Surface	0.983	0.125	0.033	0.083	0.071	0.726	0.745	No	0.083	0.983
C4-3C4-2	C4-3	C4-2	8	444.064	0.004	0.023	0.023	Free Surface	0.991	0.119	0.03	0.079	0.068	0.751	0.775	No	0.079	0.991
C5-1C-5	C5-1	C-5	8	395.375	0.004	0.005	0.005	Free Surface	0.597	0.056	0.006	0.037	0.03	0.662	0.753	No	0.037	0.597
C5-2C5-1	C5-2	C5-1	8	400.643	0.003	0.003	0.003	Free Surface	0.499	0.048	0.004	0.032	0.025	0.598	0.694	No	0.032	0.499
C5-3C5-2	C5-3	C5-2	8	409.915	0.004	0.002	0.002	Free Surface	0.426	0.034	0.002	0.022	0.018	0.612	0.75	No	0.022	0.426
C6-1C-6	C6-1	C-6	8	395.468	0.004	0.005	0.005	Free Surface	0.617	0.055	0.006	0.037	0.03	0.693	0.79	No	0.037	0.617
C6-2C6-1	C6-2	C6-1	8	401.719	0.004	0.003	0.003	Free Surface	0.543	0.045	0.004	0.03	0.025	0.67	0.785	No	0.03	0.543
C6-3C6-2	C6-3	C6-2	8	402.623	0.005	0.002	0.002	Free Surface	0.469	0.032	0.002	0.021	0.018	0.696	0.862	No	0.021	0.469
C7-1C7	C7-1	C-7	8	399.024	0.003	0.014	0.014	Free Surface	0.795	0.097	0.02	0.065	0.053	0.667	0.705	No	0.065	0.795
C7-2C7-1	C7-2	C7-1	8	401.25	0.003	0.012	0.012	Free Surface	0.729	0.095	0.019	0.063	0.05	0.619	0.655	No	0.063	0.729
C7-3C7-2	C7-3	C7-2	8	413.373	0.004	0.011	0.011	Free Surface	0.798	0.082	0.014	0.055	0.047	0.731	0.789	No	0.055	0.798
C7-4AC7-3	C7-4A	C7-3	8	384.949	0.006	0.009	0.009	Free Surface	0.836	0.071	0.01	0.048	0.043	0.822	0.903	No	0.048	0.836
C7-4C7-4A	C7-4	C7-4A	8	9.947	0.084	0.008	0.008	Free Surface	2.034	0.035	0.002	0.023	0.039	2.878	3.512	No	0.023	2.034
C7-5AC7-4	C7-5A	C7-4	8	401.026	0.002	0.006	0.006	Free Surface	0.51	0.076	0.012	0.05	0.035	0.486	0.53	No	0.05	0.51
C7-5C7-5A	C7-5	C7-5A	8	9.894	0.12	0.005	0.005	Free Surface	1.969	0.025	0.001	0.017	0.03	3.273	4.197	Yes	0.034	0.699
C7-6C7-5	C7-6	C7-5	8	401.541	0.002	0.003	0.003	Free Surface	0.385	0.057	0.006	0.038	0.025	0.422	0.479	No	0.038	0.385
C7-7C7-6	C7-7	C7-6	8	255.2	0.006	0.002	0.002	Free Surface	0.488	0.031	0.002	0.02	0.018	0.734	0.912	No	0.02	0.488
C8-1C-8	C8-1	C-8	8	399.687	0.004	0.009	0.009	Free Surface	0.728	0.078	0.012	0.052	0.043	0.682	0.74	No	0.052	0.728
C8-2C8-1	C8-2	C8-1	8	401.028	0.003	0.008	0.008	Free Surface	0.668	0.073	0.011	0.049	0.039	0.647	0.708	No	0.049	0.668
C8-3C8-2	C8-3	C8-2	8	401.123	0.004	0.006	0.006	Free Surface	0.66	0.064	0.008	0.042	0.035	0.686	0.766	No	0.042	0.66
C8-4C8-3	C8-4	C8-3	8	397.399	0.004	0.005	0.005	Free Surface	0.593	0.056	0.006	0.038	0.03	0.657	0.746	No	0.038	0.593
C8-5C8-4	C8-5	C8-4	8	405.457	0.004	0.003	0.003	Free Surface	0.551	0.045	0.004	0.03	0.025	0.683	0.801	No	0.03	0.551

ID	From ID	To ID	Diameter (in)	Length (ft)	Slope	Total Flow (cfs)	Unpeakable Flow (cfs)	Flow Type	Velocity (ft/s)	d/D	q/Q	Water Depth (ft)	Critical Depth (ft)	Froude Number	Full Flow (cfs)	Backwater Adjustment	Adjusted Depth (ft)	Adjusted Velocity (ft/s)
C8-6C8-5	C8-6	C8-5	8	337.655	0.005	0.002	0.002	Free Surface	0.462	0.032	0.002	0.021	0.018	0.682	0.843	No	0.021	0.462
C9-1C9	C9-1	C-9	8	394.597	0.005	0.009	0.009	Free Surface	0.785	0.074	0.011	0.05	0.043	0.755	0.825	No	0.05	0.785
C9-2C9-1	C9-2	C9-1	8	398.783	0.004	0.008	0.008	Free Surface	0.689	0.072	0.01	0.048	0.039	0.675	0.741	No	0.048	0.689
C9-3C9-2	C9-3	C9-2	8	398.332	0.004	0.006	0.006	Free Surface	0.674	0.063	0.008	0.042	0.035	0.707	0.791	No	0.042	0.674
C9-4C9-3	C9-4	C9-3	8	407.521	0.004	0.005	0.005	Free Surface	0.625	0.054	0.006	0.036	0.03	0.704	0.803	No	0.036	0.625
C9-5C9-4	C9-5	C9-4	8	391.223	0.005	0.003	0.003	Free Surface	0.576	0.044	0.004	0.029	0.025	0.724	0.854	No	0.029	0.576
C9-6C9-5	C9-6	C9-5	8	332.714	0.011	0.002	0.002	Free Surface	0.612	0.026	0.001	0.018	0.018	0.994	1.265	No	0.018	0.612
D-10D-9	D-10	D-9	15	355.006	0.005	0.236	0.236	Free Surface	1.92	0.156	0.053	0.196	0.188	0.92	4.442	No	0.196	1.92
D-11D-10	D-11	D-10	15	397.227	0.002	0.234	0.234	Free Surface	1.413	0.193	0.081	0.241	0.187	0.607	2.881	No	0.241	1.413
D-12D-11	D-12	D-11	12	399.274	0.003	0.232	0.232	Free Surface	1.648	0.235	0.122	0.235	0.198	0.712	1.913	No	0.235	1.648
D-13D-12	D-13	D-12	12	365.557	0.003	0.037	0.037	Free Surface	1.011	0.093	0.018	0.093	0.078	0.709	2.076	Yes	0.114	0.746
D-14D-13	D-14	D-13	8	347.678	0.014	0.028	0.028	Free Surface	1.619	0.096	0.019	0.064	0.075	1.367	1.446	No	0.064	1.619
D-15A2D-15A	D-15A2	D-15A	8	182.011	0.008	0.002	0.002	Free Surface	0.54	0.029	0.001	0.019	0.018	0.841	1.056	No	0.019	0.54
D-15AD-15	D-15A	D-15	8	274.978	0.006	0.005	0.005	Free Surface	0.702	0.05	0.005	0.034	0.03	0.823	0.95	No	0.034	0.702
D-15AD-15B	D-15B	D-15A	8	345.534	0.006	0.002	0.002	Free Surface	0.497	0.03	0.002	0.02	0.018	0.753	0.938	No	0.02	0.497
D-15D-14	D-15	D-14	8	166.755	0.011	0.026	0.026	Free Surface	1.448	0.1	0.021	0.066	0.073	1.2	1.263	No	0.066	1.448
D-16D-15	D-16	D-15	8	183.173	0.011	0.02	0.02	Free Surface	1.36	0.087	0.015	0.058	0.064	1.21	1.297	No	0.058	1.36
D-17D-16	D-17	D-16	8	347.425	0.015	0.018	0.018	Free Surface	1.444	0.079	0.013	0.053	0.061	1.349	1.463	No	0.053	1.444
D-18D-17	D-18	D-17	8	347.551	0.014	0.017	0.017	Free Surface	1.4	0.076	0.012	0.051	0.058	1.333	1.454	No	0.051	1.4
D-19D-18	D-19	D-18	8	342.565	0.015	0.015	0.015	Free Surface	1.37	0.072	0.01	0.048	0.056	1.338	1.469	No	0.048	1.37
D-1I-54	D-1	I-54	15	365.829	0.003	0.353	0.353	Free Surface	1.763	0.22	0.106	0.275	0.23	0.707	3.326	Yes	0.311	1.48
D-20D-19	D-20	D-19	8	413.68	0.017	0.014	0.014	Free Surface	1.409	0.066	0.009	0.044	0.053	1.44	1.6	No	0.044	1.409
D-21D-20	D-21	D-20	8	401.811	0.017	0.012	0.012	Free Surface	1.354	0.063	0.008	0.042	0.05	1.421	1.591	No	0.042	1.354
D-22D-21	D-22	D-21	8	179.889	0.018	0.011	0.011	Free Surface	1.315	0.058	0.007	0.039	0.047	1.432	1.618	No	0.039	1.315
D-23D-22	D-23	D-22	8	354.854	0.004	0.009	0.009	Free Surface	0.741	0.077	0.012	0.052	0.043	0.698	0.759	No	0.052	0.741
D-24D-23	D-24	D-23	8	315.214	0.006	0.008	0.008	Free Surface	0.801	0.065	0.008	0.043	0.039	0.825	0.919	No	0.043	0.801
D-25D-24	D-25	D-24	8	329.001	0.008	0.006	0.006	Free Surface	0.856	0.053	0.006	0.036	0.035	0.973	1.114	No	0.036	0.856
D-26D-25	D-26	D-25	8	341.164	0.022	0.005	0.005	Free Surface	1.09	0.037	0.003	0.025	0.03	1.484	1.79	No	0.025	1.09
D-27D-26	D-27	D-26	8	337.953	0.014	0.003	0.003	Free Surface	0.825	0.034	0.002	0.023	0.025	1.172	1.433	No	0.023	0.825
D-28D-27	D-28	D-27	8	329.035	0.03	0.002	0.002	Free Surface	0.871	0.021	0.001	0.014	0.018	1.592	2.102	No	0.014	0.871
D-2D-1	D-2	D-1	15	364.893	0.001	0.351	0.351	Free Surface	1.172	0.293	0.187	0.366	0.23	0.403	1.878	No	0.366	1.172
D-3D-2	D-3	D-2	15	393.525	0.011	0.294	0.294	Free Surface	2.747	0.142	0.044	0.178	0.21	1.383	6.734	Yes	0.222	1.995
D-4D-3	D-4	D-3	15	402.244	0.001	0.293	0.293	Free Surface	1.226	0.249	0.136	0.311	0.209	0.46	2.151	No	0.311	1.226
D-5D-4	D-5	D-4	15	405.815	0.002	0.291	0.291	Free Surface	1.387	0.227	0.113	0.284	0.209	0.546	2.567	No	0.284	1.387
D-6D-5	D-6	D-5	15	381.078	0.001	0.289	0.289	Free Surface	1.092	0.268	0.158	0.335	0.208	0.393	1.837	No	0.335	1.092
D-7D-6	D-7	D-6	15	233.693	0.011	0.248	0.248	Free Surface	2.623	0.131	0.037	0.163	0.192	1.38	6.783	Yes	0.199	1.964
D-8D-7	D-8	D-7	15	275.535	0.004	0.239	0.239	Free Surface	1.763	0.167	0.061	0.209	0.189	0.816	3.915	No	0.209	1.763
D-9D-8	D-9	D-8	15	346.652	0.004	0.237	0.237	Free Surface	1.735	0.169	0.062	0.211	0.188	0.8	3.837	No	0.211	1.735
D13-1D-13	D13-1	D-13	8	368.769	0.004	0.008	0.008	Free Surface	0.689	0.072	0.01	0.048	0.039	0.674	0.74	No	0.048	0.689
D13-2D13-1	D13-2	D13-1	8	344.744	0.003	0.006	0.006	Free Surface	0.566	0.071	0.01	0.047	0.035	0.559	0.615	No	0.047	0.566
D13-3D13-2	D13-3	D13-2	8	384.226	0.003	0.005	0.005	Free Surface	0.564	0.058	0.007	0.039	0.03	0.614	0.694	No	0.039	0.564
D13-4D13-3	D13-4	D13-3	8	269.275	0.003	0.003	0.003	Free Surface	0.491	0.049	0.005	0.032	0.025	0.585	0.679	No	0.032	0.491
D13-5D13-4	D13-5	D13-4	8	265.355	0.004	0.002	0.002	Free Surface	0.423	0.034	0.002	0.023	0.018	0.607	0.743	No	0.023	0.423
D6-10D6-9	D6-10	D6-9	8	398.018	0.008	0.002	0.002	Free Surface	0.55	0.028	0.001	0.019	0.018	0.862	1.085	No	0.019	0.55
D6-1D-6	D6-1	D-6	8	423.897	0.004	0.04	0.04	Free Surface	1.153	0.156	0.053	0.104	0.09	0.758	0.76	Yes	0.17	0.572
D6-2AD6-2	D6-2A	D6-2	8	346.519	0.003	0.003	0.003	Free Surface	0.51	0.047	0.004	0.032	0.025	0.616	0.717	No	0.032	0.51

ID	From ID	To ID	Diameter (in)	Length (ft)	Slope	Total Flow (cfs)	Unpeakable Flow (cfs)	Flow Type	Velocity (ft/s)	d/D	q/Q	Water Depth (ft)	Critical Depth (ft)	Froude Number	Full Flow (cfs)	Backwater Adjustment	Adjusted Depth (ft)	Adjusted Velocity (ft/s)
D6-2BD6-2A	D6-2B	D6-2A	8	344.124	0.003	0.002	0.002	Free Surface	0.411	0.034	0.002	0.023	0.018	0.584	0.713	No	0.023	0.411
D6-2C1D6-2C	D6-2C1	D6-2C	8	269.019	0.005	0.002	0.002	Free Surface	0.459	0.032	0.002	0.021	0.018	0.676	0.835	No	0.021	0.459
D6-2CD6-2B	D6-2C	D6-2	8	164.509	0.003	0.012	0.012	Free Surface	0.728	0.095	0.019	0.064	0.05	0.617	0.653	No	0.064	0.728
D6-2D6-1	D6-2	D6-1	8	393.353	0.003	0.038	0.038	Free Surface	1.047	0.162	0.057	0.108	0.089	0.675	0.674	No	0.108	1.047
D6-2DD6-2C	D6-2D	D6-2C	8	220.441	0.004	0.009	0.009	Free Surface	0.739	0.078	0.012	0.052	0.043	0.696	0.756	No	0.052	0.739
D6-2E1D6-2E	D6-2E1	D6-2E	8	215.631	0.003	0.005	0.005	Free Surface	0.57	0.058	0.007	0.039	0.03	0.623	0.705	No	0.039	0.57
D6-2E2D6-2E1	D6-2E2	D6-2E1	8	207.935	0.003	0.003	0.003	Free Surface	0.487	0.049	0.005	0.033	0.025	0.579	0.671	No	0.033	0.487
D6-2E3D6-2E2	D6-2E3	D6-2E2	8	382.415	0.005	0.002	0.002	Free Surface	0.473	0.031	0.002	0.021	0.018	0.704	0.872	No	0.021	0.473
D6-2ED6-2D	D6-2E	D6-2D	8	232.968	0.002	0.008	0.008	Free Surface	0.573	0.081	0.014	0.054	0.039	0.526	0.568	No	0.054	0.573
D6-2FD6-2E	D6-2F	D6-2E	8	366.152	0.01	0.002	0.002	Free Surface	0.59	0.027	0.001	0.018	0.018	0.946	1.199	No	0.018	0.59
D6-3D6-2	D6-3	D6-2	8	380.075	0.006	0.02	0.02	Free Surface	1.067	0.102	0.022	0.068	0.064	0.873	0.916	No	0.068	1.067
D6-4D6-3	D6-4	D6-3	8	314.156	0.005	0.018	0.018	Free Surface	0.963	0.104	0.023	0.069	0.061	0.781	0.818	No	0.069	0.963
D6-5D6-4	D6-5	D6-4	8	340.745	0.003	0.017	0.017	Free Surface	0.835	0.108	0.024	0.072	0.058	0.664	0.693	No	0.072	0.835
D6-6D6-5	D6-6	D6-5	8	300.319	0.003	0.015	0.015	Free Surface	0.818	0.102	0.022	0.068	0.056	0.668	0.701	No	0.068	0.818
D6-7A1D6-7A	D6-7A1	D6-7A	8	202.466	0.012	0.002	0.002	Free Surface	0.637	0.026	0.001	0.017	0.018	1.049	1.341	No	0.017	0.637
D6-7AD6-7	D6-7A	D6-7	8	290.904	0.004	0.008	0.008	Free Surface	0.691	0.072	0.01	0.048	0.039	0.677	0.743	No	0.048	0.691
D6-7BD6-7A	D6-7B	D6-7A	8	402.616	0.003	0.005	0.005	Free Surface	0.562	0.058	0.007	0.039	0.03	0.611	0.691	No	0.039	0.562
D6-7CD6-7B	D6-7C	D6-7B	8	238.048	0.014	0.003	0.003	Free Surface	0.834	0.034	0.002	0.023	0.025	1.189	1.454	No	0.023	0.834
D6-7D6-6	D6-7	D6-6	8	285.181	0.003	0.014	0.014	Free Surface	0.723	0.104	0.023	0.069	0.053	0.587	0.615	No	0.069	0.723
D6-7DD6-7C	D6-7D	D6-7C	8	247.463	0.004	0.002	0.002	Free Surface	0.443	0.033	0.002	0.022	0.018	0.646	0.795	No	0.022	0.443
D6-8D6-7	D6-8	D6-7	8	123.779	0.015	0.005	0.005	Free Surface	0.955	0.041	0.003	0.027	0.03	1.243	1.479	No	0.027	0.955
D6-9D6-8	D6-9	D6-8	8	149.351	0.011	0.003	0.003	Free Surface	0.757	0.036	0.002	0.024	0.025	1.045	1.266	No	0.024	0.757
DA-1D-7	D7-1	D-7	8	350.328	0.006	0.008	0.008	Free Surface	0.791	0.065	0.009	0.044	0.039	0.811	0.902	Yes	0.054	0.585
DA-2DA-1	D7-2	D7-1	8	339.334	0.007	0.006	0.006	Free Surface	0.811	0.055	0.006	0.037	0.035	0.906	1.031	No	0.037	0.811
DA-3DA-2	D7-3	D7-2	8	342.858	0.006	0.005	0.005	Free Surface	0.697	0.051	0.005	0.034	0.03	0.815	0.94	No	0.034	0.697
DA-4DA-3	D7-4	D7-3	8	334.531	0.005	0.003	0.003	Free Surface	0.564	0.044	0.004	0.03	0.025	0.705	0.829	No	0.03	0.564
DA-5DA-4	D7-5	D7-4	8	337.34	0.009	0.002	0.002	Free Surface	0.578	0.027	0.001	0.018	0.018	0.922	1.166	No	0.018	0.578
DG-10DG-9	DG-10	DG-9	8	311.973	0.004	0.02	0.02	Free Surface	0.901	0.115	0.028	0.076	0.064	0.694	0.719	No	0.076	0.901
DG-11DG-10	DG-11	DG-10	15	400.424	0.003	0.018	0.018	Free Surface	0.752	0.052	0.005	0.065	0.052	0.631	3.487	No	0.065	0.752
DG-12DG-11	DG-12	DG-11	8	398.884	0.003	0.017	0.017	Free Surface	0.776	0.113	0.027	0.076	0.058	0.602	0.624	No	0.076	0.776
DG-13DG-12	DG-13	DG-12	15	398.209	0.003	0.015	0.015	Free Surface	0.75	0.046	0.004	0.058	0.047	0.669	3.764	No	0.058	0.75
DG-14DG-13	DG-14	DG-13	8	326.066	0.003	0.006	0.006	Free Surface	0.592	0.068	0.009	0.046	0.035	0.594	0.656	No	0.046	0.592
DG-15DG-13	DG-15	DG-13	8	324.457	0.005	0.005	0.005	Free Surface	0.633	0.054	0.006	0.036	0.03	0.716	0.818	No	0.036	0.633
DG-16DG-15	DG-16	DG-15	8	178.018	0.004	0.002	0.002	Free Surface	0.424	0.034	0.002	0.022	0.018	0.609	0.746	No	0.022	0.424
DG-1I-40	DG-1	I-40	18	363.751	0.002	1.03	1.03	Free Surface	2.262	0.305	0.202	0.457	0.379	0.694	5.107	Yes	0.573	1.661
DG-2DG-1	DG-2	DG-1	8	236.693	0.003	0.032	0.032	Free Surface	0.96	0.153	0.05	0.102	0.081	0.639	0.642	Yes	0.229	0.304
DG-3DG-2	DG-3	DG-2	8	233.229	0.003	0.031	0.031	Free Surface	0.981	0.145	0.046	0.097	0.079	0.669	0.675	No	0.097	0.981
DG-4DG-3	DG-4	DG-3	8	213.985	0.002	0.029	0.029	Free Surface	0.831	0.157	0.054	0.105	0.077	0.544	0.545	No	0.105	0.831
DG-5DG-4	DG-5	DG-4	8	187.819	0.003	0.028	0.028	Free Surface	0.921	0.141	0.043	0.094	0.075	0.638	0.646	No	0.094	0.921
DG-6DG-5	DG-6	DG-5	8	388.63	0.002	0.026	0.026	Free Surface	0.836	0.145	0.045	0.097	0.073	0.57	0.576	No	0.097	0.836
DG-7DG-6	DG-7	DG-6	8	232.807	0.004	0.025	0.025	Free Surface	0.981	0.125	0.033	0.083	0.071	0.724	0.743	No	0.083	0.981
DG-8DG-7	DG-8	DG-7	8	229.769	0.003	0.023	0.023	Free Surface	0.938	0.123	0.032	0.082	0.068	0.698	0.717	No	0.082	0.938
DG-9DG-8	DG-9	DG-8	15	324.667	0.002	0.022	0.022	Free Surface	0.698	0.061	0.007	0.076	0.056	0.542	2.929	No	0.076	0.698
DG13-1DG-13	DG13-1	DG-13	8	75.517	0.022	0.003	0.003	Free Surface	0.97	0.031	0.002	0.021	0.025	1.456	1.809	No	0.021	0.97
DG13-2DG13-1	DG13-2	DG13-1	8	388.763	0.005	0.002	0.002	Free Surface	0.453	0.032	0.002	0.022	0.018	0.664	0.819	No	0.022	0.453
DG14-1DG-14	DG14-1	DG-14	8	204.8	0.006	0.005	0.005	Free Surface	0.69	0.051	0.005	0.034	0.03	0.805	0.928	No	0.034	0.69

ID	From ID	To ID	Diameter (in)	Length (ft)	Slope	Total Flow (cfs)	Unpeakable Flow (cfs)	Flow Type	Velocity (ft/s)	d/D	q/Q	Water Depth (ft)	Critical Depth (ft)	Froude Number	Full Flow (cfs)	Backwater Adjustment	Adjusted Depth (ft)	Adjusted Velocity (ft/s)
DG14-2DG14-1	DG14-2	DG14-1	8	357.128	0.006	0.003	0.003	Free Surface	0.605	0.042	0.003	0.028	0.025	0.774	0.917	No	0.028	0.605
DG14-3DG14-2	DG14-3	DG14-2	8	293.234	0.004	0.002	0.002	Free Surface	0.449	0.032	0.002	0.022	0.018	0.658	0.811	No	0.022	0.449
DG15-1DG-15	DG15-1	DG-15	8	330.438	0.004	0.002	0.002	Free Surface	0.449	0.032	0.002	0.022	0.018	0.657	0.809	No	0.022	0.449
EA-NORTHE-2	D6-2AA	D6-2	8	195.889	0.004	0.002	0.002	Free Surface	0.424	0.034	0.002	0.022	0.018	0.609	0.746	No	0.022	0.424
G-10G-9	G-10	G-9	10	417.2	0.003	0.159	0.159	Free Surface	1.508	0.248	0.134	0.206	0.171	0.695	1.181	No	0.206	1.508
G-11G-10	G-11	G-10	10	424.65	0.002	0.157	0.157	Free Surface	1.334	0.268	0.157	0.224	0.17	0.589	0.997	No	0.224	1.334
G-12G-11	G-12	G-11	10	392.092	0.002	0.155	0.155	Free Surface	1.379	0.26	0.148	0.217	0.17	0.619	1.05	No	0.217	1.379
G-13G-12	G-13	G-12	10	307.632	0.003	0.152	0.152	Free Surface	1.528	0.238	0.125	0.199	0.168	0.719	1.222	No	0.199	1.528
G-14G-13	G-14	G-13	10	388.445	0.002	0.151	0.151	Free Surface	1.293	0.267	0.155	0.222	0.167	0.573	0.97	No	0.222	1.293
G-15G-14	G-15	G-14	10	262.637	0.002	0.148	0.148	Free Surface	1.191	0.279	0.17	0.232	0.165	0.515	0.872	No	0.232	1.191
G-16G-15	G-16	G-15	10	249.499	0.003	0.146	0.146	Free Surface	1.441	0.241	0.128	0.201	0.164	0.673	1.144	No	0.201	1.441
G-17G-16	G-17	G-16	10	381.281	0.001	0.06	0.06	Free Surface	0.858	0.186	0.076	0.155	0.105	0.46	0.794	No	0.155	0.858
G-18G-17	G-18	G-17	10	413.839	0.003	0.059	0.059	Free Surface	1.11	0.153	0.051	0.127	0.103	0.66	1.158	No	0.127	1.11
G-19G-18	G-19	G-18	10	415.919	0.002	0.057	0.057	Free Surface	1.051	0.156	0.053	0.13	0.102	0.618	1.083	No	0.13	1.051
G-1D-12	G-1	D-12	12	418.231	0.002	0.194	0.194	Free Surface	1.39	0.234	0.12	0.234	0.181	0.603	1.621	Yes	0.956	0.251
G-20G-19	G-20	G-19	10	376.425	0.002	0.055	0.055	Free Surface	1.018	0.156	0.053	0.13	0.1	0.598	1.047	No	0.13	1.018
G-21G-20	G-21	G-20	10	362.282	0.002	0.054	0.054	Free Surface	1.021	0.153	0.051	0.128	0.099	0.606	1.064	No	0.128	1.021
G-22G-21	G-22	G-21	10	337.853	0.003	0.051	0.051	Free Surface	1.119	0.138	0.041	0.115	0.096	0.702	1.244	No	0.115	1.119
G-23G-22	G-23	G-22	10	234.157	0.002	0.048	0.048	Free Surface	0.984	0.144	0.045	0.12	0.093	0.602	1.064	No	0.12	0.984
G-24G-23	G-24	G-23	10	181.509	0.003	0.046	0.046	Free Surface	1.012	0.138	0.041	0.115	0.092	0.634	1.123	No	0.115	1.012
G-25G-24	G-25	G-24	10	140.904	0.003	0.045	0.045	Free Surface	1.004	0.136	0.04	0.113	0.09	0.634	1.126	No	0.113	1.004
G-26G-25	G-26	G-25	10	360.602	0.002	0.043	0.043	Free Surface	0.855	0.148	0.047	0.124	0.088	0.516	0.909	No	0.124	0.855
G-27G-26	G-27	G-26	8	267.235	0.006	0.04	0.04	Free Surface	1.321	0.142	0.043	0.095	0.09	0.913	0.923	No	0.095	1.321
G-28G-27	G-28	G-27	8	266.804	0.003	0.038	0.038	Free Surface	1.077	0.159	0.055	0.106	0.089	0.701	0.702	No	0.106	1.077
G-29G-28	G-29	G-28	8	228.801	0.003	0.037	0.037	Free Surface	1.033	0.159	0.055	0.106	0.087	0.672	0.673	No	0.106	1.033
G-2G-1	G-2	G-1	12	415.319	0.004	0.192	0.192	Free Surface	1.744	0.198	0.086	0.198	0.18	0.826	2.239	Yes	0.315	0.908
G-30G-29	G-30	G-29	8	140.251	0.003	0.034	0.034	Free Surface	1.01	0.152	0.05	0.101	0.083	0.672	0.676	No	0.101	1.01
G-31G-30	G-31	G-30	8	193.293	0.003	0.032	0.032	Free Surface	1.003	0.148	0.047	0.099	0.081	0.677	0.682	No	0.099	1.003
G-32G-31	G-32	G-31	8	160.112	0.002	0.031	0.031	Free Surface	0.896	0.155	0.052	0.103	0.079	0.591	0.593	No	0.103	0.896
G-33G-32	G-33	G-32	8	143.579	0.007	0.028	0.028	Free Surface	1.233	0.116	0.028	0.077	0.075	0.946	0.979	No	0.077	1.233
G-34G-33	G-34	G-33	8	345.94	0.003	0.026	0.026	Free Surface	0.968	0.131	0.037	0.087	0.073	0.696	0.71	No	0.087	0.968
G-35G-34	G-35	G-34	8	389.979	0.003	0.023	0.023	Free Surface	0.852	0.131	0.037	0.088	0.068	0.612	0.624	No	0.088	0.852
G-37G-35	G-36	G-35	8	238.428	0.004	0.012	0.012	Free Surface	0.781	0.091	0.017	0.061	0.05	0.679	0.723	No	0.061	0.781
G-37G-36	G-37	G-36	8	243.61	0.003	0.011	0.011	Free Surface	0.743	0.086	0.015	0.057	0.047	0.665	0.713	No	0.057	0.743
G-38G-37	G-38	G-37	8	343.017	0.004	0.009	0.009	Free Surface	0.747	0.077	0.012	0.051	0.043	0.706	0.769	No	0.051	0.747
G-39G-38	G-39	G-38	8	351.745	0.004	0.008	0.008	Free Surface	0.681	0.072	0.011	0.048	0.039	0.663	0.727	No	0.048	0.681
G-3G-2	G-3	G-2	12	415.318	0.001	0.191	0.191	Free Surface	1.209	0.255	0.143	0.255	0.179	0.5	1.339	No	0.255	1.209
G-40G-39	G-40	G-39	8	337.267	0.005	0.006	0.006	Free Surface	0.721	0.06	0.007	0.04	0.035	0.773	0.871	No	0.04	0.721
G-41G-40	G-41	G-40	8	312.177	0.006	0.005	0.005	Free Surface	0.704	0.05	0.005	0.033	0.03	0.827	0.955	No	0.033	0.704
G-42G-41	G-42	G-41	8	145.309	0.005	0.003	0.003	Free Surface	0.576	0.044	0.004	0.029	0.025	0.725	0.854	No	0.029	0.576
G-43G-42	G-43	G-42	8	396.444	0.004	0.002	0.002	Free Surface	0.445	0.033	0.002	0.022	0.018	0.649	0.8	No	0.022	0.445
G-4G-3	G-4	G-3	12	416.008	0.002	0.189	0.189	Free Surface	1.328	0.237	0.123	0.237	0.178	0.572	1.535	No	0.237	1.328
G-5AG-5	G-5A	G-5	12	235.863	0.002	0.186	0.186	Free Surface	1.279	0.241	0.127	0.241	0.177	0.546	1.464	No	0.241	1.279
G-5G-4	G-5	G-4	12	417.571	0.002	0.188	0.188	Free Surface	1.379	0.23	0.116	0.23	0.178	0.604	1.623	No	0.23	1.379
G-6G-5A	G-6	G-5A	12	259.219	0.002	0.185	0.185	Free Surface	1.376	0.227	0.113	0.227	0.176	0.606	1.628	No	0.227	1.376
G-7G-6	G-7	G-6	12	424.422	0.001	0.172	0.172	Free Surface	1.198	0.239	0.125	0.239	0.17	0.514	1.379	No	0.239	1.198

ID	From ID	To ID	Diameter (in)	Length (ft)	Slope	Total Flow (cfs)	Unpeakable Flow (cfs)	Flow Type	Velocity (ft/s)	d/D	q/Q	Water Depth (ft)	Critical Depth (ft)	Froude Number	Full Flow (cfs)	Backwater Adjustment	Adjusted Depth (ft)	Adjusted Velocity (ft/s)
G-8G-7	G-8	G-7	12	238.534	0.002	0.163	0.163	Free Surface	1.197	0.23	0.116	0.23	0.165	0.524	1.408	Yes	0.234	1.165
G-9G-8	G-9	G-8	12	239.687	0.002	0.162	0.162	Free Surface	1.26	0.22	0.106	0.22	0.165	0.564	1.52	Yes	0.225	1.222
G12-1G-12	G12-1	G-12	8	213.035	0.003	0.002	0.002	Free Surface	0.388	0.036	0.002	0.024	0.018	0.541	0.657	No	0.024	0.388
G14-1G-14	G14-1	G-14	8	265.537	0.003	0.002	0.002	Free Surface	0.391	0.036	0.002	0.024	0.018	0.546	0.663	No	0.024	0.391
G16-1G-16	G16-1	G-16	8	382.618	0.009	0.063	0.063	Free Surface	1.752	0.16	0.055	0.107	0.114	1.137	1.138	No	0.107	1.752
G16-2G16-1	G16-2	G16-1	8	404.676	0.004	0.062	0.062	Free Surface	1.278	0.196	0.084	0.131	0.112	0.746	0.734	No	0.131	1.278
G16-3AG16-3	G16-3A	G16-3	8	433.77	0.004	0.026	0.026	Free Surface	0.992	0.129	0.036	0.086	0.073	0.72	0.736	No	0.086	0.992
G16-3BG16-3A	G16-3B	G16-3A	8	394.839	0.011	0.025	0.025	Free Surface	1.422	0.097	0.02	0.065	0.071	1.195	1.263	No	0.065	1.422
G16-3CG16-3B	G16-3C	G16-3B	8	399.679	0.008	0.023	0.023	Free Surface	1.246	0.101	0.021	0.068	0.068	1.023	1.074	No	0.068	1.246
G16-3DG16-3C	G16-3D	G16-3C	8	369.257	0.01	0.022	0.022	Free Surface	1.342	0.092	0.018	0.061	0.066	1.158	1.231	No	0.061	1.342
G16-3EG16-3D	G16-3E	G16-3D	8	370.372	0.011	0.02	0.02	Free Surface	1.335	0.088	0.016	0.059	0.064	1.18	1.262	No	0.059	1.335
G16-3F1G16-3F	G16-3F1	G16-3F	8	397.268	0.011	0.008	0.008	Free Surface	1.017	0.055	0.006	0.037	0.039	1.137	1.295	No	0.037	1.017
G16-3F2G16-3F1	G16-3F2	G16-3F1	8	399.866	0.013	0.006	0.006	Free Surface	1.004	0.048	0.004	0.032	0.035	1.205	1.401	No	0.032	1.004
G16-3F3G16-3F2	G16-3F3	G16-3F2	8	235.64	0.014	0.005	0.005	Free Surface	0.945	0.041	0.003	0.027	0.03	1.226	1.458	No	0.027	0.945
G16-3F4G16-3F3	G16-3F4	G16-3F3	8	229.054	0.024	0.003	0.003	Free Surface	1.001	0.03	0.002	0.02	0.025	1.518	1.892	No	0.02	1.001
G16-3F5G16-3F4	G16-3F5	G16-3F4	12	156.532	0.009	0.002	0.002	Free Surface	0.541	0.017	0	0.017	0.016	0.904	3.409	No	0.017	0.541
G16-3FG16-3E	G16-3F	G16-3E	8	370.403	0.008	0.018	0.018	Free Surface	1.181	0.09	0.017	0.06	0.061	1.029	1.097	No	0.06	1.181
G16-3G16-2	G16-3	G16-2	8	396.766	0.004	0.06	0.06	Free Surface	1.359	0.184	0.074	0.123	0.111	0.819	0.81	No	0.123	1.359
G16-3GG16-3F	G16-3G	G16-3F	8	382.659	0.005	0.009	0.009	Free Surface	0.779	0.075	0.011	0.05	0.043	0.746	0.815	No	0.05	0.779
G16-3H1G16-3H	G16-3H1	G16-3H	8	394.913	0.014	0.006	0.006	Free Surface	1.008	0.048	0.004	0.032	0.035	1.212	1.409	No	0.032	1.008
G16-3H2G16-3H1	G16-3H2	G16-3H1	8	399.715	0.017	0.005	0.005	Free Surface	1.004	0.04	0.003	0.026	0.03	1.329	1.59	No	0.026	1.004
G16-3H3G16-3H2	G16-3H3	G16-3H2	8	226.879	0.014	0.003	0.003	Free Surface	0.826	0.034	0.002	0.023	0.025	1.174	1.434	No	0.023	0.826
G16-3H4G16-3H3	G16-3H4	G16-3H3	8	214.967	0.026	0.002	0.002	Free Surface	0.823	0.022	0.001	0.014	0.018	1.477	1.939	No	0.014	0.823
G16-3HG16-3G	G16-3H	G16-3G	8	20.898	0.013	0.008	0.008	Free Surface	1.055	0.054	0.006	0.036	0.039	1.194	1.365	No	0.036	1.055
G16-4G16-3	G16-4	G16-3	8	254.184	0.007	0.032	0.032	Free Surface	1.349	0.121	0.031	0.081	0.081	1.012	1.042	No	0.081	1.349
G16-5AG16-5	G16-5A	G16-5	8	427.662	0.004	0.008	0.008	Free Surface	0.687	0.072	0.01	0.048	0.039	0.672	0.737	No	0.048	0.687
G16-5BG16-5A	G16-5B	G16-5A	8	400.897	0.011	0.006	0.006	Free Surface	0.947	0.05	0.005	0.033	0.035	1.114	1.288	No	0.033	0.947
G16-5CG16-5B	G16-5C	G16-5B	8	202.139	0.027	0.005	0.005	Free Surface	1.17	0.036	0.002	0.024	0.03	1.631	1.982	No	0.024	1.17
G16-5DG16-5C	G16-5D	G16-5C	8	159.251	0.021	0.003	0.003	Free Surface	0.953	0.031	0.002	0.021	0.025	1.422	1.764	No	0.021	0.953
G16-5EG16-5D	G16-5E	G16-5D	8	132.211	0.024	0.002	0.002	Free Surface	0.803	0.022	0.001	0.015	0.018	1.429	1.871	No	0.015	0.803
G16-5G16-4	G16-5	G16-4	8	210.373	0.003	0.031	0.031	Free Surface	0.94	0.15	0.048	0.1	0.079	0.631	0.636	No	0.1	0.94
G16-6AG16-6	G16-6A	G16-6	8	387.819	0.004	0.002	0.002	Free Surface	0.421	0.034	0.002	0.023	0.018	0.602	0.737	No	0.023	0.421
G16-6G16-5	G16-6	G16-5	8	288.377	0.006	0.022	0.022	Free Surface	1.091	0.106	0.024	0.071	0.066	0.876	0.915	No	0.071	1.091
G16-7AG16-7	G16-7A	G16-7	8	425.516	0.007	0.006	0.006	Free Surface	0.809	0.055	0.006	0.037	0.035	0.902	1.027	No	0.037	0.809
G16-7BG16-7A	G16-7B	G16-7A	8	401.124	0.018	0.005	0.005	Free Surface	1.024	0.039	0.003	0.026	0.03	1.365	1.636	No	0.026	1.024
G16-7CG16-7B	G16-7C	G16-7B	8	224.682	0.018	0.003	0.003	Free Surface	0.904	0.032	0.002	0.022	0.025	1.325	1.635	No	0.022	0.904
G16-7DG16-7C	G16-7D	G16-7C	8	113.036	0.02	0.002	0.002	Free Surface	0.757	0.023	0.001	0.015	0.018	1.321	1.719	Yes	0.018	0.572
G16-7G16-6	G16-7	G16-6	8	196.869	0.004	0.018	0.018	Free Surface	0.919	0.107	0.024	0.071	0.061	0.734	0.766	No	0.071	0.919
G16-8G16-7	G16-8	G16-7	8	176.942	0.012	0.011	0.011	Free Surface	1.133	0.064	0.008	0.043	0.047	1.172	1.306	No	0.043	1.133
G16-9AG16-9	G16-9A	G16-9	8	427.518	0.009	0.008	0.008	Free Surface	0.928	0.059	0.007	0.039	0.039	1.006	1.136	No	0.039	0.928
G16-9BG16-9A	G16-9B	G16-9A	8	399.072	0.021	0.006	0.006	Free Surface	1.18	0.043	0.003	0.029	0.035	1.497	1.768	No	0.029	1.18
G16-9CG16-9B	G16-9C	G16-9B	8	401.396	0.015	0.005	0.005	Free Surface	0.962	0.041	0.003	0.027	0.03	1.255	1.495	No	0.027	0.962
G16-9DG16-9C	G16-9D	G16-9C	8	397.898	0.011	0.003	0.003	Free Surface	0.75	0.037	0.002	0.024	0.025	1.032	1.249	No	0.024	0.75
G16-9EG16-9D	G16-9E	G16-9D	8	150.845	0.01	0.002	0.002	Free Surface	0.586	0.027	0.001	0.018	0.018	0.937	1.188	No	0.018	0.586
G16-9G16-8	G16-9	G16-8	8	299.143	0.004	0.009	0.009	Free Surface	0.747	0.077	0.012	0.051	0.043	0.706	0.768	No	0.051	0.747
G16-AG-16	G16-A	G-16	8	258.457	0.019	0.022	0.022	Free Surface	1.649	0.08	0.013	0.053	0.066	1.528	1.655	Yes	0.077	0.956

ID	From ID	To ID	Diameter (in)	Length (ft)	Slope	Total Flow (cfs)	Unpeakable Flow (cfs)	Flow Type	Velocity (ft/s)	d/D	q/Q	Water Depth (ft)	Critical Depth (ft)	Froude Number	Full Flow (cfs)	Backwater Adjustment	Adjusted Depth (ft)	Adjusted Velocity (ft/s)
G16-BG16-A	G16-B	G16-A	8	198.26	0.003	0.02	0.02	Free Surface	0.823	0.122	0.032	0.081	0.064	0.615	0.632	No	0.081	0.823
G16-CG16-B	G16-C	G16-B	8	224.936	0.003	0.014	0.014	Free Surface	0.789	0.098	0.02	0.065	0.053	0.66	0.697	No	0.065	0.789
G16-DG16-C	G16-D	G16-C	8	216.415	0.003	0.012	0.012	Free Surface	0.716	0.096	0.019	0.064	0.05	0.603	0.638	No	0.064	0.716
G16-EG16-D	G16-E	G16-D	8	343.773	0.003	0.002	0.002	Free Surface	0.403	0.035	0.002	0.023	0.018	0.568	0.693	No	0.023	0.403
G16B-1G16-B	G16B-1	G16-B	8	348.071	0.008	0.005	0.005	Free Surface	0.772	0.047	0.004	0.031	0.03	0.935	1.09	No	0.031	0.772
G16B-2G16B-1	G16B-2	G16B-1	8	389.874	0.004	0.003	0.003	Free Surface	0.527	0.046	0.004	0.031	0.025	0.643	0.751	No	0.031	0.527
G16B-3G16B-2	G16B-3	G16B-2	8	332.52	0.004	0.002	0.002	Free Surface	0.43	0.033	0.002	0.022	0.018	0.62	0.761	No	0.022	0.43
G16D-1G16-D	G16D-1	G16-D	8	247.819	0.004	0.009	0.009	Free Surface	0.721	0.079	0.013	0.053	0.043	0.673	0.73	No	0.053	0.721
G16D-2AG16D-2	G16D-2A	G16D-2	8	246.593	0.004	0.002	0.002	Free Surface	0.432	0.033	0.002	0.022	0.018	0.623	0.765	No	0.022	0.432
G16D-2G16D-1	G16D-2	G16D-1	8	261.352	0.004	0.008	0.008	Free Surface	0.69	0.072	0.01	0.048	0.039	0.676	0.742	No	0.048	0.69
G16D-3G16D-2	G16D-3	G16D-2	8	218.579	0.008	0.005	0.005	Free Surface	0.759	0.048	0.004	0.032	0.03	0.914	1.063	No	0.032	0.759
G16D-4AG16D-4	G16D-4A	G16D-4	8	233	0.009	0.002	0.002	Free Surface	0.573	0.028	0.001	0.018	0.018	0.91	1.15	No	0.018	0.573
G16D-4G16D-3	G16D-4	G16D-3	8	212.636	0.011	0.003	0.003	Free Surface	0.762	0.036	0.002	0.024	0.025	1.055	1.279	No	0.024	0.762
G21-1G-21	G21-1	G-21	8	115.94	0.005	0.002	0.002	Free Surface	0.454	0.032	0.002	0.021	0.018	0.666	0.822	Yes	0.024	0.373
G22-1G-22	G22-1	G-22	8	159.319	0.015	0.002	0.002	Free Surface	0.684	0.024	0.001	0.016	0.018	1.154	1.486	No	0.016	0.684
G26-1G-26	G26-1	G-26	8	362.657	0.004	0.002	0.002	Free Surface	0.419	0.034	0.002	0.023	0.018	0.598	0.732	Yes	0.023	0.407
G29-1G-29	G29-1	G-29	8	210.347	0.005	0.002	0.002	Free Surface	0.472	0.031	0.002	0.021	0.018	0.702	0.87	No	0.021	0.472
G32-1G32	G32-1	G-32	8	249.337	0.003	0.002	0.002	Free Surface	0.39	0.036	0.002	0.024	0.018	0.544	0.661	No	0.024	0.39
G34-AG-34	G34-A	G-34	8	323.832	0.008	0.002	0.002	Free Surface	0.548	0.028	0.001	0.019	0.018	0.857	1.079	No	0.019	0.548
G6-1G-6	G6-1	G-6	8	405.411	0.003	0.011	0.011	Free Surface	0.743	0.086	0.015	0.057	0.047	0.664	0.713	Yes	0.092	0.369
G6-2G6-1	G6-2	G6-1	8	402.355	0.003	0.009	0.009	Free Surface	0.688	0.081	0.014	0.054	0.043	0.632	0.683	No	0.054	0.688
G6-3AG6-3	G6-3A	G6-3	8	172.45	0.009	0.002	0.002	Free Surface	0.582	0.027	0.001	0.018	0.018	0.93	1.177	No	0.018	0.582
G6-3G6-2	G6-3	G6-2	8	398.098	0.003	0.008	0.008	Free Surface	0.617	0.077	0.012	0.052	0.039	0.581	0.632	No	0.052	0.617
G6-4G6-3	G6-4	G6-3	8	280.778	0.008	0.005	0.005	Free Surface	0.757	0.048	0.004	0.032	0.03	0.911	1.059	No	0.032	0.757
G6-5G6-4	G6-5	G6-4	8	369.502	0.009	0.003	0.003	Free Surface	0.702	0.038	0.003	0.026	0.025	0.946	1.137	No	0.026	0.702
G6-6G6-5	G6-6	G6-5	8	376.775	0.009	0.002	0.002	Free Surface	0.565	0.028	0.001	0.019	0.018	0.893	1.127	No	0.019	0.565
G7-1G-7	G7-1	G-7	8	391.418	0.005	0.008	0.008	Free Surface	0.785	0.066	0.009	0.044	0.039	0.803	0.892	Yes	0.141	0.143
G7-2G7-1	G7-2	G7-1	8	389.943	0.006	0.006	0.006	Free Surface	0.776	0.057	0.006	0.038	0.035	0.854	0.968	No	0.038	0.776
G7-3G7-2	G7-3	G7-2	8	384.462	0.006	0.005	0.005	Free Surface	0.713	0.05	0.005	0.033	0.03	0.84	0.971	No	0.033	0.713
G7-4G7-3	G7-4	G7-3	8	384.736	0.004	0.003	0.003	Free Surface	0.522	0.047	0.004	0.031	0.025	0.635	0.741	No	0.031	0.522
G7-5G7-4	G7-5	G7-4	8	392.713	0.003	0.002	0.002	Free Surface	0.405	0.035	0.002	0.023	0.018	0.572	0.698	No	0.023	0.405
G9-1G-9	G9-1	G-9	8	153.478	0.004	0.002	0.002	Free Surface	0.447	0.033	0.002	0.022	0.018	0.653	0.804	Yes	0.071	0.077
GH1G35	G35-1	G-35	8	362.976	0.007	0.009	0.009	Free Surface	0.906	0.068	0.009	0.045	0.043	0.915	1.014	No	0.045	0.906
GH2GH1	G35-2	G35-1	8	341.838	0.005	0.008	0.008	Free Surface	0.788	0.066	0.009	0.044	0.039	0.807	0.898	No	0.044	0.788
GH35-5GH35-4	G35-5	G35-4	8	360.686	0.005	0.003	0.003	Free Surface	0.558	0.045	0.004	0.03	0.025	0.695	0.817	No	0.03	0.558
GH35-6GH35-5	G35-6	G35-5	8	154.537	0.006	0.002	0.002	Free Surface	0.503	0.03	0.002	0.02	0.018	0.765	0.954	No	0.02	0.503
GH3GH2	G35-3	G35-2	8	353.029	0.005	0.006	0.006	Free Surface	0.728	0.06	0.007	0.04	0.035	0.783	0.882	No	0.04	0.728
GH4GH3	G35-4	G35-3	8	348.685	0.006	0.005	0.005	Free Surface	0.682	0.051	0.005	0.034	0.03	0.792	0.912	No	0.034	0.682
I-10I-9	I-10	I-9	18	468.729	0.001	1.03	1.03	Free Surface	1.362	0.443	0.406	0.665	0.379	0.337	2.539	No	0.665	1.362
I-11I-10	I-11	I-10	18	454.877	0.001	1.03	1.03	Free Surface	1.335	0.45	0.417	0.675	0.379	0.327	2.471	No	0.675	1.335
I-12I-11	I-12	I-11	18	483.05	0.001	1.03	1.03	Free Surface	1.79	0.361	0.279	0.542	0.379	0.499	3.692	Yes	0.559	1.718
I-13I-12	I-13	I-12	18	286.093	0	1.03	1.03	Free Surface	1.025	0.554	0.593	0.831	0.379	0.22	1.737	No	0.831	1.025
I-14I-13	I-14	I-13	18	285.682	0.001	1.03	1.03	Free Surface	1.767	0.365	0.284	0.547	0.379	0.49	3.627	Yes	0.639	1.435
I-15I-14	I-15	I-14	18	285.794	0	1.03	1.03	Free Surface	1.229	0.48	0.466	0.72	0.379	0.29	2.211	No	0.72	1.229
I-16I-15	I-16	I-15	18	272.877	0.001	1.03	1.03	Free Surface	1.887	0.348	0.259	0.521	0.379	0.538	3.97	Yes	0.57	1.67
I-17I-16	I-17	I-16	18	466.592	0.001	1.03	1.03	Free Surface	1.542	0.404	0.343	0.605	0.379	0.403	3.006	No	0.605	1.542

ID	From ID	To ID	Diameter (in)	Length (ft)	Slope	Total Flow (cfs)	Unpeakable Flow (cfs)	Flow Type	Velocity (ft/s)	d/D	q/Q	Water Depth (ft)	Critical Depth (ft)	Froude Number	Full Flow (cfs)	Backwater Adjustment	Adjusted Depth (ft)	Adjusted Velocity (ft/s)
I-18I-17	I-18	I-17	18	465.704	0.001	1.03	1.03	Free Surface	1.732	0.37	0.292	0.555	0.379	0.476	3.527	No	0.555	1.732
I-19I-18	I-19	I-18	18	464.81	0.001	1.03	1.03	Free Surface	1.549	0.402	0.34	0.603	0.379	0.406	3.026	No	0.603	1.549
I-20I-19	I-20	I-19	18	387.919	0.001	1.03	1.03	Free Surface	1.797	0.36	0.277	0.54	0.379	0.502	3.713	No	0.54	1.797
I-21I-20	I-21	I-20	18	387.049	0	1.03	1.03	Free Surface	1.121	0.516	0.527	0.774	0.379	0.252	1.955	No	0.774	1.121
I-22I-21	I-22	I-21	18	400.435	0.001	1.03	1.03	Free Surface	1.725	0.371	0.294	0.557	0.379	0.474	3.507	Yes	0.665	1.361
I-23I-22	I-23	I-22	18	401.09	0.001	1.03	1.03	Free Surface	1.86	0.351	0.265	0.527	0.379	0.527	3.893	Yes	0.542	1.79
I-24I-23	I-24	I-23	18	400.469	0.001	1.03	1.03	Free Surface	1.816	0.357	0.273	0.536	0.379	0.51	3.767	No	0.536	1.816
I-25I-24	I-25	I-24	18	311.531	0.001	1.03	1.03	Free Surface	1.45	0.423	0.373	0.634	0.379	0.369	2.765	No	0.634	1.45
I-26I-25	I-26	I-25	18	324.723	0.001	1.03	1.03	Free Surface	1.757	0.366	0.286	0.549	0.379	0.486	3.598	No	0.549	1.757
I-27I-26	I-27	I-26	18	466.515	0.001	1.03	1.03	Free Surface	1.353	0.446	0.409	0.668	0.379	0.334	2.516	No	0.668	1.353
I-28I-27	I-28	I-27	18	453.872	0.001	1.03	1.03	Free Surface	1.41	0.432	0.387	0.648	0.379	0.354	2.662	No	0.648	1.41
I-29I-28	I-29	I-28	18	453.897	0.001	1.03	1.03	Free Surface	1.776	0.363	0.282	0.545	0.379	0.494	3.651	Yes	0.546	1.77
I-2I-1	I-2	I-1	18	488.672	0.001	1.03	1.03	Free Surface	1.616	0.39	0.321	0.584	0.379	0.432	3.208	No	0.584	1.616
I-30I-29	I-30	I-29	18	468.184	0	1.03	1.03	Free Surface	0.972	0.579	0.635	0.868	0.379	0.202	1.621	No	0.868	0.972
I-31I-30	I-31	I-30	18	455.367	0.002	1.03	1.03	Free Surface	2.07	0.325	0.228	0.487	0.379	0.613	4.514	Yes	0.678	1.328
I-32I-31	I-32	I-31	18	427.855	0.001	1.03	1.03	Free Surface	1.844	0.353	0.268	0.53	0.379	0.521	3.846	No	0.53	1.844
I-33I-32	I-33	I-32	18	415.237	0.001	1.03	1.03	Free Surface	1.651	0.383	0.312	0.575	0.379	0.445	3.303	No	0.575	1.651
I-34I-33	I-34	I-33	18	415.901	0.001	1.03	1.03	Free Surface	1.68	0.379	0.305	0.568	0.379	0.456	3.382	No	0.568	1.68
I-35I-34	I-35	I-34	18	416.624	0.001	1.03	1.03	Free Surface	1.31	0.457	0.428	0.685	0.379	0.318	2.409	No	0.685	1.31
I-36I-35	I-36	I-35	18	417.09	0.001	1.03	1.03	Free Surface	1.843	0.354	0.268	0.53	0.379	0.52	3.843	Yes	0.558	1.721
I-37I-36	I-37	I-36	18	416.272	0.002	1.03	1.03	Free Surface	2.031	0.329	0.234	0.494	0.379	0.597	4.398	No	0.494	2.031
I-38I-37	I-38	I-37	18	411.154	0.001	1.03	1.03	Free Surface	1.376	0.44	0.4	0.66	0.379	0.342	2.576	No	0.66	1.376
I-39I-38	I-39	I-38	18	413.355	0	1.03	1.03	Free Surface	1.081	0.531	0.553	0.796	0.379	0.239	1.863	No	0.796	1.081
I-3I-2	I-3	I-2	18	470.176	0.002	1.03	1.03	Free Surface	1.956	0.339	0.247	0.508	0.379	0.566	4.172	No	0.508	1.956
I-40I-39	I-40	I-39	18	417.665	0.001	1.03	1.03	Free Surface	1.302	0.459	0.431	0.688	0.379	0.315	2.39	Yes	0.742	1.181
I-41DG-1	I-41	DG-1	18	31.686	0	0.996	0.996	Pressurized	0.564	1	1.255	1.5	0.331	0.081	0.794	No	1.5	0.564
I-42I-41	I-42	I-41	18	128.115	0.002	0.995	0.995	Free Surface	2.055	0.318	0.22	0.477	0.372	0.615	4.53	Yes	1.388	0.582
I-43I-42	I-43	I-42	18	441.324	0.001	0.993	0.993	Free Surface	1.596	0.383	0.311	0.574	0.372	0.431	3.195	Yes	0.992	0.801
I-44I-43	I-44	I-43	18	441.446	0.001	0.991	0.991	Free Surface	1.546	0.392	0.324	0.587	0.371	0.412	3.059	Yes	0.648	1.356
I-45I-44	I-45	I-44	18	311.58	0.002	0.99	0.99	Free Surface	1.941	0.331	0.236	0.496	0.371	0.569	4.192	No	0.496	1.941
I-46I-45	I-46	I-45	18	319.697	0.001	0.988	0.988	Free Surface	1.551	0.39	0.321	0.584	0.371	0.414	3.078	No	0.584	1.551
I-47I-46	I-47	I-46	18	441.155	0	0.985	0.985	Free Surface	1.117	0.499	0.499	0.749	0.37	0.257	1.974	No	0.749	1.117
I-48-1I-48	I-48-1	I-48	8	117.477	0.005	0.003	0.003	Free Surface	0.559	0.045	0.004	0.03	0.025	0.696	0.818	No	0.03	0.559
I-48-2I-48-1	I-48-2	I-48-1	8	379.692	0.005	0.002	0.002	Free Surface	0.478	0.031	0.002	0.021	0.018	0.713	0.885	No	0.021	0.478
I-48I-47	I-48	I-47	18	373.303	0.004	0.674	0.674	Free Surface	2.315	0.222	0.108	0.332	0.305	0.844	6.259	Yes	0.491	1.341
I-49-1I-49	I-49-1	I-49	8	117.461	0.005	0.003	0.003	Free Surface	0.581	0.043	0.004	0.029	0.025	0.733	0.864	No	0.029	0.581
I-49-2I-49-1	I-49-2	I-49-1	8	380.052	0.003	0.002	0.002	Free Surface	0.394	0.035	0.002	0.024	0.018	0.552	0.671	No	0.024	0.394
I-49I-48	I-49	I-48	18	383.615	0.001	0.67	0.67	Free Surface	1.701	0.274	0.165	0.412	0.304	0.553	4.07	No	0.412	1.701
I-4I-3	I-4	I-3	18	466.683	0	1.03	1.03	Free Surface	1.263	0.47	0.449	0.704	0.379	0.302	2.294	No	0.704	1.263
I-50-1I-50	I-50-1	I-50	8	82.116	0.007	0.003	0.003	Free Surface	0.65	0.04	0.003	0.027	0.025	0.853	1.017	No	0.027	0.65
I-50-2I-50-1	I-50-2	I-50-1	8	424.292	0.003	0.002	0.002	Free Surface	0.377	0.036	0.002	0.024	0.018	0.52	0.63	No	0.024	0.377
I-50-AI-50	I-50-A	I-50	8	68.917	0.011	0.009	0.009	Free Surface	1.059	0.061	0.007	0.041	0.043	1.128	1.267	No	0.041	1.059
I-50-BI-50-A	I-50-B	I-50-A	8	420.17	0.003	0.008	0.008	Free Surface	0.659	0.074	0.011	0.049	0.039	0.636	0.695	No	0.049	0.659
I-50-CI-50-B	I-50-C	I-50-B	8	422.191	0.004	0.002	0.002	Free Surface	0.416	0.034	0.002	0.023	0.018	0.592	0.724	No	0.023	0.416
I-50-DI-50-B	I-50-D	I-50-B	8	422.036	0.004	0.005	0.005	Free Surface	0.581	0.057	0.006	0.038	0.03	0.639	0.724	No	0.038	0.581
I-50-EI-50-D	I-50-E	I-50-D	8	378.488	0.004	0.002	0.002	Free Surface	0.436	0.033	0.002	0.022	0.018	0.631	0.775	No	0.022	0.436

ID	From ID	To ID	Diameter (in)	Length (ft)	Slope	Total Flow (cfs)	Unpeakable Flow (cfs)	Flow Type	Velocity (ft/s)	d/D	q/Q	Water Depth (ft)	Critical Depth (ft)	Froude Number	Full Flow (cfs)	Backwater Adjustment	Adjusted Depth (ft)	Adjusted Velocity (ft/s)
I-50D-1I-50-D	I-50D-1	I-50-D	8	342.976	0.004	0.002	0.002	Free Surface	0.432	0.033	0.002	0.022	0.018	0.624	0.767	No	0.022	0.432
I-50I-49	I-50	I-49	18	376.472	0.001	0.665	0.665	Free Surface	1.518	0.296	0.191	0.444	0.303	0.473	3.48	No	0.444	1.518
I-51I-50	I-51	I-50	18	374.529	0.001	0.651	0.651	Free Surface	1.442	0.303	0.199	0.454	0.299	0.444	3.268	No	0.454	1.442
I-52I-51	I-52	I-51	18	438.296	0.001	0.65	0.65	Free Surface	1.317	0.323	0.226	0.484	0.299	0.391	2.88	No	0.484	1.317
I-53-1I-53	I-53-1	I-53	8	444.455	0.009	0.003	0.003	Free Surface	0.696	0.039	0.003	0.026	0.025	0.934	1.121	Yes	0.379	0.015
I-53-2I-53-1	I-53-2	I-53-1	8	394.541	0.004	0.002	0.002	Free Surface	0.439	0.033	0.002	0.022	0.018	0.637	0.784	No	0.022	0.439
I-53I-52	I-53	I-52	18	351.829	0	0.648	0.648	Free Surface	0.755	0.489	0.481	0.733	0.299	0.176	1.348	No	0.733	0.755
I-54I-53	I-54	I-53	18	335.209	0.001	0.644	0.644	Free Surface	1.456	0.298	0.193	0.447	0.298	0.452	3.328	Yes	0.59	0.997
I-5I-4	I-5	I-4	18	455.571	0.001	1.03	1.03	Free Surface	1.839	0.354	0.269	0.531	0.379	0.519	3.832	Yes	0.568	1.68
I-6I-5	I-6	I-5	18	450.415	0.001	1.03	1.03	Free Surface	1.753	0.367	0.287	0.55	0.379	0.485	3.586	No	0.55	1.753
I-7I-6	I-7	I-6	18	505.989	0.001	1.03	1.03	Free Surface	1.607	0.391	0.324	0.587	0.379	0.428	3.183	No	0.587	1.607
I-8I-7	I-8	I-7	18	272.622	0.001	1.03	1.03	Free Surface	1.909	0.345	0.255	0.517	0.379	0.547	4.034	Yes	0.552	1.746
I-9I-8	I-9	I-8	18	272.656	0.001	1.03	1.03	Free Surface	1.923	0.343	0.253	0.514	0.379	0.553	4.076	Yes	0.515	1.916
IM-1C4-3	IM-1	C4-3	8	136.536	0.007	0.022	0.022	Free Surface	1.143	0.103	0.022	0.068	0.066	0.933	0.979	No	0.068	1.143
IM-2IM-1	IM-2	IM-1	8	304.89	0.006	0.02	0.02	Free Surface	1.076	0.102	0.022	0.068	0.064	0.882	0.927	No	0.068	1.076
IM-3IM-2	IM-3	IM-2	8	352.292	0.002	0.009	0.009	Free Surface	0.542	0.096	0.019	0.064	0.043	0.458	0.485	Yes	0.066	0.518
IM-5IM-4	IM-4	IM-3	8	376.654	0.005	0.005	0.005	Free Surface	0.661	0.052	0.005	0.035	0.03	0.759	0.872	No	0.035	0.661
IM2-1IM-2	IM2-1	IM-2	8	48.094	0.003	0.009	0.009	Free Surface	0.664	0.083	0.014	0.056	0.043	0.603	0.649	Yes	0.062	0.57
IM2-2IM2-1	IM2-2	IM2-1	8	294.231	0.003	0.008	0.008	Free Surface	0.656	0.074	0.011	0.05	0.039	0.631	0.689	Yes	0.053	0.601
IM2-3IM2-2	IM2-3	IM2-2	8	324.988	0.004	0.006	0.006	Free Surface	0.672	0.063	0.008	0.042	0.035	0.704	0.787	No	0.042	0.672
IM2-4AIM2-4	IM2-4A	IM2-4	8	153.104	0.005	0.002	0.002	Free Surface	0.459	0.032	0.002	0.021	0.018	0.676	0.836	No	0.021	0.459
IM2-4IM2-3	IM2-4	IM2-3	8	233.904	0.007	0.005	0.005	Free Surface	0.729	0.049	0.005	0.033	0.03	0.866	1.004	No	0.033	0.729
IM2-5IM2-4	IM2-5	IM2-4	8	232.757	0.006	0.002	0.002	Free Surface	0.499	0.03	0.002	0.02	0.018	0.757	0.944	No	0.02	0.499
IM3-1IM-3	IM3-1	IM-3	8	334.1	0.004	0.003	0.003	Free Surface	0.546	0.045	0.004	0.03	0.025	0.676	0.792	No	0.03	0.546
IM3-2IM3-1	IM3-2	IM3-1	8	325.7	0.005	0.002	0.002	Free Surface	0.467	0.032	0.002	0.021	0.018	0.692	0.856	No	0.021	0.467
IM4-1IM-4	IM4-1	IM-4	8	375.736	0.003	0.003	0.003	Free Surface	0.502	0.048	0.004	0.032	0.025	0.602	0.7	No	0.032	0.502
IM4-2IM4-1	IM4-2	IM4-1	8	374.815	0.004	0.002	0.002	Free Surface	0.431	0.033	0.002	0.022	0.018	0.621	0.762	No	0.022	0.431
M-1D-2	M-1	D-2	12	398.385	0.007	0.055	0.055	Free Surface	1.479	0.094	0.018	0.094	0.096	1.03	3.008	Yes	0.18	0.576
M-2M-1	M-2	M-1	12	400.835	0.004	0.054	0.054	Free Surface	1.241	0.104	0.023	0.104	0.094	0.821	2.368	No	0.104	1.241
M-3AM-2	M-3A	M-2	12	32.459	0.004	0.052	0.052	Free Surface	1.22	0.103	0.022	0.103	0.093	0.81	2.34	No	0.103	1.22
M-3M-3A	M-3	M-3A	8	277.888	0.004	0.051	0.051	Free Surface	1.267	0.172	0.065	0.115	0.102	0.791	0.786	No	0.115	1.267
M-4M-3	M-4	M-3	8	477.031	0.003	0.045	0.045	Free Surface	1.073	0.177	0.068	0.118	0.095	0.661	0.656	No	0.118	1.073
M-5M-4	M-5	M-4	8	374.287	0.002	0.038	0.038	Free Surface	0.866	0.185	0.075	0.123	0.089	0.521	0.515	No	0.123	0.866
M-6M-5	M-6	M-5	12	763.68	0.002	0.025	0.025	Free Surface	0.773	0.084	0.015	0.084	0.064	0.569	1.687	No	0.084	0.773
M-7M-6	M-7	M-6	12	383.412	0.002	0.017	0.017	Free Surface	0.672	0.072	0.01	0.072	0.053	0.537	1.624	No	0.072	0.672
M3-1M-3	M3-1	M-3	8	195.141	0.002	0.005	0.005	Free Surface	0.454	0.068	0.009	0.045	0.03	0.458	0.507	No	0.045	0.454
M3-2M3-1	M3-2	M3-1	8	103.826	0.009	0.003	0.003	Free Surface	0.701	0.038	0.003	0.026	0.025	0.942	1.132	No	0.026	0.701
M3-3M3-2	M3-3	M3-2	8	241.254	0.005	0.002	0.002	Free Surface	0.469	0.032	0.002	0.021	0.018	0.696	0.862	No	0.021	0.469
M4-1M-4	M4-1	M-4	8	411.431	0.004	0.005	0.005	Free Surface	0.588	0.057	0.006	0.038	0.03	0.65	0.737	No	0.038	0.588
M4-2M4-1	M4-2	M4-1	8	401.29	0.004	0.003	0.003	Free Surface	0.524	0.047	0.004	0.031	0.025	0.638	0.745	No	0.031	0.524
M4-3M4-2	M4-3	M4-2	8	399.091	0.004	0.002	0.002	Free Surface	0.429	0.033	0.002	0.022	0.018	0.619	0.759	No	0.022	0.429
M5-1M-5	M5-1	M-5	8	410.944	0.003	0.012	0.012	Free Surface	0.75	0.093	0.018	0.062	0.05	0.642	0.682	No	0.062	0.75
M5-2A-1M5-2A	M5-2A-1	M5-2A	8	377.985	0.004	0.003	0.003	Free Surface	0.548	0.045	0.004	0.03	0.025	0.678	0.795	No	0.03	0.548
M5-2A-2M5-2A-1	M5-2A-2	M5-2A-1	8	376.497	0.005	0.002	0.002	Free Surface	0.477	0.031	0.002	0.021	0.018	0.713	0.884	No	0.021	0.477
M5-2AM5-2	M5-2A	M5-2	8	371.416	0.006	0.006	0.006	Free Surface	0.749	0.058	0.007	0.039	0.035	0.814	0.92	Yes	0.05	0.515
M5-2BM5-2A	M5-2B	M5-2A	8	162.088	0.005	0.002	0.002	Free Surface	0.478	0.031	0.002	0.021	0.018	0.715	0.886	No	0.021	0.478

ID	From ID	To ID	Diameter (in)	Length (ft)	Slope	Total Flow (cfs)	Unpeakable Flow (cfs)	Flow Type	Velocity (ft/s)	d/D	q/Q	Water Depth (ft)	Critical Depth (ft)	Froude Number	Full Flow (cfs)	Backwater Adjustment	Adjusted Depth (ft)	Adjusted Velocity (ft/s)
M5-2M5-1	M5-2	M5-1	8	66.668	0.003	0.011	0.011	Free Surface	0.67	0.092	0.018	0.061	0.047	0.578	0.615	No	0.061	0.67
M5-3M5-2	M5-3	M5-2	8	401.792	0.005	0.003	0.003	Free Surface	0.593	0.043	0.003	0.029	0.025	0.753	0.89	Yes	0.045	0.303
M5-4M5-3	M5-4	M5-3	8	400.891	0.003	0.002	0.002	Free Surface	0.41	0.034	0.002	0.023	0.018	0.582	0.711	No	0.023	0.41
M6-1M-6	M6-1	M-6	8	309.413	0.003	0.006	0.006	Free Surface	0.606	0.067	0.009	0.045	0.035	0.612	0.678	No	0.045	0.606
M6-2M6-1	M6-2	M6-1	8	310.227	0.005	0.005	0.005	Free Surface	0.652	0.053	0.005	0.035	0.03	0.745	0.854	No	0.035	0.652
M6-3M6-2	M6-3	M6-2	8	310.187	0.004	0.003	0.003	Free Surface	0.538	0.046	0.004	0.031	0.025	0.662	0.775	No	0.031	0.538
M6-4M6-3	M6-4	M6-3	8	310.198	0.004	0.002	0.002	Free Surface	0.441	0.033	0.002	0.022	0.018	0.642	0.79	No	0.022	0.441
M7-10M7-9	M7-10	M7-9	8	342.704	0.004	0.002	0.002	Free Surface	0.446	0.033	0.002	0.022	0.018	0.651	0.802	No	0.022	0.446
M7-1M-7	M7-1	M-7	8	311.373	0.003	0.015	0.015	Free Surface	0.794	0.105	0.023	0.07	0.056	0.642	0.672	No	0.07	0.794
M7-2M7-1	M7-2	M7-1	8	310.365	0.005	0.014	0.014	Free Surface	0.941	0.087	0.015	0.058	0.053	0.837	0.896	No	0.058	0.941
M7-3M7-2	M7-3	M7-2	8	310.5	0.005	0.012	0.012	Free Surface	0.894	0.083	0.014	0.055	0.05	0.814	0.878	No	0.055	0.894
M7-4M7-3	M7-4	M7-3	8	311.868	0.005	0.011	0.011	Free Surface	0.818	0.08	0.013	0.054	0.047	0.756	0.818	No	0.054	0.818
M7-5M7-4	M7-5	M7-4	8	108.738	0.005	0.009	0.009	Free Surface	0.832	0.072	0.01	0.048	0.043	0.816	0.897	No	0.048	0.832
M7-6M7-5	M7-6	M7-5	8	24.019	0.013	0.008	0.008	Free Surface	1.067	0.053	0.006	0.036	0.039	1.213	1.388	No	0.036	1.067
M7-7M7-6	M7-7	M7-6	8	285.347	0.005	0.006	0.006	Free Surface	0.687	0.062	0.008	0.041	0.035	0.725	0.813	No	0.041	0.687
M7-8M7-7	M7-8	M7-7	8	226.535	0.005	0.005	0.005	Free Surface	0.645	0.053	0.005	0.035	0.03	0.735	0.842	No	0.035	0.645
M7-9M7-8	M7-9	M7-8	8	344.976	0.004	0.003	0.003	Free Surface	0.539	0.046	0.004	0.03	0.025	0.664	0.777	No	0.03	0.539
RV-10RV-9	RV-10	RV-9	8	359.357	0.004	0.008	0.008	Free Surface	0.681	0.072	0.011	0.048	0.039	0.664	0.729	No	0.048	0.681
RV-11RV-10	RV-11	RV-10	8	250.723	0.028	0.006	0.006	Free Surface	1.303	0.04	0.003	0.027	0.035	1.71	2.041	No	0.027	1.303
RV-12RV-11	RV-12	RV-11	8	220.171	0.006	0.005	0.005	Free Surface	0.695	0.051	0.005	0.034	0.03	0.812	0.937	No	0.034	0.695
RV-13RV-12	RV-13	RV-12	8	214.267	0.005	0.003	0.003	Free Surface	0.558	0.045	0.004	0.03	0.025	0.695	0.816	No	0.03	0.558
RV-14RV-13	RV-14	RV-13	8	370.913	0.005	0.002	0.002	Free Surface	0.467	0.032	0.002	0.021	0.018	0.692	0.857	No	0.021	0.467
RV-1B-20	RV-1	B-20	8	200.575	0.008	0.112	0.112	Free Surface	2.047	0.214	0.101	0.143	0.153	1.139	1.115	No	0.143	2.047
RV-2RV-1	RV-2	RV-1	8	209.636	0.019	0.111	0.111	Free Surface	2.724	0.174	0.066	0.116	0.152	1.692	1.681	No	0.116	2.724
RV-3RV-2	RV-3	RV-2	8	258.835	0.006	0.109	0.109	Free Surface	1.84	0.227	0.113	0.151	0.151	0.994	0.97	No	0.151	1.84
RV-4RV-3	RV-4	RV-3	8	256.598	0.007	0.108	0.108	Free Surface	1.877	0.221	0.107	0.148	0.15	1.027	1.003	No	0.148	1.877
RV-5RV-4	RV-5	RV-4	8	298.397	0.004	0.106	0.106	Free Surface	1.516	0.255	0.142	0.17	0.148	0.769	0.747	No	0.17	1.516
RV-6RV-5	RV-6	RV-5	8	207.409	0.019	0.105	0.105	Free Surface	2.653	0.17	0.063	0.114	0.147	1.667	1.658	No	0.114	2.653
RV-7RV-6	RV-7	RV-6	8	253.921	0.005	0.103	0.103	Free Surface	1.656	0.234	0.12	0.156	0.146	0.879	0.856	No	0.156	1.656
RV-8ARV-8	RV-8A	RV-8	8	94.701	0.013	0.091	0.091	Free Surface	2.252	0.173	0.065	0.115	0.137	1.404	1.395	No	0.115	2.252
RV-8BRV-8A	RV-8B	RV-8A	8	334.25	0.022	0.089	0.089	Free Surface	2.679	0.152	0.05	0.101	0.136	1.788	1.798	No	0.101	2.679
RV-8CRV-8B	RV-8C	RV-8B	8	226.744	0.058	0.088	0.088	Free Surface	3.747	0.119	0.03	0.079	0.135	2.834	2.923	No	0.079	3.747
RV-8DRV-8C	RV-8D	RV-8C	8	343.301	0.07	0.086	0.086	Free Surface	3.967	0.113	0.027	0.075	0.133	3.081	3.196	No	0.075	3.967
RV-8E1RV-8E	RV-8E1	RV-8E	8	123.152	0.104	0.083	0.083	Free Surface	4.517	0.101	0.021	0.067	0.131	3.719	3.909	No	0.067	4.517
RV-8ERV-8D	RV-8E	RV-8D	8	275.933	0.065	0.085	0.085	Free Surface	3.856	0.114	0.027	0.076	0.132	2.984	3.092	No	0.076	3.856
RV-8FRV-8E1	RV-8F	RV-8E1	8	221.342	0.021	0.082	0.082	Free Surface	2.58	0.146	0.046	0.097	0.13	1.754	1.77	No	0.097	2.58
RV-8GRV-8F	RV-8G	RV-8F	8	366.079	0.02	0.08	0.08	Free Surface	2.524	0.146	0.046	0.098	0.128	1.715	1.73	No	0.098	2.524
RV-8HARV-8G	RV-8HA	RV-8G	8	143.264	0.034	0.079	0.079	Free Surface	3.007	0.128	0.035	0.085	0.127	2.189	2.239	No	0.085	3.007
RV-8HBRV-8HA	RV-8HB	RV-8HA	8	159.488	0.017	0.009	0.009	Free Surface	1.232	0.055	0.006	0.037	0.043	1.382	1.576	No	0.037	1.232
RV-8HC1RV-8HC	RV-8HC1	RV-8HC	8	122.597	0.021	0.002	0.002	Free Surface	0.767	0.023	0.001	0.015	0.018	1.344	1.752	No	0.015	0.767
RV-8HCRV-8HB	RV-8HC	RV-8HB	8	222.853	0.013	0.008	0.008	Free Surface	1.062	0.054	0.006	0.036	0.039	1.205	1.378	No	0.036	1.062
RV-8HDRV-8HC	RV-8HD	RV-8HC	8	287.422	0.024	0.005	0.005	Free Surface	1.118	0.037	0.002	0.025	0.03	1.536	1.858	No	0.025	1.118
RV-8HERV-8HD	RV-8HE	RV-8HD	8	92.069	0.031	0.003	0.003	Free Surface	1.084	0.029	0.001	0.019	0.025	1.689	2.123	No	0.019	1.084
RV-8HFRV-8HE	RV-8HF	RV-8HE	8	125.359	0.011	0.002	0.002	Free Surface	0.622	0.026	0.001	0.017	0.018	1.015	1.294	No	0.017	0.622
RV-8HRV-8HA	RV-8H	RV-8HA	8	33.126	0.02	0.068	0.068	Free Surface	2.364	0.137	0.04	0.091	0.118	1.665	1.692	No	0.091	2.364
RV-8IRV-8H	RV-8I	RV-8H	8	221.282	0.021	0.066	0.066	Free Surface	2.414	0.133	0.038	0.088	0.117	1.727	1.76	No	0.088	2.414

ID	From ID	To ID	Diameter (in)	Length (ft)	Slope	Total Flow (cfs)	Unpeakable Flow (cfs)	Flow Type	Velocity (ft/s)	d/D	q/Q	Water Depth (ft)	Critical Depth (ft)	Froude Number	Full Flow (cfs)	Backwater Adjustment	Adjusted Depth (ft)	Adjusted Velocity (ft/s)
RV-8JRV-8I	RV-8J	RV-8I	8	398.865	0.023	0.065	0.065	Free Surface	2.461	0.129	0.035	0.086	0.115	1.788	1.828	No	0.086	2.461
RV-8K-1RV-8K	RV-8K-1	RV-8K	8	140.426	0.006	0.002	0.002	Free Surface	0.505	0.03	0.002	0.02	0.018	0.768	0.958	Yes	0.021	0.474
RV-8KRV-8J	RV-8K	RV-8J	8	148.379	0.005	0.063	0.063	Free Surface	1.447	0.183	0.073	0.122	0.114	0.877	0.867	No	0.122	1.447
RV-8L-1RV-8L	RV-8L-1	RV-8L	8	192.744	0.006	0.002	0.002	Free Surface	0.496	0.03	0.002	0.02	0.018	0.75	0.934	No	0.02	0.496
RV-8LRV-8K	RV-8L	RV-8K	12	364.216	0.03	0.06	0.06	Free Surface	2.508	0.07	0.01	0.07	0.1	2.038	6.193	No	0.07	2.508
RV-8RV-7	RV-8	RV-7	8	239.522	0.005	0.102	0.102	Free Surface	1.623	0.235	0.121	0.157	0.145	0.859	0.837	No	0.157	1.623
RV-9RV-8	RV-9	RV-8	8	361.837	0.003	0.009	0.009	Free Surface	0.663	0.083	0.014	0.056	0.043	0.601	0.647	Yes	0.056	0.653
SH-10SH-9	SH-10	SH-9	8	73.987	0.009	0.014	0.014	Free Surface	1.11	0.078	0.012	0.052	0.053	1.045	1.136	No	0.052	1.11
SH-11SH-10	SH-11	SH-10	8	173.029	0.011	0.005	0.005	Free Surface	0.869	0.044	0.004	0.029	0.03	1.096	1.292	No	0.029	0.869
SH-12SH-11	SH-12	SH-11	8	241.871	0.003	0.002	0.002	Free Surface	0.397	0.035	0.002	0.023	0.018	0.557	0.679	No	0.023	0.397
SH-1C12-6	SH-1	C12-6	8	404.972	0.013	0.069	0.069	Free Surface	2.038	0.154	0.051	0.102	0.119	1.35	1.356	No	0.102	2.038
SH-2SH-1	SH-2	SH-1	8	227.343	0.045	0.035	0.035	Free Surface	2.614	0.082	0.014	0.055	0.085	2.393	2.583	No	0.055	2.614
SH-3SH-2	SH-3	SH-2	8	234.06	0.025	0.034	0.034	Free Surface	2.08	0.093	0.018	0.062	0.083	1.787	1.898	No	0.062	2.08
SH-4SH-3	SH-4	SH-3	8	186.269	0.024	0.029	0.029	Free Surface	1.983	0.087	0.015	0.058	0.077	1.763	1.889	No	0.058	1.983
SH-5SH-4	SH-5	SH-4	8	320.319	0.024	0.028	0.028	Free Surface	1.936	0.085	0.015	0.057	0.075	1.74	1.868	No	0.057	1.936
SH-6SH-5	SH-6	SH-5	8	256.114	0.042	0.023	0.023	Free Surface	2.23	0.068	0.009	0.046	0.068	2.239	2.476	No	0.046	2.23
SH-7SH-6	SH-7	SH-6	8	254.251	0.041	0.022	0.022	Free Surface	2.169	0.066	0.009	0.044	0.066	2.209	2.452	No	0.044	2.169
SH-8SH-7	SH-8	SH-7	8	104.539	0.042	0.017	0.017	Free Surface	2.031	0.059	0.007	0.039	0.058	2.197	2.479	No	0.039	2.031
SH-9SH-8	SH-9	SH-8	8	249.336	0.016	0.015	0.015	Free Surface	1.41	0.071	0.01	0.047	0.056	1.391	1.531	No	0.047	1.41
SH1-ASH-1	SH1-A	SH-1	8	339.061	0.003	0.003	0.003	Free Surface	0.475	0.05	0.005	0.033	0.025	0.56	0.648	No	0.033	0.475
SH1-BSH1-A	SH1-B	SH1-A	8	388.256	0.004	0.002	0.002	Free Surface	0.427	0.034	0.002	0.022	0.018	0.615	0.754	No	0.022	0.427
SH10-ASH-10	SH10-A	SH-10	8	235.864	0.026	0.008	0.008	Free Surface	1.356	0.046	0.004	0.03	0.039	1.673	1.96	No	0.03	1.356
SH10-BSH10-A	SH10-B	SH10-A	8	293.97	0.006	0.006	0.006	Free Surface	0.744	0.059	0.007	0.039	0.035	0.807	0.911	No	0.039	0.744
SH10-CSH10-B	SH10-C	SH10-B	8	293.706	0.012	0.005	0.005	Free Surface	0.885	0.043	0.003	0.029	0.03	1.122	1.326	No	0.029	0.885
SH10-DSH10-C	SH10-D	SH10-C	8	243.827	0.022	0.003	0.003	Free Surface	0.97	0.031	0.002	0.021	0.025	1.457	1.81	No	0.021	0.97
SH10-ESH10-D	SH10-E	SH10-D	8	346.005	0.044	0.002	0.002	Free Surface	0.993	0.019	0.001	0.013	0.018	1.897	2.541	No	0.013	0.993
SH11-ASH-11	SH11-A	SH-11	8	420.684	0.093	0.002	0.002	Free Surface	1.286	0.016	0	0.011	0.018	2.679	3.689	No	0.011	1.286
SH1A-1SH-1	SH1A-1	SH-1	8	408.038	0.01	0.029	0.029	Free Surface	1.479	0.106	0.024	0.071	0.077	1.187	1.241	No	0.071	1.479
SH1A-2SH1A-1	SH1A-2	SH1A-1	8	409.933	0.01	0.028	0.028	Free Surface	1.419	0.105	0.023	0.07	0.075	1.144	1.197	No	0.07	1.419
SH1A-3SH1A-2	SH1A-3	SH1A-2	8	371.943	0.01	0.026	0.026	Free Surface	1.423	0.101	0.021	0.067	0.073	1.172	1.232	No	0.067	1.423
SH1A-4SH1A-3	SH1A-4	SH1A-3	8	145.041	0.016	0.025	0.025	Free Surface	1.625	0.088	0.016	0.059	0.071	1.431	1.529	No	0.059	1.625
SH1A-5SH1A-4	SH1A-5	SH1A-4	8	228.953	0.016	0.02	0.02	Free Surface	1.541	0.08	0.013	0.053	0.064	1.431	1.55	No	0.053	1.541
SH1A-6SH1A-5	SH1A-6	SH1A-5	8	233.431	0.012	0.018	0.018	Free Surface	1.332	0.083	0.014	0.056	0.061	1.209	1.302	No	0.056	1.332
SH1A-7SH1A-6	SH1A-7	SH1A-6	8	150.712	0.02	0.008	0.008	Free Surface	1.232	0.049	0.005	0.032	0.039	1.471	1.707	No	0.032	1.232
SH1A-8SH1A-7	SH1A-8	SH1A-7	8	206.776	0.018	0.006	0.006	Free Surface	1.122	0.045	0.004	0.03	0.035	1.399	1.645	No	0.03	1.122
SH1A-9SH1A-8	SH1A-9	SH1A-8	8	230.584	0.033	0.002	0.002	Free Surface	0.901	0.02	0.001	0.014	0.018	1.668	2.21	No	0.014	0.901
SH1A4-ASH1A-4	SH1A4-A	SH1A-4	8	401.146	0.003	0.003	0.003	Free Surface	0.488	0.049	0.005	0.033	0.025	0.58	0.673	No	0.033	0.488
SH1A4-BSH1A4-A	SH1A4-B	SH1A4-A	8	295.919	0.003	0.002	0.002	Free Surface	0.377	0.036	0.002	0.024	0.018	0.52	0.629	No	0.024	0.377
SH1A6-2SH1A6-1	SH1A6-2	SH1A6-1	8	232.963	0.029	0.003	0.003	Free Surface	1.067	0.029	0.001	0.019	0.025	1.653	2.075	No	0.019	1.067
SH1A6-3SH1A6-2	SH1A6-3	SH1A6-2	8	233.892	0.041	0.002	0.002	Free Surface	0.965	0.019	0.001	0.013	0.018	1.827	2.44	No	0.013	0.965
SH1A8-ASH1A-8	SH1A8-A	SH1A-8	8	394.956	0.02	0.003	0.003	Free Surface	0.929	0.032	0.002	0.021	0.025	1.375	1.701	No	0.021	0.929
SH1A8-BSH1A8-A	SH1A8-B	SH1A8-A	8	388.185	0.034	0.002	0.002	Free Surface	0.911	0.02	0.001	0.013	0.018	1.691	2.245	No	0.013	0.911
SH1B-1ASH1B-1	SH1B-1A	SH1B-1	8	208.843	0.025	0.002	0.002	Free Surface	0.818	0.022	0.001	0.014	0.018	1.464	1.921	Yes	0.022	0.447
SH1B-1SH1A-6	SH1B-1	SH1A-6	8	370.594	0.012	0.005	0.005	Free Surface	0.873	0.043	0.004	0.029	0.03	1.103	1.301	No	0.029	0.873
SH1B-2SH1B-1	SH1B-2	SH1B-1	8	231.481	0.011	0.002	0.002	Free Surface	0.609	0.026	0.001	0.018	0.018	0.987	1.255	Yes	0.023	0.402
SH3-ASH-3	SH3-A	SH-3	8	340.725	0.003	0.003	0.003	Free Surface	0.467	0.05	0.005	0.034	0.025	0.548	0.632	No	0.034	0.467

ID	From ID	To ID	Diameter (in)	Length (ft)	Slope	Total Flow (cfs)	Unpeakable Flow (cfs)	Flow Type	Velocity (ft/s)	d/D	q/Q	Water Depth (ft)	Critical Depth (ft)	Froude Number	Full Flow (cfs)	Backwater Adjustment	Adjusted Depth (ft)	Adjusted Velocity (ft/s)
SH3-BSH3-A	SH3-B	SH3-A	8	340.171	0.003	0.002	0.002	Free Surface	0.411	0.034	0.002	0.023	0.018	0.584	0.713	No	0.023	0.411
SH5-ASH-5	SH5-A	SH-5	8	229.013	0.004	0.003	0.003	Free Surface	0.542	0.046	0.004	0.03	0.025	0.668	0.783	No	0.03	0.542
SH5-BSH5-A	SH5-B	SH5-A	8	248.393	0.029	0.002	0.002	Free Surface	0.859	0.021	0.001	0.014	0.018	1.564	2.063	No	0.014	0.859
SH5-CSH5	SH1A6-1	SH1A-6	8	398.057	0.014	0.005	0.005	Free Surface	0.938	0.041	0.003	0.028	0.03	1.214	1.442	No	0.028	0.938
SH7-ASH-7	SH7-A	SH-7	8	234.958	0.02	0.003	0.003	Free Surface	0.94	0.031	0.002	0.021	0.025	1.395	1.728	No	0.021	0.94
SH7-BSH7-A	SH7-B	SH7-A	8	276.891	0.006	0.002	0.002	Free Surface	0.507	0.03	0.002	0.02	0.018	0.773	0.965	No	0.02	0.507
ST-2I-46	ST-2	I-46	8	28.036	0.101	0.002	0.002	Free Surface	1.326	0.016	0	0.01	0.018	2.793	3.858	Yes	0.247	0.013
TR-1ATR-1	TR-1A	TR-1	8	275.193	0.022	0.029	0.029	Free Surface	1.924	0.089	0.016	0.059	0.077	1.692	1.808	No	0.059	1.924
TR-1B-22	TR-1	B-22	8	379.09	0.035	0.102	0.102	Free Surface	3.275	0.144	0.045	0.096	0.145	2.243	2.266	No	0.096	3.275
TR-1BTR-1A	TR-1B	TR-1A	8	310.838	0.123	0.028	0.028	Free Surface	3.435	0.058	0.007	0.038	0.075	3.757	4.253	No	0.038	3.435
TR-1C-1TR-1C	TR-1C-1	TR-1C	8	156.274	0.006	0.002	0.002	Free Surface	0.503	0.03	0.002	0.02	0.018	0.764	0.953	No	0.02	0.503
TR-1CTR-1B	TR-1C	TR-1B	8	201.349	0.012	0.026	0.026	Free Surface	1.507	0.097	0.02	0.065	0.073	1.266	1.337	No	0.065	1.507
TR-1DTR-1C	TR-1D	TR-1C	8	300.421	0.043	0.023	0.023	Free Surface	2.246	0.068	0.009	0.045	0.068	2.261	2.502	No	0.045	2.246
TR-1E-1TR-1E	TR-1E-1	TR-1E	8	461.138	0.008	0.002	0.002	Free Surface	0.546	0.028	0.001	0.019	0.018	0.854	1.074	No	0.019	0.546
TR-1ETR-1D	TR-1E	TR-1D	8	431.283	0.047	0.022	0.022	Free Surface	2.277	0.064	0.008	0.043	0.066	2.358	2.629	No	0.043	2.277
TR-1FTR-1E	TR-1F	TR-1E	8	144.25	0.058	0.018	0.018	Free Surface	2.336	0.057	0.006	0.038	0.061	2.574	2.919	No	0.038	2.336
TR-1GTR-1F	TR-1G	TR-1F	8	137.752	0.018	0.017	0.017	Free Surface	1.525	0.072	0.01	0.048	0.058	1.495	1.643	No	0.048	1.525
TR-1HTR-1G	TR-1H	TR-1G	8	239.904	0.019	0.015	0.015	Free Surface	1.488	0.068	0.009	0.046	0.056	1.495	1.653	No	0.046	1.488
TR-1I1TR-1I	TR-1I1	TR-1I	8	251.562	0.02	0.003	0.003	Free Surface	0.942	0.031	0.002	0.021	0.025	1.4	1.734	No	0.021	0.942
TR-1I2TR-1I1	TR-1I2	TR-1I1	8	207.97	0.005	0.002	0.002	Free Surface	0.455	0.032	0.002	0.021	0.018	0.669	0.826	No	0.021	0.455
TR-1ITR-1H	TR-1I	TR-1H	8	246.177	0.015	0.014	0.014	Free Surface	1.348	0.068	0.009	0.045	0.053	1.358	1.502	No	0.045	1.348
TR-1J1TR-1J	TR-1J1	TR-1J	8	241.984	0.032	0.003	0.003	Free Surface	1.104	0.028	0.001	0.019	0.025	1.731	2.18	No	0.019	1.104
TR-1J2TR-1J1	TR-1J2	TR-1J1	8	242.481	0.028	0.002	0.002	Free Surface	0.85	0.021	0.001	0.014	0.018	1.541	2.03	No	0.014	0.85
TR-1JTR-1I	TR-1J	TR-1I	8	396.631	0.012	0.009	0.009	Free Surface	1.096	0.059	0.007	0.04	0.043	1.181	1.331	No	0.04	1.096
TR-1K1TR-1K	TR-1K1	TR-1K	8	241.878	0.02	0.003	0.003	Free Surface	0.934	0.032	0.002	0.021	0.025	1.384	1.713	No	0.021	0.934
TR-1K2TR-1K1	TR-1K2	TR-1K1	8	241.841	0.024	0.002	0.002	Free Surface	0.801	0.022	0.001	0.015	0.018	1.424	1.865	No	0.015	0.801
TR-1KTR-1J	TR-1K	TR-1J	8	363.113	0.023	0.005	0.005	Free Surface	1.112	0.037	0.003	0.025	0.03	1.525	1.843	No	0.025	1.112
TR-2BTR6-2A	TR6-2B	TR6-2A	8	133.527	0.011	0.002	0.002	Free Surface	0.611	0.026	0.001	0.018	0.018	0.992	1.262	No	0.018	0.611
TR-2TR-1	TR-2	TR-1	8	305.058	0.019	0.071	0.071	Free Surface	2.379	0.14	0.042	0.093	0.121	1.654	1.676	No	0.093	2.379
TR-3ATR-3	TR-3A	TR-3	8	283.462	0.033	0.003	0.003	Free Surface	1.113	0.028	0.001	0.019	0.025	1.751	2.206	No	0.019	1.113
TR-3BTR-3A	TR-3B	TR-3A	8	199.421	0.114	0.002	0.002	Free Surface	1.381	0.015	0	0.01	0.018	2.947	4.089	No	0.01	1.381
TR-3TR-2	TR-3	TR-2	8	311.454	0.018	0.069	0.069	Free Surface	2.334	0.14	0.042	0.093	0.119	1.623	1.645	No	0.093	2.334
TR-4TR-3	TR-4	TR-3	8	422.708	0.008	0.065	0.065	Free Surface	1.693	0.167	0.06	0.111	0.115	1.076	1.073	No	0.111	1.693
TR-5ATR-5	TR-5A	TR-5	8	207.047	0.06	0.003	0.003	Free Surface	1.368	0.024	0.001	0.016	0.025	2.306	2.969	No	0.016	1.368
TR-5BTR-5A	TR-5B	TR-5A	8	207.904	0.038	0.002	0.002	Free Surface	0.941	0.02	0.001	0.013	0.018	1.767	2.353	No	0.013	0.941
TR-5TR-4	TR-5	TR-4	8	91.715	0.009	0.063	0.063	Free Surface	1.779	0.158	0.054	0.105	0.114	1.161	1.163	No	0.105	1.779
TR-6TR-5	TR-6	TR-5	8	328.035	0.011	0.059	0.059	Free Surface	1.823	0.148	0.047	0.098	0.11	1.233	1.243	No	0.098	1.823
TR-7TR-6	TR-7	TR-6	8	296.983	0.027	0.005	0.005	Free Surface	1.172	0.036	0.002	0.024	0.03	1.636	1.988	No	0.024	1.172
TR-8TR-7	TR-8	TR-7	8	316.707	0.024	0.003	0.003	Free Surface	0.991	0.03	0.002	0.02	0.025	1.499	1.867	No	0.02	0.991
TR-9TR-8	TR-9	TR-8	8	295.268	0.015	0.002	0.002	Free Surface	0.69	0.024	0.001	0.016	0.018	1.166	1.502	No	0.016	0.69
TR6-1TR-6	TR6-1	TR-6	8	352.017	0.051	0.052	0.052	Free Surface	3.064	0.096	0.019	0.064	0.104	2.589	2.738	No	0.064	3.064
TR6-2A-1TR6-2A	TR6-2A-1	TR6-2A	8	204.063	0.043	0.026	0.026	Free Surface	2.336	0.072	0.01	0.048	0.073	2.284	2.507	No	0.048	2.336
TR6-2A-2ATR6-2A-2	TR6-2A-2A	TR6-2A-2	8	218.243	0.006	0.008	0.008	Free Surface	0.806	0.065	0.008	0.043	0.039	0.833	0.928	No	0.043	0.806
TR6-2A-2BTR6-2A-2A	TR6-2A-2B	TR6-2A-2A	8	216.992	0.018	0.006	0.006	Free Surface	1.12	0.045	0.004	0.03	0.035	1.396	1.641	No	0.03	1.12
TR6-2A-2CTR6-2A-2B	TR6-2A-2C	TR6-2A-2B	8	253.116	0.012	0.005	0.005	Free Surface	0.881	0.043	0.004	0.029	0.03	1.116	1.318	No	0.029	0.881
TR6-2A-2DTR6-2A-2C	TR6-2A-2D	TR6-2A-2C	8	97.422	0.025	0.003	0.003	Free Surface	1.014	0.03	0.002	0.02	0.025	1.546	1.93	No	0.02	1.014

ID	From ID	To ID	Diameter (in)	Length (ft)	Slope	Total Flow (cfs)	Unpeakable Flow (cfs)	Flow Type	Velocity (ft/s)	d/D	q/Q	Water Depth (ft)	Critical Depth (ft)	Froude Number	Full Flow (cfs)	Backwater Adjustment	Adjusted Depth (ft)	Adjusted Velocity (ft/s)
TR6-2A-2ETR6-2A-2D	TR6-2A-2E	TR6-2A-2D	8	162.847	0.028	0.002	0.002	Free Surface	0.845	0.021	0.001	0.014	0.018	1.53	2.015	No	0.014	0.845
TR6-2A-2TR6-2A-1	TR6-2A-2	TR6-2A-1	8	212.913	0.018	0.025	0.025	Free Surface	1.68	0.086	0.015	0.058	0.071	1.497	1.604	No	0.058	1.68
TR6-2A-3TR6-2A-2	TR6-2A-3	TR6-2A-2	8	206.836	0.052	0.015	0.015	Free Surface	2.133	0.054	0.006	0.036	0.056	2.423	2.772	No	0.036	2.133
TR6-2A-4TR6-2A-3	TR6-2A-4	TR6-2A-3	8	350.306	0.027	0.014	0.014	Free Surface	1.64	0.06	0.007	0.04	0.053	1.766	1.991	No	0.04	1.64
TR6-2A-5ATR6-2A-5	TR6-2A-5A	TR6-2A-5	8	153.252	0.022	0.002	0.002	Free Surface	0.784	0.022	0.001	0.015	0.018	1.384	1.808	No	0.015	0.784
TR6-2A-5TR6-2A-4	TR6-2A-5	TR6-2A-4	8	149.584	0.025	0.012	0.012	Free Surface	1.547	0.057	0.006	0.038	0.05	1.7	1.926	No	0.038	1.547
TR6-2A-6TR6-2A-5	TR6-2A-6	TR6-2A-5	8	184.651	0.037	0.009	0.009	Free Surface	1.624	0.046	0.004	0.03	0.043	2.001	2.344	No	0.03	1.624
TR6-2A-7ATR6-2A-7	TR6-2A-7A	TR6-2A-7	8	269.529	0.018	0.002	0.002	Free Surface	0.724	0.024	0.001	0.016	0.018	1.244	1.612	No	0.016	0.724
TR6-2A-7TR6-2A-6	TR6-2A-7	TR6-2A-6	8	153.44	0.023	0.008	0.008	Free Surface	1.299	0.047	0.004	0.031	0.039	1.579	1.841	No	0.031	1.299
TR6-2A-8ATR6-2A-8	TR6-2A-8A	TR6-2A-8	8	270.883	0.019	0.002	0.002	Free Surface	0.743	0.023	0.001	0.015	0.018	1.287	1.672	No	0.015	0.743
TR6-2A-8TR6-2A-7	TR6-2A-8	TR6-2A-7	8	379.934	0.03	0.005	0.005	Free Surface	1.219	0.035	0.002	0.023	0.03	1.724	2.104	No	0.023	1.219
TR6-2A-9TR6-2A-8	TR6-2A-9	TR6-2A-8	8	305.602	0.031	0.002	0.002	Free Surface	0.876	0.021	0.001	0.014	0.018	1.604	2.12	No	0.014	0.876
TR6-2ATR6-2	TR6-2A	TR6-2	8	271.057	0.009	0.029	0.029	Free Surface	1.406	0.11	0.025	0.073	0.077	1.109	1.154	No	0.073	1.406
TR6-2C-1TR6-2C	TR6-2C-1	TR6-2C	8	397.69	0.056	0.014	0.014	Free Surface	2.109	0.05	0.005	0.033	0.053	2.474	2.857	No	0.033	2.109
TR6-2C-2TR6-2C-1	TR6-2C-2	TR6-2C-1	8	400.324	0.031	0.012	0.012	Free Surface	1.657	0.055	0.006	0.036	0.05	1.863	2.126	No	0.036	1.657
TR6-2C-3TR6-2C-2	TR6-2C-3	TR6-2C-2	8	293.44	0.037	0.011	0.011	Free Surface	1.7	0.049	0.005	0.033	0.047	2.019	2.34	No	0.033	1.7
TR6-2C-4TR6-2C-3	TR6-2C-4	TR6-2C-3	8	123.338	0.015	0.009	0.009	Free Surface	1.174	0.057	0.006	0.038	0.043	1.295	1.469	No	0.038	1.174
TR6-2C-5TR6-2C-4	TR6-2C-5	TR6-2C-4	8	234.525	0.035	0.008	0.008	Free Surface	1.5	0.043	0.003	0.028	0.039	1.914	2.264	No	0.028	1.5
TR6-2C-6ATR6-2C-6	TR6-2C-6A	TR6-2C-6	8	205.887	0.018	0.002	0.002	Free Surface	0.731	0.023	0.001	0.016	0.018	1.26	1.633	No	0.016	0.731
TR6-2C-6TR6-2C-5	TR6-2C-6	TR6-2C-5	8	401.236	0.035	0.006	0.006	Free Surface	1.399	0.038	0.003	0.026	0.035	1.88	2.259	No	0.026	1.399
TR6-2C-7TR6-2C-6	TR6-2C-7	TR6-2C-6	8	249.292	0.034	0.003	0.003	Free Surface	1.127	0.028	0.001	0.019	0.025	1.779	2.245	No	0.019	1.127
TR6-2C-8TR6-2C-7	TR6-2C-8	TR6-2C-7	8	251.474	0.034	0.002	0.002	Free Surface	0.912	0.02	0.001	0.013	0.018	1.695	2.25	No	0.013	0.912
TR6-2CTR6-2	TR6-2C	TR6-2	8	189.788	0.003	0.02	0.02	Free Surface	0.802	0.124	0.033	0.083	0.064	0.594	0.609	No	0.083	0.802
TR6-2DTR6-2C	TR6-2D	TR6-2C	8	48.209	0.002	0.005	0.005	Free Surface	0.432	0.07	0.01	0.047	0.03	0.429	0.473	No	0.047	0.432
TR6-2ETR6-2D	TR6-2E	TR6-2D	8	401.194	0.004	0.003	0.003	Free Surface	0.512	0.047	0.004	0.032	0.025	0.62	0.722	Yes	0.039	0.373
TR6-2FTR6-2E	TR6-2F	TR6-2E	8	380.854	0.009	0.002	0.002	Free Surface	0.58	0.027	0.001	0.018	0.018	0.924	1.17	No	0.018	0.58
TR6-2TR6-1	TR6-2	TR6-1	8	347.795	0.066	0.051	0.051	Free Surface	3.313	0.089	0.016	0.059	0.102	2.906	3.102	No	0.059	3.313
VG-10VG-9	VG-10	VG-9	8	400.438	0.027	0.002	0.002	Free Surface	0.836	0.021	0.001	0.014	0.018	1.508	1.983	No	0.014	0.836
VG-1A1VG-1A	VG-1A1	VG-1A	8	453.624	0.021	0.014	0.014	Free Surface	1.5	0.063	0.008	0.042	0.053	1.567	1.751	No	0.042	1.5
VG-1A2AVG-1A2	VG-1A2A	VG-1A2	8	229.565	0.005	0.002	0.002	Free Surface	0.462	0.032	0.002	0.021	0.018	0.682	0.843	No	0.021	0.462
VG-1A2VG-1A1	VG-1A2	VG-1A1	8	274.09	0.041	0.012	0.012	Free Surface	1.833	0.051	0.005	0.034	0.05	2.135	2.46	No	0.034	1.833
VG-1A3VG-1A2	VG-1A3	VG-1A2	8	456.717	0.027	0.009	0.009	Free Surface	1.456	0.049	0.005	0.033	0.043	1.729	2.004	No	0.033	1.456
VG-1A4VG-1A3	VG-1A4	VG-1A3	8	256.766	0.045	0.008	0.008	Free Surface	1.633	0.04	0.003	0.027	0.039	2.145	2.56	No	0.027	1.633
VG-1A5VG-1A4	VG-1A5	VG-1A4	8	399.972	0.036	0.006	0.006	Free Surface	1.421	0.038	0.003	0.025	0.035	1.92	2.311	No	0.025	1.421
VG-1A6VG-1A5	VG-1A6	VG-1A5	8	290.603	0.003	0.005	0.005	Free Surface	0.536	0.06	0.007	0.04	0.03	0.573	0.644	No	0.04	0.536
VG-1A7VG-1A6	VG-1A7	VG-1A6	8	349.918	0.003	0.003	0.003	Free Surface	0.478	0.05	0.005	0.033	0.025	0.565	0.654	No	0.033	0.478
VG-1A8VG-1A7	VG-1A8	VG-1A7	8	362.939	0.003	0.002	0.002	Free Surface	0.371	0.037	0.003	0.025	0.018	0.508	0.614	No	0.025	0.371
VG-1AVG-1	VG-1A	VG-1	8	374.726	0.032	0.032	0.032	Free Surface	2.247	0.085	0.015	0.057	0.081	2.014	2.162	No	0.057	2.247
VG-1BVG-1A	VG-1B	VG-1A	8	394.56	0.019	0.017	0.017	Free Surface	1.553	0.071	0.01	0.047	0.058	1.532	1.686	No	0.047	1.553
VG-1CVG-1B	VG-1C	VG-1B	8	401.173	0.02	0.015	0.015	Free Surface	1.536	0.067	0.009	0.045	0.056	1.56	1.73	No	0.045	1.536
VG-1D1VG-1D	VG-1D1	VG-1D	8	282.543	0.03	0.008	0.008	Free Surface	1.422	0.044	0.004	0.029	0.039	1.783	2.098	No	0.029	1.422
VG-1D2VG-1D1	VG-1D2	VG-1D1	8	414.791	0.013	0.006	0.006	Free Surface	0.986	0.049	0.005	0.032	0.035	1.176	1.365	No	0.032	0.986
VG-1D3VG-1D2	VG-1D3	VG-1D2	8	254.873	0.03	0.005	0.005	Free Surface	1.217	0.035	0.002	0.023	0.03	1.721	2.099	No	0.023	1.217
VG-1D4VG-1D3	VG-1D4	VG-1D3	8	261.08	0.022	0.003	0.003	Free Surface	0.97	0.031	0.002	0.021	0.025	1.457	1.811	No	0.021	0.97
VG-1D5VG-1D4	VG-1D5	VG-1D4	8	398.232	0.012	0.002	0.002	Free Surface	0.634	0.026	0.001	0.017	0.018	1.041	1.33	No	0.017	0.634
VG-1DVG-1C	VG-1D	VG-1C	8	421.866	0.013	0.014	0.014	Free Surface	1.284	0.07	0.01	0.047	0.053	1.271	1.4	No	0.047	1.284

ID	From ID	To ID	Diameter (in)	Length (ft)	Slope	Total Flow (cfs)	Unpeakable Flow (cfs)	Flow Type	Velocity (ft/s)	d/D	q/Q	Water Depth (ft)	Critical Depth (ft)	Froude Number	Full Flow (cfs)	Backwater Adjustment	Adjusted Depth (ft)	Adjusted Velocity (ft/s)
VG-1EVG-1D	VG-1E	VG-1D	8	414.368	0.021	0.005	0.005	Free Surface	1.078	0.038	0.003	0.025	0.03	1.462	1.762	No	0.025	1.078
VG-1FVG-1E	VG-1F	VG-1E	8	402.73	0.027	0.003	0.003	Free Surface	1.038	0.029	0.002	0.02	0.025	1.595	1.996	No	0.02	1.038
VG-1GVG-1F	VG-1G	VG-1F	8	156.085	0.019	0.002	0.002	Free Surface	0.747	0.023	0.001	0.015	0.018	1.297	1.686	No	0.015	0.747
VG-1RV-8L	VG-1	RV-8L	8	61.712	0.063	0.057	0.057	Free Surface	3.389	0.095	0.019	0.063	0.108	2.879	3.049	No	0.063	3.389
VG-2VG-1	VG-2	VG-1	8	382.287	0.033	0.023	0.023	Free Surface	2.046	0.072	0.011	0.048	0.068	1.995	2.189	No	0.048	2.046
VG-3VG-2	VG-3	VG-2	8	402.975	0.027	0.022	0.022	Free Surface	1.877	0.073	0.011	0.049	0.066	1.82	1.993	No	0.049	1.877
VG-4VG-3	VG-4	VG-3	8	397.809	0.028	0.02	0.02	Free Surface	1.86	0.07	0.01	0.047	0.064	1.844	2.032	No	0.047	1.86
VG-5VG-4	VG-5	VG-4	8	403.53	0.024	0.018	0.018	Free Surface	1.713	0.07	0.01	0.047	0.061	1.696	1.869	No	0.047	1.713
VG-6AAVG-6A	VG-6AA	VG-6A	8	114.688	0.005	0.005	0.005	Free Surface	0.631	0.054	0.006	0.036	0.03	0.713	0.815	No	0.036	0.631
VG-6AVG-6	VG-6A	VG-6	8	244.945	0.003	0.006	0.006	Free Surface	0.623	0.066	0.009	0.044	0.035	0.636	0.706	No	0.044	0.623
VG-6BVG-6AA	VG-6B	VG-6AA	8	326.792	0.003	0.003	0.003	Free Surface	0.493	0.049	0.005	0.032	0.025	0.588	0.683	Yes	0.034	0.454
VG-6CVG-6B	VG-6C	VG-6B	8	293.689	0.002	0.002	0.002	Free Surface	0.334	0.04	0.003	0.026	0.018	0.442	0.528	No	0.026	0.334
VG-6VG-5	VG-6	VG-5	8	396.74	0.014	0.017	0.017	Free Surface	1.37	0.077	0.012	0.051	0.058	1.294	1.408	No	0.051	1.37
VG-7VG-6	VG-7	VG-6	8	351.227	0.031	0.009	0.009	Free Surface	1.52	0.048	0.004	0.032	0.043	1.831	2.131	No	0.032	1.52
VG-8VG-7	VG-8	VG-7	8	403.198	0.023	0.008	0.008	Free Surface	1.302	0.047	0.004	0.031	0.039	1.584	1.848	No	0.031	1.302
VG-9AVG-9	VG-9A	VG-9	8	231.864	0.003	0.003	0.003	Free Surface	0.465	0.05	0.005	0.034	0.025	0.544	0.628	No	0.034	0.465
VG-9BVG-9A	VG-9B	VG-9A	8	469.712	0.002	0.002	0.002	Free Surface	0.331	0.04	0.003	0.027	0.018	0.437	0.522	No	0.027	0.331
VG-9VG-8	VG-9	VG-8	8	397.243	0.018	0.006	0.006	Free Surface	1.121	0.045	0.004	0.03	0.035	1.398	1.643	No	0.03	1.121

ID	From ID	To ID	Diameter (in)	Length (ft)	Existing Flow (cfs)	Existing Velocity (ft/s)	d/D Ratio	Design Flow (cfs)	Design Excess (cfs)	Design d/D Ratio	Replacement Diameter/Depth (in)	Replacement Velocity (ft/s)	Replacement d/D Ratio	Parallel Diameter/Depth (in)	Parallel Velocity (ft/s)	Parallel d/D Ratio
VG-9VG-8	VG-9	VG-8	8	397.243	0.01	1.306	0.056	0.821	0.811	0.5						
VG-9BVG-9A	VG-9B	VG-9A	8	469.712	0.003	0.386	0.05	0.261	0.259	0.5						
VG-9AVG-9	VG-9A	VG-9	8	231.864	0.005	0.542	0.064	0.314	0.309	0.5						
VG-8VG-7	VG-8	VG-7	8	403.198	0.013	1.517	0.059	0.924	0.911	0.5						
VG-7VG-6	VG-7	VG-6	8	351.227	0.015	1.77	0.06	1.065	1.05	0.5						
VG-6VG-5	VG-6	VG-5	8	396.74	0.028	1.594	0.098	0.704	0.676	0.5						
VG-6CVG-6B	VG-6C	VG-6B	8	293.689	0.003	0.389	0.05	0.264	0.262	0.5						
VG-6BVG-6AA	VG-6B	VG-6AA	8	326.792	0.005	0.574	0.061	0.341	0.336	0.5						
VG-6AVG-6	VG-6A	VG-6	8	244.945	0.01	0.725	0.084	0.353	0.343	0.5						
VG-6AAVG-6A	VG-6AA	VG-6A	8	114.688	0.008	0.734	0.068	0.407	0.4	0.5						
VG-5VG-4	VG-5	VG-4	8	403.53	0.03	1.993	0.089	0.934	0.904	0.5						
VG-4VG-3	VG-4	VG-3	8	397.809	0.033	2.165	0.089	1.016	0.983	0.5	0	0	0	0	0	0
VG-3VG-2	VG-3	VG-2	8	402.975	0.036	2.184	0.093	0.996	0.961	0.5	0	0	0	0	0	0
VG-2VG-1	VG-2	VG-1	8	382.287	0.038	2.381	0.092	1.094	1.056	0.5	0	0	0	0	0	0
VG-1RV-8L	VG-1	RV-8L	8	61.712	0.094	3.939	0.12	1.525	1.431	0.5	0	0	0	0	0	0
VG-1GVG-1F	VG-1G	VG-1F	8	156.085	0.003	0.871	0.029	0.843	0.84	0.5						
VG-1FVG-1E	VG-1F	VG-1E	8	402.73	0.005	1.21	0.037	0.998	0.993	0.5						
VG-1EVG-1D	VG-1E	VG-1D	8	414.368	0.008	1.256	0.048	0.881	0.873	0.5						
VG-1DVG-1C	VG-1D	VG-1C	8	421.866	0.023	1.494	0.089	0.7	0.677	0.5						
VG-1D5VG-1D4	VG-1D5	VG-1D4	8	398.232	0.003	0.738	0.033	0.665	0.662	0.5						
VG-1D4VG-1D3	VG-1D4	VG-1D3	8	261.08	0.005	1.131	0.039	0.905	0.9	0.5						
VG-1D3VG-1D2	VG-1D3	VG-1D2	8	254.873	0.008	1.419	0.044	1.05	1.042	0.5						
VG-1D2VG-1D1	VG-1D2	VG-1D1	8	414.791	0.01	1.148	0.061	0.683	0.672	0.5						
VG-1D1VG-1D	VG-1D1	VG-1D	8	282.543	0.013	1.657	0.056	1.049	1.036	0.5						
VG-1CVG-1B	VG-1C	VG-1B	8	401.173	0.025	1.788	0.085	0.865	0.84	0.5						
VG-1BVG-1A	VG-1B	VG-1A	8	394.56	0.028	1.807	0.09	0.843	0.815	0.5						
VG-1AVG-1	VG-1A	VG-1	8	374.726	0.053	2.613	0.108	1.081	1.028	0.5	0	0	0	0	0	0
VG-1A8VG-1A7	VG-1A8	VG-1A7	8	362.939	0.003	0.432	0.047	0.307	0.304	0.5						
VG-1A7VG-1A6	VG-1A7	VG-1A6	8	349.918	0.005	0.557	0.063	0.327	0.322	0.5						
VG-1A6VG-1A5	VG-1A6	VG-1A5	8	290.603	0.008	0.624	0.076	0.322	0.315	0.5						
VG-1A5VG-1A4	VG-1A5	VG-1A4	8	399.972	0.01	1.656	0.048	1.156	1.146	0.5						
VG-1A4VG-1A3	VG-1A4	VG-1A3	8	256.766	0.013	1.903	0.051	1.28	1.267	0.5						
VG-1A3VG-1A2	VG-1A3	VG-1A2	8	456.717	0.015	1.696	0.062	1.002	0.987	0.5						
VG-1A2VG-1A1	VG-1A2	VG-1A1	8	274.09	0.02	2.135	0.065	1.23	1.21	0.5	0	0	0	0	0	0
VG-1A2AVG-1A2	VG-1A2A	VG-1A2	8	229.565	0.003	0.538	0.04	0.421	0.419	0.5						
VG-1A1VG-1A	VG-1A1	VG-1A	8	453.624	0.023	1.746	0.08	0.875	0.853	0.5						
VG-10VG-9	VG-10	VG-9	8	400.438	0.003	0.974	0.027	0.991	0.989	0.5						
TR-9TR-8	TR-9	TR-8	8	295.268	0.003	0.804	0.031	0.751	0.748	0.5						
TR-8TR-7	TR-8	TR-7	8	316.707	0.005	1.155	0.038	0.933	0.928	0.5						
TR-7TR-6	TR-7	TR-6	8	296.983	0.008	1.366	0.045	0.994	0.986	0.5						
TR-6TR-5	TR-6	TR-5	8	328.035	0.124	2.276	0.213	0.622	0.497	0.5	0	0	0	0	0	0
TR6-2TR6-1	TR6-2	TR6-1	8	347.795	0.111	4.196	0.13	1.551	1.44	0.5	0	0	0	0	0	0
TR6-2FTR6-2E	TR6-2F	TR6-2E	8	380.854	0.003	0.676	0.035	0.585	0.582	0.5						
TR6-2ETR6-2D	TR6-2E	TR6-2D	8	401.194	0.005	0.597	0.06	0.361	0.356	0.5						
TR6-2DTR6-2C	TR6-2D	TR6-2C	8	48.209	0.035	0.795	0.185	0.237	0.201	0.5						
TR6-2CTR6-2	TR6-2C	TR6-2	8	189.788	0.061	1.115	0.213	0.305	0.244	0.5						
TR6-2C-8TR6-2C-7	TR6-2C-8	TR6-2C-7	8	251.474	0.003	1.064	0.025	1.125	1.122	0.5						
TR6-2C-7TR6-2C-6	TR6-2C-7	TR6-2C-6	8	249.292	0.005	1.313	0.035	1.122	1.117	0.5						
TR6-2C-6TR6-2C-5	TR6-2C-6	TR6-2C-5	8	401.236	0.01	1.63	0.048	1.13	1.119	0.5						
TR6-2C-6ATR6-2C-6	TR6-2C-6A	TR6-2C-6	8	205.887	0.003	0.852	0.03	0.817	0.814	0.5						
TR6-2C-5TR6-2C-4	TR6-2C-5	TR6-2C-4	8	234.525	0.013	1.747	0.054	1.132	1.12	0.5						
TR6-2C-4TR6-2C-3	TR6-2C-4	TR6-2C-3	8	123.338	0.015	1.367	0.072	0.735	0.72	0.5						
TR6-2C-3TR6-2C-2	TR6-2C-3	TR6-2C-2	8	293.44	0.018	1.98	0.062	1.17	1.152	0.5						
TR6-2C-2TR6-2C-1	TR6-2C-2	TR6-2C-1	8	400.324	0.02	1.929	0.069	1.063	1.043	0.5						
TR6-2C-1TR6-2C	TR6-2C-1	TR6-2C	8	397.69	0.023	2.456	0.064	1.429	1.406	0.5	0	0	0	0	0	0
TR6-2ATR6-2	TR6-2A	TR6-2	8	271.057	0.048	1.634	0.139	0.577	0.529	0.5						
TR6-2A-9TR6-2A-8	TR6-2A-9	TR6-2A-8	8	305.602	0.003	1.021	0.026	1.06	1.058	0.5						
TR6-2A-8TR6-2A-7	TR6-2A-8	TR6-2A-7	8	379.934	0.008	1.421	0.044	1.052	1.044	0.5						
TR6-2A-8ATR6-2A-8	TR6-2A-8A	TR6-2A-8	8	270.883	0.003	0.866	0.029	0.836	0.833	0.5						
TR6-2A-7TR6-2A-6	TR6-2A-7	TR6-2A-6	8	153.44	0.013	1.513	0.059	0.921	0.908	0.5						
TR6-2A-7ATR6-2A-7	TR6-2A-7A	TR6-2A-7	8	269.529	0.003	0.844	0.03	0.806	0.803	0.5						
TR6-2A-6TR6-2A-5	TR6-2A-6	TR6-2A-5	8	184.651	0.015	1.892	0.058	1.172	1.157	0.5						
TR6-2A-5TR6-2A-4	TR6-2A-5	TR6-2A-4	8	149.584	0.02	1.801	0.072	0.963	0.943	0.5						
TR6-2A-5ATR6-2A-5	TR6-2A-5A	TR6-2A-5	8	153.252	0.003	0.914	0.028	0.904	0.902	0.5						
TR6-2A-4TR6-2A-3	TR6-2A-4	TR6-2A-3	8	350.306	0.023	1.91	0.075	0.995	0.972	0.5						
TR6-2A-3TR6-2A-2	TR6-2A-3	TR6-2A-2	8	206.836	0.025	2.483	0.068	1.386	1.361	0.5	0	0	0	0	0	0
TR6-2A-2TR6-2A-1	TR6-2A-2	TR6-2A-1	8	212.913	0.041	1.954	0.11	0.802	0.761	0.5						
TR6-2A-2ETR6-2A-2D	TR6-2A-2E	TR6-2A-2D	8	162.847	0.003	0.985	0.027	1.007	1.005	0.5						
TR6-2A-2DTR6-2A-2C	TR6-2A-2D	TR6-2A-2C	8	97.422	0.005	1.182	0.038	0.965	0.96	0.5						
TR6-2A-2CTR6-2A-2B	TR6-2A-2C	TR6-2A-2B	8	253.116	0.008	1.026	0.055	0.659	0.651	0.5						
TR6-2A-2BTR6-2A-2A	TR6-2A-2B	TR6-2A-2A	8	216.992	0.01	1.305	0.056	0.82	0.81	0.5						
TR6-2A-2ATR6-2A-2	TR6-2A-2A	TR6-2A-2	8	218.243	0.013	0.938	0.082	0.464	0.451	0.5						
TR6-2A-1TR6-2A	TR6-2A-1	TR6-2A	8	204.063	0.043	2.719	0.091	1.254	1.21	0.5	0	0	0	0	0	0
TR6-1TR-6	TR6-1	TR-6	8	352.017	0.114	3.871	0.139	1.369	1.255	0.5	0	0	0	0	0	0
TR-5TR-4	TR-5	TR-4	8	91.715	0.132	2.21	0.227	0.582	0.45	0.5	0	0	0	0	0	0
TR-5BTR-5A	TR-5B	TR-5A	8	207.904	0.003	1.097	0.025	1.176	1.174	0.5						
TR-5ATR-5	TR-5A	TR-5	8	207.047	0.005	1.594	0.031	1.485	1.48	0.5						
TR-4TR-3	TR-4	TR-3	8	422.708	0.134	2.098	0.239	0.536	0.402	0.5	0	0	0	0	0	0
TR-3TR-2	TR-3	TR-2	8	311.454	0.142	2.886	0.199	0.823	0.681	0.5	0	0	0	0	0	0
TR-3BTR-3A	TR-3B	TR-3A	8	199.421	0.003	1.61	0.019	2.044	2.042	0.5						
TR-3ATR-3	TR-3A	TR-3	8	283.462	0.005	1.297	0.035	1.103	1.098	0.5						

ID	From ID	To ID	Diameter (in)	Length (ft)	Existing Flow (cfs)	Existing Velocity (ft/s)	d/D Ratio	Design Flow (cfs)	Design Excess (cfs)	Design d/D Ratio	Replacement Diameter/Depth (in)	Replacement Velocity (ft/s)	Replacement d/D Ratio	Parallel Diameter/Depth (in)	Parallel Velocity (ft/s)	Parallel d/D Ratio
TR-2TR-1	TR-2	TR-1	8	305.058	0.144	2.939	0.198	0.838	0.693	0.5	0	0	0	0	0	0
TR-2BTR6-2A	TR6-2B	TR6-2A	8	133.527	0.003	0.712	0.033	0.631	0.628	0.5						
TR-1KTR-1J	TR-1K	TR-1J	8	363.113	0.008	1.296	0.047	0.922	0.914	0.5						
TR-1K2TR-1K1	TR-1K2	TR-1K1	8	241.841	0.003	0.934	0.028	0.932	0.93	0.5						
TR-1K1TR-1K	TR-1K1	TR-1K	8	241.878	0.005	1.088	0.04	0.857	0.852	0.5						
TR-1JTR-1I	TR-1J	TR-1I	8	396.631	0.015	1.275	0.075	0.665	0.65	0.5						
TR-1J2TR-1J1	TR-1J2	TR-1J1	8	242.481	0.003	0.991	0.027	1.015	1.012	0.5						
TR-1J1TR-1J	TR-1J1	TR-1J	8	241.984	0.005	1.287	0.036	1.09	1.085	0.5						
TR-1ITR-1H	TR-1I	TR-1H	8	246.177	0.023	1.569	0.086	0.751	0.728	0.5						
TR-1I2TR-1I1	TR-1I2	TR-1I1	8	207.97	0.003	0.531	0.041	0.413	0.41	0.5						
TR-1I1TR-1I	TR-1I1	TR-1I	8	251.562	0.005	1.098	0.04	0.867	0.862	0.5						
TR-1HTR-1G	TR-1H	TR-1G	8	239.904	0.025	1.731	0.086	0.826	0.801	0.5						
TR-1GTR-1F	TR-1G	TR-1F	8	137.752	0.028	1.774	0.091	0.821	0.793	0.5						
TR-1FTR-1E	TR-1F	TR-1E	8	144.25	0.03	2.72	0.072	1.46	1.429	0.5	0	0	0	0	0	0
TR-1ETR-1D	TR-1E	TR-1D	8	431.283	0.036	2.65	0.081	1.315	1.279	0.5	0	0	0	0	0	0
TR-1E-1TR-1E	TR-1E-1	TR-1E	8	461.138	0.003	0.637	0.036	0.537	0.534	0.5						
TR-1DTR-1C	TR-1D	TR-1C	8	300.421	0.038	2.614	0.086	1.251	1.213	0.5	0	0	0	0	0	0
TR-1CTR-1B	TR-1C	TR-1B	8	201.349	0.043	1.752	0.123	0.669	0.625	0.5						
TR-1C-1TR-1C	TR-1C-1	TR-1C	8	156.274	0.003	0.586	0.038	0.476	0.474	0.5						
TR-1BTR-1A	TR-1B	TR-1A	8	310.838	0.046	3.999	0.073	2.127	2.081	0.5	0	0	0	0	0	0
TR-1B-22	TR-1	B-22	8	379.09	0.195	3.973	0.198	1.133	0.938	0.5	0	0	0	0	0	0
TR-1ATR-1	TR-1A	TR-1	8	275.193	0.048	2.237	0.112	0.904	0.856	0.5	0	0	0	0	0	0
ST-2I-46	ST-2	I-46	8	28.036	0.003	1.546	0.02	1.929	1.926	0.5						
SH-9SH-8	SH-9	SH-8	8	249.336	0.025	1.642	0.09	0.765	0.74	0.5						
SH-8SH-7	SH-8	SH-7	8	104.539	0.028	2.365	0.075	1.24	1.212	0.5	0	0	0	0	0	0
SH-7SH-6	SH-7	SH-6	8	254.251	0.036	2.524	0.084	1.226	1.19	0.5	0	0	0	0	0	0
SH7-BSH7-A	SH7-B	SH7-A	8	276.891	0.003	0.591	0.038	0.483	0.48	0.5						
SH7-ASH-7	SH7-A	SH-7	8	234.958	0.005	1.095	0.04	0.864	0.859	0.5						
SH-6SH-5	SH-6	SH-5	8	256.114	0.038	2.595	0.087	1.238	1.2	0.5	0	0	0	0	0	0
SH-5SH-4	SH-5	SH-4	8	320.319	0.046	2.252	0.108	0.934	0.888	0.5	0	0	0	0	0	0
SH5-CSH5	SH1A6-1	SH1A-6	8	398.057	0.008	1.093	0.052	0.721	0.713	0.5						
SH5-BSH5-A	SH5-B	SH5-A	8	248.393	0.003	1.002	0.026	1.032	1.029	0.5						
SH5-ASH-5	SH5-A	SH-5	8	229.013	0.005	0.631	0.058	0.391	0.386	0.5						
SH-4SH-3	SH-4	SH-3	8	186.269	0.048	2.306	0.11	0.944	0.896	0.5	0	0	0	0	0	0
SH-3SH-2	SH-3	SH-2	8	234.06	0.056	2.418	0.118	0.949	0.893	0.5	0	0	0	0	0	0
SH3-BSH3-A	SH3-B	SH3-A	8	340.171	0.003	0.479	0.043	0.356	0.354	0.5						
SH3-ASH-3	SH3-A	SH-3	8	340.725	0.005	0.544	0.064	0.316	0.311	0.5						
SH-2SH-1	SH-2	SH-1	8	227.343	0.058	3.041	0.104	1.291	1.233	0.5	0	0	0	0	0	0
SH-1C12-6	SH-1	C12-6	8	404.972	0.114	2.363	0.196	0.678	0.564	0.5	0	0	0	0	0	0
SH1-BSH1-A	SH1-B	SH1-A	8	388.256	0.003	0.498	0.042	0.377	0.374	0.5						
SH1B-2SH1B-1	SH1B-2	SH1B-1	8	231.481	0.003	0.71	0.033	0.628	0.625	0.5						
SH1B-1SH1A-6	SH1B-1	SH1A-6	8	370.594	0.008	1.017	0.055	0.651	0.643	0.5						
SH1B-1ASH1B-1	SH1B-1A	SH1B-1	8	208.843	0.003	0.953	0.027	0.961	0.958	0.5						
SH1-ASH-1	SH1-A	SH-1	8	339.061	0.005	0.554	0.063	0.324	0.319	0.5						
SH1A-9SH1A-8	SH1A-9	SH1A-8	8	230.584	0.003	1.051	0.026	1.105	1.103	0.5						
SH1A-8SH1A-7	SH1A-8	SH1A-7	8	206.776	0.01	1.307	0.056	0.822	0.812	0.5						
SH1A8-BSH1A8-A	SH1A8-B	SH1A8-A	8	388.185	0.003	1.062	0.025	1.122	1.12	0.5						
SH1A8-ASH1A-8	SH1A8-A	SH1A-8	8	394.956	0.005	1.083	0.04	0.85	0.845	0.5						
SH1A-7SH1A-6	SH1A-7	SH1A-6	8	150.712	0.013	1.435	0.061	0.853	0.841	0.5						
SH1A-6SH1A-5	SH1A-6	SH1A-5	8	233.431	0.03	1.549	0.106	0.651	0.621	0.5						
SH1A6-3SH1A6-2	SH1A6-3	SH1A6-2	8	233.892	0.003	1.125	0.025	1.22	1.217	0.5						
SH1A6-2SH1A6-1	SH1A6-2	SH1A6-1	8	232.963	0.005	1.243	0.036	1.037	1.032	0.5						
SH1A-5SH1A-4	SH1A-5	SH1A-4	8	228.953	0.033	1.792	0.101	0.775	0.742	0.5						
SH1A-4SH1A-3	SH1A-4	SH1A-3	8	145.041	0.041	1.89	0.112	0.765	0.724	0.5						
SH1A4-BSH1A4-A	SH1A4-B	SH1A4-A	8	295.919	0.003	0.439	0.046	0.315	0.312	0.5						
SH1A4-ASH1A-4	SH1A4-A	SH1A-4	8	401.146	0.005	0.568	0.062	0.336	0.331	0.5						
SH1A-3SH1A-2	SH1A-3	SH1A-2	8	371.943	0.043	1.654	0.128	0.616	0.573	0.5						
SH1A-2SH1A-1	SH1A-2	SH1A-1	8	409.933	0.046	1.649	0.134	0.599	0.553	0.5						
SH1A-1SH-1	SH1A-1	SH-1	8	408.038	0.048	1.719	0.135	0.62	0.572	0.5						
SH-12SH-11	SH-12	SH-11	8	241.871	0.003	0.463	0.045	0.339	0.337	0.5						
SH-11SH-10	SH-11	SH-10	8	173.029	0.008	1.012	0.055	0.646	0.638	0.5						
SH11-ASH-11	SH11-A	SH-11	8	420.684	0.003	1.499	0.02	1.844	1.842	0.5						
SH-10SH-9	SH-10	SH-9	8	73.987	0.023	1.291	0.098	0.568	0.545	0.5						
SH10-ESH10-D	SH10-E	SH10-D	8	346.005	0.003	1.158	0.024	1.271	1.268	0.5						
SH10-DSH10-C	SH10-D	SH10-C	8	243.827	0.005	1.131	0.039	0.905	0.9	0.5						
SH10-CSH10-B	SH10-C	SH10-B	8	293.706	0.008	1.031	0.054	0.663	0.655	0.5						
SH10-BSH10-A	SH10-B	SH10-A	8	293.97	0.01	0.866	0.074	0.456	0.445	0.5						
SH10-ASH-10	SH10-A	SH-10	8	235.864	0.013	1.58	0.058	0.98	0.967	0.5						
RV-9RV-8	RV-9	RV-8	8	361.837	0.084	1.281	0.244	0.324	0.239	0.5						
RV-8RV-7	RV-8	RV-7	8	239.522	0.264	2.126	0.386	0.419	0.154	0.5	0	0	0	0	0	0
RV-8LRV-8K	RV-8L	RV-8K	12	364.216	0.099	2.919	0.088	3.097	2.997	0.5	0	0	0	0	0	0
RV-8L-1RV-8L	RV-8L-1	RV-8L	8	192.744	0.003	0.578	0.038	0.467	0.464	0.5						
RV-8KRV-8J	RV-8K	RV-8J	8	148.379	0.104	1.676	0.234	0.434	0.33	0.5						
RV-8K-1RV-8K	RV-8K-1	RV-8K	8	140.426	0.003	0.588	0.038	0.479	0.477	0.5						
RV-8JRV-8I	RV-8J	RV-8I	8	398.865	0.107	2.858	0.164	0.914	0.807	0.5	0	0	0	0	0	0
RV-8IRV-8H	RV-8I	RV-8H	8	221.282	0.109	2.802	0.169	0.88	0.771	0.5	0	0	0	0	0	0
RV-8HRV-8HA	RV-8H	RV-8HA	8	33.126	0.132	2.885	0.189	0.846	0.714	0.5	0	0	0	0	0	0
RV-8HFRV-8HE	RV-8HF	RV-8HE	8	125.359	0.009	1.081	0.061	0.647	0.637	0.5						
RV-8HERV-8HD	RV-8HE	RV-8HD	8	92.069	0.012	1.641	0.054	1.061	1.049	0.5						
RV-8HDRV-8HC	RV-8HD	RV-8HC	8	287.422	0.015	1.586	0.063	0.929	0.915	0.5						
RV-8HCRV-8HB	RV-8HC	RV-8HB	8	222.853	0.02	1.411	0.083	0.689	0.67	0.5						

ID	From ID	To ID	Diameter (in)	Length (ft)	Existing Flow (cfs)	Existing Velocity (ft/s)	d/D Ratio	Design Flow (cfs)	Design Excess (cfs)	Design d/D Ratio	Replacement Diameter/Depth (in)	Replacement Velocity (ft/s)	Replacement d/D Ratio	Parallel Diameter/Depth (in)	Parallel Velocity (ft/s)	Parallel d/D Ratio
RV-8HC1RV-8HC	RV-8HC1	RV-8HC	8	122.597	0.003	0.894	0.029	0.876	0.873	0.5						
RV-8HBRV-8HA	RV-8HB	RV-8HA	8	159.488	0.022	1.607	0.083	0.788	0.766	0.5						
RV-8HARV-8G	RV-8HA	RV-8G	8	143.264	0.157	3.696	0.179	1.12	0.962	0.5	0	0	0	0	0	0
RV-8GRV-8F	RV-8G	RV-8F	8	366.079	0.16	3.095	0.205	0.865	0.705	0.5	0	0	0	0	0	0
RV-8FRV-8E1	RV-8F	RV-8E1	8	221.342	0.162	3.161	0.205	0.885	0.723	0.5	0	0	0	0	0	0
RV-8ERV-8D	RV-8E	RV-8D	8	275.933	0.167	4.726	0.158	1.546	1.379	0.5	0	0	0	0	0	0
RV-8E1RV-8E	RV-8E1	RV-8E	8	123.152	0.165	5.546	0.14	1.955	1.79	0.5	0	0	0	0	0	0
RV-8DRV-8C	RV-8D	RV-8C	8	343.301	0.17	4.859	0.157	1.598	1.428	0.5	0	0	0	0	0	0
RV-8CRV-8B	RV-8C	RV-8B	8	226.744	0.172	4.583	0.165	1.461	1.289	0.5	0	0	0	0	0	0
RV-8BRV-8A	RV-8B	RV-8A	8	334.25	0.175	3.267	0.211	0.899	0.724	0.5	0	0	0	0	0	0
RV-8ARV-8	RV-8A	RV-8	8	94.701	0.177	2.741	0.241	0.698	0.52	0.5	0	0	0	0	0	0
RV-7RV-6	RV-7	RV-6	8	253.921	0.267	2.167	0.383	0.428	0.161	0.5	0	0	0	0	0	0
RV-6RV-5	RV-6	RV-5	8	207.409	0.269	3.496	0.273	0.829	0.56	0.5	0	0	0	0	0	0
RV-5RV-4	RV-5	RV-4	8	298.397	0.272	1.972	0.417	0.374	0.102	0.5						
RV-4RV-3	RV-4	RV-3	8	256.598	0.274	2.449	0.357	0.502	0.227	0.5	0	0	0	0	0	0
RV-3RV-2	RV-3	RV-2	8	258.835	0.277	2.397	0.366	0.485	0.208	0.5	0	0	0	0	0	0
RV-2RV-1	RV-2	RV-1	8	209.636	0.28	3.567	0.276	0.84	0.561	0.5	0	0	0	0	0	0
RV-1B-20	RV-1	B-20	8	200.575	0.282	2.664	0.343	0.557	0.275	0.5	0	0	0	0	0	0
RV-14RV-13	RV-14	RV-13	8	370.913	0.003	0.544	0.04	0.428	0.426	0.5						
RV-13RV-12	RV-13	RV-12	8	214.267	0.005	0.65	0.056	0.408	0.403	0.5						
RV-12RV-11	RV-12	RV-11	8	220.171	0.008	0.809	0.064	0.468	0.461	0.5						
RV-11RV-10	RV-11	RV-10	8	250.723	0.079	2.825	0.135	1.02	0.941	0.5	0	0	0	0	0	0
RV-10RV-9	RV-10	RV-9	8	359.357	0.082	1.38	0.226	0.364	0.282	0.5						
M-7M-6	M-7	M-6	12	383.412	0.028	0.782	0.091	0.812	0.784	0.5						
M7-9M7-8	M7-9	M7-8	8	344.976	0.005	0.628	0.058	0.389	0.383	0.5						
M7-8M7-7	M7-8	M7-7	8	226.535	0.008	0.751	0.067	0.421	0.413	0.5						
M7-7M7-6	M7-7	M7-6	8	285.347	0.01	0.8	0.078	0.407	0.396	0.5						
M7-6M7-5	M7-6	M7-5	8	24.019	0.013	1.243	0.068	0.694	0.681	0.5						
M7-5M7-4	M7-5	M7-4	8	108.738	0.015	0.968	0.091	0.448	0.433	0.5						
M7-4M7-3	M7-4	M7-3	8	311.868	0.018	0.952	0.102	0.409	0.391	0.5						
M7-3M7-2	M7-3	M7-2	8	310.5	0.02	1.041	0.105	0.439	0.418	0.5						
M7-2M7-1	M7-2	M7-1	8	310.365	0.023	1.094	0.11	0.448	0.425	0.5						
M7-1M-7	M7-1	M-7	8	311.373	0.025	0.923	0.133	0.336	0.311	0.5						
M7-10M7-9	M7-10	M7-9	8	342.704	0.003	0.52	0.041	0.401	0.399	0.5						
M-6M-5	M-6	M-5	12	763.68	0.041	0.9	0.107	0.843	0.803	0.5						
M6-4M6-3	M6-4	M6-3	8	310.198	0.003	0.514	0.041	0.395	0.392	0.5						
M6-3M6-2	M6-3	M6-2	8	310.187	0.005	0.627	0.058	0.387	0.382	0.5						
M6-2M6-1	M6-2	M6-1	8	310.227	0.008	0.759	0.067	0.427	0.419	0.5						
M6-1M-6	M6-1	M-6	8	309.413	0.01	0.705	0.085	0.339	0.329	0.5						
M-5M-4	M-5	M-4	8	374.287	0.064	1.003	0.237	0.258	0.194	0.5						
M5-4M5-3	M5-4	M5-3	8	400.891	0.003	0.478	0.044	0.356	0.353	0.5						
M5-3M5-2	M5-3	M5-2	8	401.792	0.005	0.691	0.054	0.445	0.44	0.5						
M5-2M5-1	M5-2	M5-1	8	66.668	0.018	0.779	0.117	0.307	0.289	0.5						
M5-2BM5-2A	M5-2B	M5-2A	8	162.088	0.003	0.557	0.039	0.443	0.441	0.5						
M5-2AM5-2	M5-2A	M5-2	8	371.416	0.01	0.872	0.074	0.46	0.45	0.5						
M5-2A-2M5-2A-1	M5-2A-2	M5-2A-1	8	376.497	0.003	0.556	0.039	0.442	0.44	0.5						
M5-2A-1M5-2A	M5-2A-1	M5-2A	8	377.985	0.005	0.638	0.057	0.398	0.392	0.5						
M5-1M-5	M5-1	M-5	8	410.944	0.02	0.872	0.119	0.341	0.321	0.5						
M-4M-3	M-4	M-3	8	477.031	0.074	1.242	0.226	0.328	0.254	0.5						
M4-3M4-2	M4-3	M4-2	8	399.091	0.003	0.5	0.042	0.38	0.377	0.5						
M4-2M4-1	M4-2	M4-1	8	401.29	0.005	0.61	0.059	0.373	0.367	0.5						
M4-1M-4	M4-1	M-4	8	411.431	0.008	0.685	0.072	0.369	0.361	0.5						
M-3M-3A	M-3	M-3A	8	277.888	0.098	1.534	0.238	0.393	0.296	0.5						
M-3AM-2	M-3A	M-2	12	32.459	0.1	1.483	0.141	1.17	1.07	0.5						
M3-3M3-2	M3-3	M3-2	8	241.254	0.003	0.547	0.04	0.431	0.428	0.5						
M3-2M3-1	M3-2	M3-1	8	103.826	0.005	0.816	0.048	0.566	0.561	0.5						
M3-1M-3	M3-1	M-3	8	195.141	0.008	0.528	0.086	0.254	0.246	0.5						
M-2M-1	M-2	M-1	12	400.835	0.103	1.506	0.142	1.184	1.081	0.5						
M-1D-2	M-1	D-2	12	398.385	0.105	1.794	0.128	1.504	1.399	0.5						
IM-5IM-4	IM-4	IM-3	8	376.654	0.008	0.77	0.066	0.436	0.428	0.5						
IM4-2IM4-1	IM4-2	IM4-1	8	374.815	0.003	0.502	0.042	0.381	0.379	0.5						
IM4-1IM-4	IM4-1	IM-4	8	375.736	0.005	0.584	0.061	0.35	0.345	0.5						
IM-3IM-2	IM-3	IM-2	8	352.292	0.015	0.63	0.122	0.242	0.227	0.5						
IM3-2IM3-1	IM3-2	IM3-1	8	325.7	0.003	0.544	0.04	0.428	0.426	0.5						
IM3-1IM-3	IM3-1	IM-3	8	334.1	0.005	0.637	0.057	0.396	0.391	0.5						
IM-2IM-1	IM-2	IM-1	8	304.89	0.14	1.914	0.263	0.463	0.323	0.5						
IM2-5IM2-4	IM2-5	IM2-4	8	232.757	0.11	1.806	0.23	0.472	0.362	0.5						
IM2-4IM2-3	IM2-4	IM2-3	8	233.904	0.115	1.912	0.228	0.502	0.387	0.5						
IM2-4AIM2-4	IM2-4A	IM2-4	8	153.104	0.003	0.535	0.04	0.418	0.415	0.5						
IM2-3IM2-2	IM2-3	IM2-2	8	324.988	0.117	1.618	0.261	0.393	0.276	0.5						
IM2-2IM2-1	IM2-2	IM2-1	8	294.231	0.12	1.481	0.282	0.345	0.225	0.5						
IM2-1IM-2	IM2-1	IM-2	8	48.094	0.122	1.427	0.294	0.325	0.202	0.5						
IM-1C4-3	IM-1	C4-3	8	136.536	0.143	2	0.258	0.49	0.347	0.5	0	0	0	0	0	0
I-9I-8	I-9	I-8	18	272.656	2.352	2.389	0.545	2.038	-0.314	0.5	21	2.385	0.429	18	1.995	0.368
I-8I-7	I-8	I-7	18	272.622	2.352	2.37	0.548	2.017	-0.335	0.5	21	2.368	0.431	18	1.98	0.37
I-7I-6	I-7	I-6	18	505.989	2.352	1.971	0.64	1.591	-0.761	0.5	21	1.986	0.494	18	1.665	0.421
I-6I-5	I-6	I-5	18	450.415	2.352	2.165	0.591	1.793	-0.559	0.5	21	2.17	0.461	18	1.817	0.394
I-5I-4	I-5	I-4	18	455.571	2.352	2.279	0.566	1.916	-0.436	0.5	21	2.28	0.444	18	1.907	0.38
I-54I-53	I-54	I-53	18	335.209	1.452	1.819	0.462	1.664	0.212	0.5						
I-53I-52	I-53	I-52	18	351.829	1.46	0.826	1	0.674	-0.786	0.5	30	0.917	0.36	21	0.79	0.43
I-53-2I-53-1	I-53-2	I-53-1	8	394.541	0.003	0.512	0.042	0.392	0.389	0.5						

ID	From ID	To ID	Diameter (in)	Length (ft)	Existing Flow (cfs)	Existing Velocity (ft/s)	d/D Ratio	Design Flow (cfs)	Design Excess (cfs)	Design d/D Ratio	Replacement Diameter/Depth (in)	Replacement Velocity (ft/s)	Replacement d/D Ratio	Parallel Diameter/Depth (in)	Parallel Velocity (ft/s)	Parallel d/D Ratio
I-53-1I-53	I-53-1	I-53	8	444.455	0.005	0.811	0.049	0.561	0.556	0.5						
I-52I-51	I-52	I-51	18	438.296	1.462	1.636	0.505	1.44	-0.022	0.5	21	1.629	0.4	18	1.361	0.344
I-51I-50	I-51	I-50	18	374.529	1.465	1.799	0.469	1.634	0.169	0.5						
I-50I-49	I-50	I-49	18	376.472	1.488	1.892	0.457	1.74	0.252	0.5						
I-50-EI-50-D	I-50-E	I-50-D	8	378.488	0.003	0.508	0.042	0.388	0.385	0.5						
I-50-DI-50-B	I-50-D	I-50-B	8	422.036	0.008	0.676	0.072	0.362	0.354	0.5						
I-50D-1I-50-D	I-50D-1	I-50-D	8	342.976	0.003	0.504	0.042	0.383	0.381	0.5						
I-50-CI-50-B	I-50-C	I-50-B	8	422.191	0.003	0.484	0.043	0.362	0.36	0.5						
I-50-BI-50-A	I-50-B	I-50-A	8	420.17	0.013	0.767	0.094	0.348	0.335	0.5						
I-50-AI-50	I-50-A	I-50	8	68.917	0.015	1.233	0.077	0.634	0.618	0.5						
I-50-2I-50-1	I-50-2	I-50-1	8	424.292	0.003	0.44	0.046	0.315	0.313	0.5						
I-50-1I-50	I-50-1	I-50	8	82.116	0.005	0.758	0.051	0.509	0.504	0.5						
I-4I-3	I-4	I-3	18	466.683	2.352	1.331	1	1.147	-1.205	0.5	24	1.553	0.486	21	1.324	0.417
I-49I-48	I-49	I-48	18	383.615	1.495	2.126	0.419	2.035	0.54	0.5	0	0	0	0	0	0
I-49-2I-49-1	I-49-2	I-49-1	8	380.052	0.003	0.459	0.045	0.336	0.333	0.5						
I-49-1I-49	I-49-1	I-49	8	117.461	0.005	0.676	0.055	0.432	0.427	0.5						
I-48I-47	I-48	I-47	18	373.303	1.503	2.911	0.334	3.129	1.627	0.5	0	0	0	0	0	0
I-48-2I-48-1	I-48-2	I-48-1	8	379.692	0.003	0.557	0.039	0.443	0.44	0.5						
I-48-1I-48	I-48-1	I-48	8	117.477	0.005	0.651	0.056	0.409	0.404	0.5						
I-47I-46	I-47	I-46	18	441.155	2.278	1.289	1	0.987	-1.291	0.5	30	1.367	0.373	21	1.177	0.446
I-46I-45	I-46	I-45	18	319.697	2.283	1.908	0.641	1.539	-0.744	0.5	21	1.923	0.495	18	1.612	0.422
I-45I-44	I-45	I-44	18	311.58	2.286	2.423	0.527	2.096	-0.19	0.5	21	2.417	0.416	18	2.02	0.357
I-44I-43	I-44	I-43	18	441.446	2.289	1.899	0.645	1.53	-0.759	0.5	21	1.915	0.498	18	1.606	0.424
I-43I-42	I-43	I-42	18	441.324	2.291	1.966	0.627	1.598	-0.693	0.5	21	1.978	0.485	18	1.659	0.414
I-42I-41	I-42	I-41	18	128.115	2.294	2.571	0.504	2.265	-0.029	0.5	21	2.56	0.399	18	2.138	0.343
I-41DG-1	I-41	DG-1	18	31.686	2.296	1.299	1	0.397	-1.899	0.5	36	0.697	0.474	30	0.627	0.491
I-40I-39	I-40	I-39	18	417.665	2.352	1.542	0.806	1.195	-1.157	0.5	24	1.601	0.474	18	1.347	0.495
I-3I-2	I-3	I-2	18	470.176	2.352	2.432	0.537	2.086	-0.266	0.5	21	2.427	0.423	18	2.029	0.363
I-39I-38	I-39	I-38	18	413.355	2.352	1.331	1	0.931	-1.421	0.5	30	1.322	0.391	21	1.138	0.47
I-38I-37	I-38	I-37	18	411.154	2.352	1.652	0.751	1.288	-1.064	0.5	24	1.693	0.455	18	1.424	0.474
I-37I-36	I-37	I-36	18	416.272	2.352	2.531	0.52	2.199	-0.153	0.5	21	2.523	0.411	18	2.108	0.353
I-36I-35	I-36	I-35	18	417.09	2.352	2.283	0.565	1.921	-0.431	0.5	21	2.284	0.443	18	1.911	0.38
I-35I-34	I-35	I-34	18	416.624	2.352	1.553	0.799	1.204	-1.148	0.5	24	1.611	0.472	18	1.355	0.493
I-34I-33	I-34	I-33	18	415.901	2.352	2.068	0.614	1.691	-0.661	0.5	21	2.078	0.477	18	1.741	0.407
I-33I-32	I-33	I-32	18	415.237	2.352	2.03	0.624	1.652	-0.7	0.5	21	2.042	0.483	18	1.711	0.412
I-32I-31	I-32	I-31	18	427.855	2.352	2.285	0.565	1.923	-0.429	0.5	21	2.286	0.443	18	1.912	0.379
I-31I-30	I-31	I-30	18	455.367	2.352	2.581	0.512	2.257	-0.095	0.5	21	2.571	0.405	18	2.148	0.348
I-30I-29	I-30	I-29	18	468.184	2.352	1.331	1	0.811	-1.542	0.5	30	1.194	0.422	24	1.038	0.43
I-2I-1	I-2	I-1	18	488.672	2.352	1.983	0.636	1.604	-0.748	0.5	21	1.998	0.492	18	1.675	0.419
I-29I-28	I-29	I-28	18	453.897	2.352	2.195	0.584	1.826	-0.526	0.5	21	2.199	0.456	18	1.841	0.39
I-28I-27	I-28	I-27	18	453.872	2.352	1.701	0.73	1.331	-1.021	0.5	24	1.735	0.446	18	1.46	0.465
I-27I-26	I-27	I-26	18	466.515	2.352	1.618	0.767	1.258	-1.094	0.5	24	1.664	0.461	18	1.4	0.481
I-26I-25	I-26	I-25	18	324.723	2.352	2.17	0.589	1.799	-0.553	0.5	21	2.176	0.46	18	1.822	0.393
I-25I-24	I-25	I-24	18	311.531	2.352	1.757	0.709	1.382	-0.97	0.5	24	1.784	0.437	18	1.501	0.455
I-24I-23	I-24	I-23	18	400.469	2.352	2.249	0.572	1.883	-0.469	0.5	21	2.251	0.448	18	1.884	0.384
I-23I-22	I-23	I-22	18	401.09	2.352	2.306	0.561	1.947	-0.405	0.5	21	2.307	0.44	18	1.929	0.377
I-22I-21	I-22	I-21	18	400.435	2.352	2.127	0.599	1.753	-0.599	0.5	21	2.135	0.467	18	1.788	0.399
I-21I-20	I-21	I-20	18	387.049	2.352	1.331	1	0.978	-1.374	0.5	30	1.37	0.381	21	1.179	0.457
I-20I-19	I-20	I-19	18	387.919	2.352	2.224	0.578	1.856	-0.496	0.5	21	2.227	0.452	18	1.864	0.387
I-19I-18	I-19	I-18	18	464.81	2.352	1.892	0.663	1.513	-0.839	0.5	24	1.906	0.415	18	1.605	0.433
I-18I-17	I-18	I-17	18	465.704	2.352	2.137	0.597	1.763	-0.589	0.5	21	2.144	0.466	18	1.795	0.398
I-17I-16	I-17	I-16	18	466.592	2.352	1.882	0.666	1.503	-0.849	0.5	24	1.897	0.417	18	1.597	0.434
I-16I-15	I-16	I-15	18	272.877	2.352	2.341	0.554	1.985	-0.367	0.5	21	2.34	0.435	18	1.957	0.373
I-15I-14	I-15	I-14	18	285.794	2.352	1.331	1	1.105	-1.247	0.5	24	1.511	0.496	21	1.289	0.426
I-14I-13	I-14	I-13	18	285.682	2.352	2.184	0.586	1.814	-0.538	0.5	21	2.189	0.458	18	1.832	0.392
I-13I-12	I-13	I-12	18	286.093	2.352	1.331	1	0.868	-1.484	0.5	30	1.256	0.406	21	1.08	0.491
I-12I-11	I-12	I-11	18	483.05	2.352	2.214	0.58	1.846	-0.506	0.5	21	2.218	0.454	18	1.856	0.388
I-11I-10	I-11	I-10	18	454.877	2.352	1.591	0.78	1.235	-1.117	0.5	24	1.642	0.465	18	1.381	0.486
I-10I-9	I-10	I-9	18	468.729	2.352	1.631	0.76	1.269	-1.083	0.5	24	1.675	0.458	18	1.409	0.478
GH4GH3	G35-4	G35-3	8	348.685	0.008	0.794	0.065	0.456	0.448	0.5						
GH3GH2	G35-3	G35-2	8	353.029	0.01	0.847	0.075	0.441	0.431	0.5						
GH35-6GH35-5	G35-6	G35-5	8	154.537	0.003	0.586	0.038	0.477	0.474	0.5						
GH35-5GH35-4	G35-5	G35-4	8	360.686	0.005	0.65	0.056	0.408	0.403	0.5						
GH2GH1	G35-2	G35-1	8	341.838	0.013	0.917	0.083	0.449	0.436	0.5						
GH1G35	G35-1	G-35	8	362.976	0.015	1.055	0.086	0.507	0.492	0.5						
G-9G-8	G-9	G-8	12	239.687	0.422	1.656	0.36	0.76	0.338	0.5						
G9-1G-9	G9-1	G-9	8	153.478	0.003	0.521	0.041	0.402	0.4	0.5						
G-8G-7	G-8	G-7	12	238.534	0.425	1.569	0.377	0.704	0.279	0.5						
G-7G-6	G-7	G-6	12	424.422	0.44	1.561	0.388	0.69	0.25	0.5						
G7-5G7-4	G7-5	G7-4	8	392.713	0.003	0.472	0.044	0.349	0.347	0.5						
G7-4G7-3	G7-4	G7-3	8	384.736	0.005	0.608	0.059	0.37	0.365	0.5						
G7-3G7-2	G7-3	G7-2	8	384.462	0.008	0.83	0.063	0.486	0.478	0.5						
G7-2G7-1	G7-2	G7-1	8	389.943	0.01	0.904	0.072	0.484	0.474	0.5						
G7-1G-7	G7-1	G-7	8	391.418	0.013	0.913	0.083	0.446	0.433	0.5						
G-6G-5A	G-6	G-5A	12	259.219	0.46	1.783	0.364	0.814	0.354	0.5						
G6-6G6-5	G6-6	G6-5	8	376.775	0.003	0.658	0.035	0.563	0.561	0.5						
G6-5G6-4	G6-5	G6-4	8	369.502	0.005	0.818	0.048	0.568	0.563	0.5						
G6-4G6-3	G6-4	G6-3	8	280.778	0.008	0.882	0.06	0.53	0.522	0.5						
G6-3G6-2	G6-3	G6-2	8	398.098	0.013	0.718	0.098	0.316	0.303	0.5						
G6-3AG6-3	G6-3A	G6-3	8	172.45	0.003	0.679	0.034	0.589	0.586	0.5						
G6-2G6-1	G6-2	G6-1	8	402.355	0.015	0.8	0.103	0.341	0.326	0.5						

ID	From ID	To ID	Diameter (in)	Length (ft)	Existing Flow (cfs)	Existing Velocity (ft/s)	d/D Ratio	Design Flow (cfs)	Design Excess (cfs)	Design d/D Ratio	Replacement Diameter/Depth (in)	Replacement Velocity (ft/s)	Replacement d/D Ratio	Parallel Diameter/Depth (in)	Parallel Velocity (ft/s)	Parallel d/D Ratio
G6-1G-6	G6-1	G-6	8	405.411	0.018	0.864	0.109	0.356	0.339	0.5						
G-5G-4	G-5	G-4	12	417.571	0.465	1.784	0.367	0.811	0.346	0.5						
G-5AG-5	G-5A	G-5	12	235.863	0.463	1.653	0.386	0.732	0.269	0.5						
G-4G-3	G-4	G-3	12	416.008	0.468	1.716	0.379	0.767	0.3	0.5						
G-43G-42	G-43	G-42	8	396.444	0.003	0.519	0.041	0.4	0.397	0.5						
G-42G-41	G-42	G-41	8	145.309	0.005	0.671	0.055	0.427	0.422	0.5						
G-41G-40	G-41	G-40	8	312.177	0.008	0.82	0.063	0.478	0.47	0.5						
G-40G-39	G-40	G-39	8	337.267	0.01	0.839	0.076	0.435	0.425	0.5						
G-3G-2	G-3	G-2	12	415.318	0.47	1.556	0.409	0.67	0.199	0.5						
G-39G-38	G-39	G-38	8	351.745	0.013	0.792	0.092	0.364	0.351	0.5						
G-38G-37	G-38	G-37	8	343.017	0.015	0.87	0.098	0.384	0.369	0.5						
G-37G-36	G-37	G-36	8	243.61	0.018	0.864	0.109	0.356	0.339	0.5						
G-37G-35	G-36	G-35	8	238.428	0.02	0.908	0.115	0.361	0.341	0.5						
G-35G-34	G-35	G-34	8	389.979	0.038	0.989	0.168	0.312	0.274	0.5						
G-34G-33	G-34	G-33	8	345.94	0.043	1.124	0.167	0.355	0.312	0.5						
G34-AG-34	G34-A	G-34	8	323.832	0.003	0.639	0.036	0.539	0.537	0.5						
G-33G-32	G-33	G-32	8	143.579	0.046	1.432	0.147	0.489	0.444	0.5						
G-32G-31	G-32	G-31	8	160.112	0.051	1.038	0.198	0.297	0.246	0.5						
G32-1G32	G32-1	G-32	8	249.337	0.003	0.454	0.045	0.33	0.328	0.5						
G-31G-30	G-31	G-30	8	193.293	0.053	1.163	0.189	0.341	0.288	0.5						
G-30G-29	G-30	G-29	8	140.251	0.056	1.171	0.194	0.338	0.282	0.5						
G-2G-1	G-2	G-1	12	415.319	0.473	2.26	0.312	1.119	0.646	0.5	0	0	0	0	0	0
G-29G-28	G-29	G-28	8	228.801	0.061	1.198	0.203	0.336	0.276	0.5						
G29-1G-29	G29-1	G-29	8	210.347	0.003	0.55	0.04	0.435	0.432	0.5						
G-28G-27	G-28	G-27	8	266.804	0.064	1.248	0.203	0.351	0.287	0.5						
G-27G-26	G-27	G-26	8	267.235	0.066	1.533	0.181	0.462	0.396	0.5						
G-26G-25	G-26	G-25	10	360.602	0.071	0.992	0.189	0.454	0.383	0.5						
G26-1G-26	G26-1	G-26	8	362.657	0.003	0.488	0.043	0.366	0.364	0.5						
G-25G-24	G-25	G-24	10	140.904	0.074	1.165	0.173	0.563	0.489	0.5						
G-24G-23	G-24	G-23	10	181.509	0.076	1.175	0.176	0.562	0.485	0.5						
G-23G-22	G-23	G-22	10	234.157	0.079	1.142	0.184	0.532	0.453	0.5						
G-22G-21	G-22	G-21	10	337.853	0.084	1.299	0.176	0.622	0.538	0.5						
G22-1G-22	G22-1	G-22	8	159.319	0.003	0.798	0.031	0.743	0.74	0.5						
G-21G-20	G-21	G-20	10	362.282	0.089	1.184	0.195	0.532	0.443	0.5						
G21-1G-21	G21-1	G-21	8	115.94	0.003	0.529	0.041	0.411	0.408	0.5						
G-20G-19	G-20	G-19	10	376.425	0.091	1.18	0.2	0.524	0.432	0.5						
G-1D-12	G-1	D-12	12	418.231	0.475	1.793	0.371	0.81	0.335	0.5						
G-19G-18	G-19	G-18	10	415.919	0.094	1.218	0.199	0.542	0.448	0.5						
G-18G-17	G-18	G-17	10	413.839	0.166	1.506	0.255	0.579	0.414	0.5						
G-17G-16	G-17	G-16	10	381.281	0.168	1.155	0.312	0.397	0.229	0.5						
G-16G-15	G-16	G-15	10	249.499	0.397	1.907	0.406	0.572	0.175	0.5						
G16-EG16-D	G16-E	G16-D	8	343.773	0.003	0.47	0.044	0.346	0.344	0.5						
G16-DG16-C	G16-D	G16-C	8	216.415	0.02	0.832	0.122	0.319	0.299	0.5						
G16D-4G16D-3	G16D-4	G16D-3	8	212.636	0.005	0.888	0.046	0.639	0.634	0.5						
G16D-4AG16D-4	G16D-4A	G16D-4	8	233	0.003	0.668	0.035	0.575	0.572	0.5						
G16D-3G16D-2	G16D-3	G16D-2	8	218.579	0.008	0.884	0.06	0.532	0.524	0.5						
G16D-2G16D-1	G16D-2	G16D-1	8	261.352	0.013	0.803	0.091	0.371	0.358	0.5						
G16D-2AG16D-2	G16D-2A	G16D-2	8	246.593	0.003	0.503	0.042	0.383	0.38	0.5						
G16D-1G16-D	G16D-1	G16-D	8	247.819	0.015	0.839	0.1	0.365	0.35	0.5						
G16-CG16-B	G16-C	G16-B	8	224.936	0.023	0.917	0.124	0.348	0.325	0.5						
G16-BG16-A	G16-B	G16-A	8	198.26	0.033	0.956	0.155	0.316	0.283	0.5						
G16B-3G16B-2	G16B-3	G16B-2	8	332.52	0.003	0.501	0.042	0.381	0.378	0.5						
G16B-2G16B-1	G16B-2	G16B-1	8	389.874	0.005	0.614	0.059	0.376	0.371	0.5						
G16B-1G16-B	G16B-1	G16-B	8	348.071	0.008	0.899	0.06	0.545	0.537	0.5						
G16-AG-16	G16-A	G-16	8	258.457	0.036	1.918	0.101	0.827	0.792	0.5						
G16-9G16-8	G16-9	G16-8	8	299.143	0.015	0.869	0.098	0.384	0.369	0.5						
G16-9EG16-9D	G16-9E	G16-9D	8	150.845	0.003	0.683	0.034	0.594	0.591	0.5						
G16-9DG16-9C	G16-9D	G16-9C	8	397.898	0.005	0.874	0.046	0.624	0.619	0.5						
G16-9CG16-9B	G16-9C	G16-9B	8	401.396	0.008	1.12	0.051	0.748	0.74	0.5						
G16-9BG16-9A	G16-9B	G16-9A	8	399.072	0.01	1.374	0.054	0.884	0.874	0.5						
G16-9AG16-9	G16-9A	G16-9	8	427.518	0.013	1.081	0.074	0.568	0.555	0.5						
G16-8G16-7	G16-8	G16-7	8	176.942	0.018	1.319	0.082	0.653	0.635	0.5						
G16-7G16-6	G16-7	G16-6	8	196.869	0.03	1.068	0.136	0.383	0.352	0.5						
G16-7DG16-7C	G16-7D	G16-7C	8	113.036	0.003	0.882	0.029	0.859	0.857	0.5						
G16-7CG16-7B	G16-7C	G16-7B	8	224.682	0.005	1.054	0.041	0.817	0.812	0.5						
G16-7BG16-7A	G16-7B	G16-7A	8	401.124	0.008	1.193	0.049	0.818	0.811	0.5						
G16-7AG16-7	G16-7A	G16-7	8	425.516	0.01	0.942	0.07	0.514	0.503	0.5						
G16-6G16-5	G16-6	G16-5	8	288.377	0.036	1.268	0.135	0.458	0.422	0.5						
G16-6AG16-6	G16-6A	G16-6	8	387.819	0.003	0.49	0.043	0.369	0.366	0.5						
G16-5G16-4	G16-5	G16-4	8	210.373	0.051	1.09	0.191	0.318	0.267	0.5						
G16-5EG16-5D	G16-5E	G16-5D	8	132.211	0.003	0.936	0.028	0.936	0.933	0.5						
G16-5DG16-5C	G16-5D	G16-5C	8	159.251	0.005	1.111	0.039	0.882	0.877	0.5						
G16-5CG16-5B	G16-5C	G16-5B	8	202.139	0.008	1.363	0.045	0.991	0.983	0.5						
G16-5BG16-5A	G16-5B	G16-5A	8	400.897	0.01	1.102	0.063	0.644	0.634	0.5						
G16-5AG16-5	G16-5A	G16-5	8	427.662	0.013	0.8	0.091	0.369	0.356	0.5						
G16-4G16-3	G16-4	G16-3	8	254.184	0.053	1.566	0.154	0.521	0.468	0.5						
G16-3HG16-3G	G16-3H	G16-3G	8	20.898	0.013	1.228	0.068	0.683	0.67	0.5						
G16-3H4G16-3H3	G16-3H4	G16-3H3	8	214.967	0.003	0.959	0.027	0.969	0.967	0.5						
G16-3H3G16-3H2	G16-3H3	G16-3H2	8	226.879	0.005	0.962	0.043	0.717	0.712	0.5						
G16-3H2G16-3H1	G16-3H2	G16-3H1	8	399.715	0.008	1.169	0.05	0.795	0.787	0.5						
G16-3H1G16-3H	G16-3H1	G16-3H	8	394.913	0.01	1.173	0.061	0.704	0.694	0.5						

ID	From ID	To ID	Diameter (in)	Length (ft)	Existing Flow (cfs)	Existing Velocity (ft/s)	d/D Ratio	Design Flow (cfs)	Design Excess (cfs)	Design d/D Ratio	Replacement Diameter/Depth (in)	Replacement Velocity (ft/s)	Replacement d/D Ratio	Parallel Diameter/Depth (in)	Parallel Velocity (ft/s)	Parallel d/D Ratio
G16-3GG16-3F	G16-3G	G16-3F	8	382.659	0.015	0.906	0.095	0.407	0.392	0.5						
G16-3G16-2	G16-3	G16-2	8	396.766	0.185	1.881	0.325	0.405	0.219	0.5						
G16-3FG16-3E	G16-3F	G16-3E	8	370.403	0.117	2.046	0.22	0.548	0.431	0.5	0	0	0	0	0	0
G16-3F5G16-3F4	G16-3F5	G16-3F4	12	156.532	0.089	1.862	0.111	1.705	1.616	0.5						
G16-3F4G16-3F3	G16-3F4	G16-3F3	8	229.054	0.091	2.796	0.15	0.946	0.855	0.5	12	2.649	0.089	12	3.988	0.068
G16-3F3G16-3F2	G16-3F3	G16-3F2	8	235.64	0.094	2.347	0.172	0.729	0.635	0.5	0	0	0	0	0	0
G16-3F2G16-3F1	G16-3F2	G16-3F1	8	399.866	0.096	2.3	0.178	0.701	0.604	0.5	0	0	0	0	0	0
G16-3F1G16-3F	G16-3F1	G16-3F	8	397.268	0.099	2.193	0.187	0.648	0.549	0.5	0	0	0	0	0	0
G16-3EG16-3D	G16-3E	G16-3D	8	370.372	0.119	2.274	0.208	0.631	0.512	0.5	0	0	0	0	0	0
G16-3DG16-3C	G16-3D	G16-3C	8	369.257	0.122	2.249	0.213	0.616	0.494	0.5	0	0	0	0	0	0
G16-3CG16-3B	G16-3C	G16-3B	8	399.679	0.124	2.054	0.23	0.537	0.413	0.5	0	0	0	0	0	0
G16-3BG16-3A	G16-3B	G16-3A	8	394.839	0.127	2.317	0.214	0.631	0.505	0.5	0	0	0	0	0	0
G16-3AG16-3	G16-3A	G16-3	8	433.77	0.13	1.587	0.284	0.368	0.238	0.5						
G16-2G16-1	G16-2	G16-1	8	404.676	0.188	1.76	0.345	0.367	0.179	0.5						
G16-1G-16	G16-1	G-16	8	382.618	0.19	2.419	0.277	0.569	0.378	0.5	0	0	0	0	0	0
G-15G-14	G-15	G-14	10	262.637	0.399	1.563	0.475	0.436	0.037	0.5						
G-14G-13	G-14	G-13	10	388.445	0.404	1.698	0.45	0.485	0.081	0.5						
G14-1G-14	G14-1	G-14	8	265.537	0.003	0.456	0.045	0.332	0.329	0.5						
G-13G-12	G-13	G-12	10	307.632	0.407	2.015	0.397	0.611	0.204	0.5	0	0	0	0	0	0
G-12G-11	G-12	G-11	10	392.092	0.412	1.809	0.435	0.525	0.113	0.5						
G12-1G-12	G12-1	G-12	8	213.035	0.003	0.453	0.045	0.328	0.326	0.5						
G-11G-10	G-11	G-10	10	424.65	0.415	1.744	0.449	0.499	0.084	0.5						
G-10G-9	G-10	G-9	10	417.2	0.417	1.978	0.41	0.59	0.173	0.5						
EA-NORTHE-2	D6-2AA	D6-2	8	195.889	0.003	0.494	0.043	0.373	0.371	0.5						
DG-9DG-8	DG-9	DG-8	15	324.667	0.036	0.813	0.077	1.464	1.429	0.5						
DG-8DG-7	DG-8	DG-7	8	229.769	0.038	1.09	0.157	0.358	0.32	0.5						
DG-7DG-6	DG-7	DG-6	8	232.807	0.041	1.139	0.159	0.372	0.331	0.5						
DG-6DG-5	DG-6	DG-5	8	388.63	0.043	0.969	0.185	0.288	0.245	0.5						
DG-5DG-4	DG-5	DG-4	8	187.819	0.046	1.069	0.18	0.323	0.277	0.5						
DG-4DG-3	DG-4	DG-3	8	213.985	0.048	0.964	0.201	0.273	0.224	0.5						
DG-3DG-2	DG-3	DG-2	8	233.229	0.051	1.138	0.186	0.338	0.287	0.5						
DG-2DG-1	DG-2	DG-1	8	236.693	0.053	1.114	0.195	0.321	0.268	0.5						
DG-1I-40	DG-1	I-40	18	363.751	2.352	2.831	0.477	2.554	0.202	0.5	0	0	0	0	0	0
DG-16DG-15	DG-16	DG-15	8	178.018	0.003	0.494	0.043	0.373	0.37	0.5						
DG-15DG-13	DG-15	DG-13	8	324.457	0.008	0.737	0.068	0.409	0.402	0.5						
DG15-1DG-15	DG15-1	DG-15	8	330.438	0.003	0.523	0.041	0.405	0.402	0.5						
DG-14DG-13	DG-14	DG-13	8	326.066	0.01	0.689	0.087	0.328	0.318	0.5						
DG14-3DG14-2	DG14-3	DG14-2	8	293.234	0.003	0.524	0.041	0.405	0.403	0.5						
DG14-2DG14-1	DG14-2	DG14-1	8	357.128	0.005	0.705	0.053	0.458	0.453	0.5						
DG14-1DG-14	DG14-1	DG-14	8	204.8	0.008	0.804	0.064	0.464	0.456	0.5						
DG-13DG-12	DG-13	DG-12	15	398.209	0.025	0.874	0.059	1.882	1.856	0.5						
DG13-2DG13-1	DG13-2	DG13-1	8	388.763	0.003	0.528	0.041	0.41	0.407	0.5						
DG13-1DG-13	DG13-1	DG-13	8	75.517	0.005	1.13	0.039	0.905	0.9	0.5						
DG-12DG-11	DG-12	DG-11	8	398.884	0.028	0.901	0.144	0.312	0.284	0.5						
DG-11DG-10	DG-11	DG-10	15	400.424	0.03	0.876	0.066	1.744	1.713	0.5						
DG-10DG-9	DG-10	DG-9	8	311.973	0.033	1.047	0.146	0.359	0.326	0.5						
DA-5DA-4	D7-5	D7-4	8	337.34	0.003	0.674	0.035	0.583	0.581	0.5						
DA-4DA-3	D7-4	D7-3	8	334.531	0.005	0.657	0.056	0.414	0.409	0.5						
DA-3DA-2	D7-3	D7-2	8	342.858	0.008	0.811	0.064	0.47	0.462	0.5						
DA-2DA-1	D7-2	D7-1	8	339.334	0.01	0.944	0.07	0.516	0.505	0.5						
DA-1D-7	D7-1	D-7	8	350.328	0.013	0.921	0.083	0.451	0.438	0.5						
D-9D-8	D-9	D-8	15	346.652	0.633	2.311	0.275	1.919	1.286	0.5	0	0	0	0	0	0
D-8D-7	D-8	D-7	15	275.535	0.635	2.347	0.272	1.958	1.322	0.5	0	0	0	0	0	0
D-7D-6	D-7	D-6	15	233.693	0.651	3.492	0.209	3.391	2.741	0.5	0	0	0	0	0	0
D-6D-5	D-6	D-5	15	381.078	0.719	1.406	0.435	0.919	0.199	0.5						
D6-9D6-8	D6-9	D6-8	8	149.351	0.005	0.882	0.046	0.633	0.628	0.5						
D6-8D6-7	D6-8	D6-7	8	123.779	0.008	1.112	0.052	0.739	0.732	0.5						
D6-7DD6-7C	D6-7D	D6-7C	8	247.463	0.003	0.517	0.041	0.398	0.395	0.5						
D6-7D6-6	D6-7	D6-6	8	285.181	0.023	0.84	0.132	0.307	0.284	0.5						
D6-7CD6-7B	D6-7C	D6-7B	8	238.048	0.005	0.971	0.043	0.727	0.722	0.5						
D6-7BD6-7A	D6-7B	D6-7A	8	402.616	0.008	0.655	0.074	0.345	0.338	0.5						
D6-7AD6-7	D6-7A	D6-7	8	290.904	0.013	0.804	0.091	0.372	0.359	0.5						
D6-7A1D6-7A	D6-7A1	D6-7A	8	202.466	0.003	0.743	0.032	0.67	0.668	0.5						
D6-6D6-5	D6-6	D6-5	8	300.319	0.025	0.951	0.13	0.351	0.325	0.5						
D6-5D6-4	D6-5	D6-4	8	340.745	0.028	0.97	0.137	0.346	0.318	0.5						
D6-4D6-3	D6-4	D6-3	8	314.156	0.03	1.119	0.132	0.409	0.379	0.5						
D6-3D6-2	D6-3	D6-2	8	380.075	0.033	1.24	0.13	0.458	0.425	0.5						
D6-2FD6-2E	D6-2F	D6-2E	8	366.152	0.003	0.688	0.034	0.6	0.597	0.5						
D6-2ED6-2D	D6-2E	D6-2D	8	232.968	0.013	0.667	0.103	0.284	0.271	0.5						
D6-2E3D6-2E2	D6-2E3	D6-2E2	8	382.415	0.003	0.551	0.04	0.436	0.434	0.5						
D6-2E2D6-2E1	D6-2E2	D6-2E1	8	207.935	0.005	0.567	0.062	0.336	0.33	0.5						
D6-2E1D6-2E	D6-2E1	D6-2E	8	215.631	0.008	0.664	0.073	0.353	0.345	0.5						
D6-2DD6-2C	D6-2D	D6-2C	8	220.441	0.015	0.86	0.098	0.378	0.363	0.5						
D6-2D6-1	D6-2	D6-1	8	393.353	0.064	1.214	0.207	0.337	0.274	0.5						
D6-2CD6-2B	D6-2C	D6-2	8	164.509	0.02	0.846	0.121	0.327	0.306	0.5						
D6-2C1D6-2C	D6-2C1	D6-2C	8	269.019	0.003	0.535	0.04	0.417	0.415	0.5						
D6-2BD6-2A	D6-2B	D6-2A	8	344.124	0.003	0.479	0.043	0.356	0.354	0.5						
D6-2AD6-2	D6-2A	D6-2	8	346.519	0.005	0.594	0.06	0.358	0.353	0.5						
D6-1D-6	D6-1	D-6	8	423.897	0.066	1.336	0.199	0.38	0.314	0.5						
D6-10D6-9	D6-10	D6-9	8	398.018	0.003	0.641	0.036	0.543	0.54	0.5						
D-5D-4	D-5	D-4	15	405.815	0.722	1.796	0.363	1.283	0.562	0.5						

ID	From ID	To ID	Diameter (in)	Length (ft)	Existing Flow (cfs)	Existing Velocity (ft/s)	d/D Ratio	Design Flow (cfs)	Design Excess (cfs)	Design d/D Ratio	Replacement Diameter/Depth (in)	Replacement Velocity (ft/s)	Replacement d/D Ratio	Parallel Diameter/Depth (in)	Parallel Velocity (ft/s)	Parallel d/D Ratio
D-4D-3	D-4	D-3	15	402.244	0.724	1.581	0.4	1.076	0.351	0.5						
D-3D-2	D-3	D-2	15	393.525	0.727	3.588	0.222	3.367	2.64	0.5	0	0	0	0	0	0
D-2D-1	D-2	D-1	15	364.893	0.835	1.485	0.467	0.939	0.104	0.5						
D-28D-27	D-28	D-27	8	329.035	0.003	1.015	0.026	1.051	1.049	0.5						
D-27D-26	D-27	D-26	8	337.953	0.005	0.961	0.043	0.716	0.711	0.5						
D-26D-25	D-26	D-25	8	341.164	0.008	1.27	0.047	0.895	0.887	0.5						
D-25D-24	D-25	D-24	8	329.001	0.01	0.997	0.068	0.557	0.547	0.5						
D-24D-23	D-24	D-23	8	315.214	0.013	0.932	0.082	0.459	0.447	0.5						
D-23D-22	D-23	D-22	8	354.854	0.015	0.862	0.098	0.38	0.364	0.5						
D-22D-21	D-22	D-21	8	179.889	0.018	1.531	0.074	0.809	0.791	0.5						
D-21D-20	D-21	D-20	8	401.811	0.02	1.576	0.079	0.795	0.775	0.5						
D-20D-19	D-20	D-19	8	413.68	0.023	1.64	0.084	0.8	0.777	0.5						
D-1I-54	D-1	I-54	15	365.829	0.837	2.257	0.342	1.663	0.826	0.5	0	0	0	0	0	0
D-19D-18	D-19	D-18	8	342.565	0.025	1.595	0.091	0.734	0.709	0.5						
D-18D-17	D-18	D-17	8	347.551	0.028	1.629	0.096	0.727	0.699	0.5						
D-17D-16	D-17	D-16	8	347.425	0.03	1.68	0.1	0.731	0.701	0.5						
D-16D-15	D-16	D-15	8	183.173	0.033	1.582	0.11	0.648	0.615	0.5						
D-15D-14	D-15	D-14	8	166.755	0.13	2.331	0.216	0.632	0.502	0.5	0	0	0	0	0	0
D-15AD-15B	D-15B	D-15A	8	345.534	0.089	1.691	0.208	0.469	0.38	0.5						
D-15AD-15	D-15A	D-15	8	274.978	0.094	1.734	0.212	0.475	0.381	0.5						
D-15A2D-15A	D-15A2	D-15A	8	182.011	0.003	0.629	0.036	0.528	0.525	0.5						
D-14D-13	D-14	D-13	8	347.678	0.132	2.579	0.204	0.723	0.591	0.5	0	0	0	0	0	0
D-13D-12	D-13	D-12	12	365.557	0.147	1.528	0.18	1.038	0.891	0.5						
D13-5D13-4	D13-5	D13-4	8	265.355	0.003	0.493	0.043	0.372	0.369	0.5						
D13-4D13-3	D13-4	D13-3	8	269.275	0.005	0.572	0.062	0.339	0.334	0.5						
D13-3D13-2	D13-3	D13-2	8	384.226	0.008	0.657	0.074	0.347	0.339	0.5						
D13-2D13-1	D13-2	D13-1	8	344.744	0.01	0.659	0.089	0.307	0.297	0.5						
D13-1D-13	D13-1	D-13	8	368.769	0.013	0.801	0.091	0.37	0.357	0.5						
D-12D-11	D-12	D-11	12	399.274	0.625	2.179	0.393	0.956	0.331	0.5	0	0	0	0	0	0
D-11D-10	D-11	D-10	15	397.227	0.628	1.878	0.317	1.441	0.813	0.5						
D-10D-9	D-10	D-9	15	355.006	0.63	2.562	0.255	2.221	1.591	0.5	0	0	0	0	0	0
C-9C-8	C-9	C-8	12	407.448	0.348	1.844	0.289	0.952	0.604	0.5						
C9-6C9-5	C9-6	C9-5	8	332.714	0.003	0.713	0.033	0.633	0.63	0.5						
C9-5C9-4	C9-5	C9-4	8	391.223	0.005	0.671	0.055	0.427	0.422	0.5						
C9-4C9-3	C9-4	C9-3	8	407.521	0.008	0.727	0.069	0.402	0.394	0.5						
C9-3C9-2	C9-3	C9-2	8	398.332	0.01	0.785	0.079	0.395	0.385	0.5						
C9-2C9-1	C9-2	C9-1	8	398.783	0.013	0.802	0.091	0.37	0.358	0.5						
C9-1C9	C9-1	C-9	8	394.597	0.015	0.914	0.094	0.413	0.397	0.5						
C-8C-7A	C-8	C-7A	12	360.017	0.365	0.843	0.541	0.321	-0.045	0.5	15	0.839	0.385	12	0.704	0.365
C8-6C8-5	C8-6	C8-5	8	337.655	0.003	0.538	0.04	0.422	0.419	0.5						
C8-5C8-4	C8-5	C8-4	8	405.457	0.005	0.641	0.057	0.4	0.395	0.5						
C8-4C8-3	C8-4	C8-3	8	397.399	0.008	0.691	0.071	0.373	0.366	0.5						
C8-3C8-2	C8-3	C8-2	8	401.123	0.01	0.768	0.081	0.383	0.373	0.5						
C8-2C8-1	C8-2	C8-1	8	401.028	0.013	0.777	0.093	0.354	0.341	0.5						
C8-1C-8	C8-1	C-8	8	399.687	0.015	0.847	0.099	0.37	0.355	0.5						
C-7C-6C	C-7	C-6B	15	8.447	0.393	3.416	0.15	4.061	3.667	0.5	0	0	0	0	0	0
C-7AC-7	C-7A	C-7	12	22.499	0.368	1.952	0.289	1.008	0.64	0.5						
C7-7C7-6	C7-7	C7-6	8	255.2	0.003	0.569	0.039	0.456	0.454	0.5						
C7-6C7-5	C7-6	C7-5	8	401.541	0.005	0.448	0.073	0.239	0.234	0.5						
C7-5C7-5A	C7-5	C7-5A	8	9.894	0.008	2.295	0.032	2.098	2.091	0.5	0	0	0	0	0	0
C7-5AC7-4	C7-5A	C7-4	8	401.026	0.01	0.594	0.096	0.265	0.255	0.5						
C7-4C7-4A	C7-4	C7-4A	8	9.947	0.013	2.37	0.044	1.756	1.743	0.5	0	0	0	0	0	0
C7-4AC7-3	C7-4A	C7-3	8	384.949	0.015	0.973	0.09	0.452	0.436	0.5						
C7-3C7-2	C7-3	C7-2	8	413.373	0.018	0.928	0.104	0.395	0.377	0.5						
C7-2C7-1	C7-2	C7-1	8	401.25	0.02	0.848	0.121	0.327	0.307	0.5						
C7-1C7	C7-1	C-7	8	399.024	0.023	0.925	0.123	0.352	0.33	0.5						
C-6CC-6B	C-6B	C-6A	15	352.426	0.396	1.199	0.314	0.924	0.528	0.5						
C-6C-5A	C-6	C-5A	15	283.853	0.409	1.251	0.312	0.968	0.56	0.5						
C-6BC-6	C-6A	C-6	15	109.7	0.398	1.418	0.28	1.165	0.766	0.5						
C6-3C6-2	C6-3	C6-2	8	402.623	0.003	0.547	0.04	0.431	0.429	0.5						
C6-2C6-1	C6-2	C6-1	8	401.719	0.005	0.633	0.058	0.392	0.387	0.5						
C6-1C-6	C6-1	C-6	8	395.468	0.008	0.719	0.069	0.395	0.387	0.5						
C-5C-4B	C-5	C-4A	15	247.377	0.421	1.352	0.301	1.066	0.645	0.5						
C-5AC-5	C-5A	C-5	15	141.59	0.411	1.113	0.341	0.821	0.41	0.5						
C5-3C5-2	C5-3	C5-2	8	409.915	0.003	0.496	0.042	0.375	0.373	0.5						
C5-2C5-1	C5-2	C5-1	8	400.643	0.005	0.581	0.061	0.347	0.342	0.5						
C5-1C-5	C5-1	C-5	8	395.375	0.008	0.695	0.071	0.376	0.369	0.5						
C-4C-3	C-4	C-3	15	238.529	0.577	2.497	0.243	2.221	1.645	0.5	0	0	0	0	0	0
C-4BC-4	C-4A	C-4	15	179.269	0.424	2.029	0.227	1.88	1.456	0.5	0	0	0	0	0	0
C4-3C4-2	C4-3	C4-2	8	444.064	0.145	1.702	0.293	0.388	0.242	0.5						
C4-2C4-1	C4-2	C4-1	8	360.196	0.148	1.662	0.302	0.372	0.225	0.5						
C4-1C-4	C4-1	C-4	8	394.356	0.15	1.783	0.291	0.408	0.258	0.5						
C-3C-2	C-3	C-2	15	353.689	0.607	2.736	0.237	2.474	1.867	0.5	0	0	0	0	0	0
C3-8C3-7	C3-8	C3-7	8	321.915	0.003	0.61	0.037	0.505	0.503	0.5						
C3-7C3-6	C3-7	C3-6	8	289.532	0.005	0.595	0.06	0.359	0.354	0.5						
C3-6C3-5	C3-6	C3-5	8	413.737	0.015	0.836	0.1	0.363	0.348	0.5						
C3-6BC3-6A	C3-6B	C3-6A	8	252.047	0.003	0.477	0.044	0.354	0.352	0.5						
C3-6AC3-6	C3-6A	C3-6	8	408.484	0.008	0.665	0.073	0.353	0.346	0.5						
C3-6A1C3-6A	C3-6A1	C3-6A	8	281.694	0.003	0.504	0.042	0.383	0.381	0.5						
C3-5C3-4	C3-5	C3-4	8	415.099	0.018	0.9	0.106	0.378	0.36	0.5						
C3-4C3-3	C3-4	C3-3	8	396.856	0.02	0.926	0.114	0.371	0.351	0.5						

ID	From ID	To ID	Diameter (in)	Length (ft)	Existing Flow (cfs)	Existing Velocity (ft/s)	d/D Ratio	Design Flow (cfs)	Design Excess (cfs)	Design d/D Ratio	Replacement Diameter/Depth (in)	Replacement Velocity (ft/s)	Replacement d/D Ratio	Parallel Diameter/Depth (in)	Parallel Velocity (ft/s)	Parallel d/D Ratio
C3-3C3-2	C3-3	C3-2	8	403.182	0.023	0.873	0.128	0.325	0.302	0.5						
C3-2C3-1	C3-2	C3-1	8	399.029	0.025	1.006	0.125	0.38	0.354	0.5						
C3-1C-3	C3-1	C-3	8	404.067	0.028	1.153	0.122	0.443	0.415	0.5						
C-2C-1	C-2	C-1	15	387.516	0.61	3.105	0.217	2.951	2.342	0.5	0	0	0	0	0	0
C-29C-28	C-29	C-28	8	319.237	0.003	1.12	0.025	1.211	1.209	0.5						
C-28C-27	C-28	C-27	8	380.269	0.005	1.338	0.035	1.153	1.148	0.5						
C-27C-26	C-27	C-26	8	417.651	0.035	2.55	0.083	1.249	1.214	0.5	0	0	0	0	0	0
C-26C-25	C-26	C-25	8	265.161	0.048	2.635	0.1	1.146	1.098	0.5	0	0	0	0	0	0
C26-4C26-3	C26-4	C26-3	8	261.013	0.003	1.005	0.026	1.037	1.034	0.5						
C26-3C26-2	C26-3	C26-2	8	389.37	0.005	0.671	0.055	0.427	0.422	0.5						
C26-2C26-1	C26-2	C26-1	8	376.177	0.008	1.126	0.051	0.753	0.745	0.5						
C26-1C-26	C26-1	C-26	8	380.196	0.01	1.096	0.063	0.639	0.628	0.5						
C-25C-24	C-25	C-24	8	269.286	0.05	2.992	0.095	1.344	1.293	0.5	0	0	0	0	0	0
C-24C-23	C-24	C-23	8	190.14	0.068	3.353	0.108	1.389	1.321	0.5	0	0	0	0	0	0
C24-5C24-4	C24-5	C24-4	8	299.837	0.003	0.869	0.029	0.84	0.838	0.5						
C24-4C24-3	C24-4	C24-3	8	423.8	0.005	0.758	0.051	0.509	0.504	0.5						
C24-3C24-2	C24-3	C24-2	8	381.594	0.01	1.087	0.064	0.631	0.621	0.5						
C24-3AC24-3	C24-3A	C24-3	8	378.266	0.003	1.201	0.023	1.34	1.338	0.5						
C24-2C24-1	C24-2	C24-1	8	374.413	0.013	0.985	0.079	0.497	0.484	0.5						
C24-1C-24	C24-1	C-24	8	385.078	0.015	1.112	0.083	0.547	0.531	0.5						
C-23C-22	C-23	C-22	8	310.76	0.071	2.844	0.124	1.081	1.01	0.5	0	0	0	0	0	0
C-22C-21	C-22	C-21	8	253.832	0.086	3.209	0.13	1.181	1.095	0.5	0	0	0	0	0	0
C22-4C22-3	C22-4	C22-3	8	365.776	0.003	0.484	0.043	0.362	0.359	0.5						
C22-3C22-2	C22-3	C22-2	8	377.679	0.008	0.675	0.072	0.361	0.353	0.5						
C22-3AC22-3	C22-3A	C22-3	8	425.723	0.003	1.199	0.023	1.336	1.334	0.5						
C22-2C22-1	C22-2	C22-1	8	380.816	0.01	1.227	0.059	0.751	0.741	0.5						
C22-1C-22	C22-1	C-22	8	381.746	0.013	0.865	0.086	0.413	0.4	0.5						
C-21C-20	C-21	C-20	8	249.07	0.089	3.544	0.124	1.344	1.256	0.5	0	0	0	0	0	0
C-20C-19	C-20	C-19	8	261.528	0.104	3.01	0.155	0.996	0.892	0.5	0	0	0	0	0	0
C20-5C20-4	C20-5	C20-4	8	241.401	0.003	0.943	0.028	0.945	0.942	0.5						
C20-4C20-3	C20-4	C20-3	8	249.145	0.005	0.579	0.061	0.346	0.341	0.5						
C20-3C20-2	C20-3	C20-2	8	381.088	0.008	0.657	0.074	0.347	0.339	0.5						
C20-2C20-1	C20-2	C20-1	8	376.708	0.01	1.214	0.059	0.74	0.729	0.5						
C20-1C-20	C20-1	C-20	8	384.391	0.013	0.802	0.091	0.37	0.358	0.5						
C-1I-54	C-1	I-54	15	389.067	0.612	1.365	0.393	0.936	0.324	0.5						
C-19C-18	C-19	C-18	8	256.382	0.106	3.106	0.154	1.03	0.924	0.5	0	0	0	0	0	0
C-18C-17	C-18	C-17	8	345.487	0.122	3.348	0.161	1.083	0.962	0.5	0	0	0	0	0	0
C18-5C18-4	C18-5	C18-4	8	249.789	0.003	0.495	0.043	0.373	0.371	0.5						
C18-4C18-3	C18-4	C18-3	8	249.675	0.005	0.501	0.067	0.281	0.276	0.5						
C18-3C18-2	C18-3	C18-2	8	377.26	0.008	0.746	0.068	0.417	0.409	0.5						
C18-2C18-1	C18-2	C18-1	8	380.561	0.01	1.016	0.067	0.573	0.563	0.5						
C18-1C-18	C18-1	C-18	8	380.615	0.013	1.156	0.071	0.626	0.613	0.5						
C-17C-16	C-17	C-16	8	159.331	0.124	2.963	0.178	0.903	0.779	0.5	0	0	0	0	0	0
C-16C-15	C-16	C-15	8	31.318	0.137	3.68	0.163	1.179	1.043	0.5	0	0	0	0	0	0
C16-4C16-3	C16-4	C16-3	8	360.152	0.003	0.643	0.036	0.545	0.542	0.5						
C16-3C16-2	C16-3	C16-2	8	337.053	0.005	0.782	0.05	0.532	0.527	0.5						
C16-2C16-1	C16-2	C16-1	8	421.685	0.008	0.891	0.06	0.538	0.53	0.5						
C16-1C-16	C16-1	C-16	8	394.303	0.01	0.739	0.083	0.363	0.353	0.5						
C-15C-14	C-15	C-14	8	232.551	0.139	3.426	0.174	1.057	0.918	0.5	0	0	0	0	0	0
C-14C-13	C-14	C-13	8	225.092	0.142	2.918	0.197	0.836	0.694	0.5	0	0	0	0	0	0
C-13C-12	C-13	C-12	8	402.187	0.155	3.36	0.19	0.985	0.83	0.5	0	0	0	0	0	0
C13-4C13-3	C13-4	C13-3	8	246.605	0.003	0.557	0.039	0.443	0.44	0.5						
C13-3C13-2	C13-3	C13-2	8	378.164	0.005	0.76	0.051	0.511	0.506	0.5						
C13-2C13-1	C13-2	C13-1	8	390.698	0.008	0.776	0.066	0.441	0.433	0.5						
C13-1C-13	C13-1	C-13	8	394.413	0.01	0.854	0.075	0.446	0.436	0.5						
C-12C-11	C-12	C-11	8	395.438	0.289	3.839	0.268	0.919	0.629	0.5	0	0	0	0	0	0
C12-7C12-6	C12-7	C12-6	8	328.778	0.003	0.71	0.033	0.629	0.626	0.5						
C12-6C12-5	C12-6	C12-5	8	370.222	0.119	1.456	0.285	0.337	0.218	0.5						
C12-5C12-4	C12-5	C12-4	8	367.561	0.122	1.482	0.286	0.342	0.221	0.5						
C12-4C12-3	C12-4	C12-3	8	360.347	0.124	1.44	0.296	0.326	0.202	0.5						
C12-3C12-2	C12-3	C12-2	8	400.447	0.127	1.463	0.297	0.331	0.204	0.5						
C12-2C12-1	C12-2	C12-1	8	386.026	0.13	1.529	0.292	0.349	0.22	0.5						
C12-1C-12	C12-1	C-12	8	396.643	0.132	2.378	0.216	0.644	0.512	0.5	0	0	0	0	0	0
C-11C-10	C-11	C-10	8	401.091	0.31	2.069	0.444	0.381	0.071	0.5	0	0	0	0	0	0
C11-7C11-6	C11-7	C11-6	8	399.906	0.003	0.725	0.033	0.647	0.645	0.5						
C11-6C11-5	C11-6	C11-5	8	368.489	0.005	0.703	0.054	0.457	0.452	0.5						
C11-5C11-4	C11-5	C11-4	8	343.676	0.008	0.741	0.068	0.413	0.405	0.5						
C11-4C11-3	C11-4	C11-3	8	356.359	0.01	0.911	0.072	0.49	0.48	0.5						
C11-3C11-2	C11-3	C11-2	8	356.49	0.013	0.915	0.083	0.447	0.434	0.5						
C11-2C11-1	C11-2	C11-1	8	354.392	0.015	0.951	0.092	0.437	0.421	0.5						
C11-1C-11	C11-1	C-11	8	388.374	0.018	0.938	0.103	0.401	0.383	0.5						
C-10C-9	C-10	C-9	12	389.196	0.33	2.413	0.23	1.418	1.088	0.5	0	0	0	0	0	0
C10-7C10-6	C10-7	C10-6	8	401.916	0.003	0.801	0.031	0.748	0.745	0.5						
C10-6C10-5	C10-6	C10-5	8	355.258	0.005	0.642	0.057	0.401	0.396	0.5						
C10-5C10-4	C10-5	C10-4	8	354.651	0.008	0.725	0.069	0.4	0.392	0.5						
C10-4C10-3	C10-4	C10-3	8	355.862	0.01	0.971	0.069	0.537	0.527	0.5						
C10-3C10-2	C10-3	C10-2	8	357.478	0.013	0.813	0.09	0.377	0.365	0.5						
C10-2C10-1	C10-2	C10-1	8	355.112	0.015	0.81	0.102	0.347	0.332	0.5						
C10-1C-10	C10-1	C-10	8	393.509	0.018	0.863	0.109	0.356	0.338	0.5						
BC-2BC-1	BC-2	BC-1	8	204.715	0.003	1.34	0.022	1.568	1.566	0.5						
BC-1B-22	BC-1	B-22	8	184.789	0.005	1.71	0.029	1.642	1.637	0.5						

ID	From ID	To ID	Diameter (in)	Length (ft)	Existing Flow (cfs)	Existing Velocity (ft/s)	d/D Ratio	Design Flow (cfs)	Design Excess (cfs)	Design d/D Ratio	Replacement Diameter/Depth (in)	Replacement Velocity (ft/s)	Replacement d/D Ratio	Parallel Diameter/Depth (in)	Parallel Velocity (ft/s)	Parallel d/D Ratio
B-9B-8	B-9	B-8	12	128.856	0.615	1.808	0.447	0.746	0.132	0.5						
B-8B-7	B-8	B-7	12	327.516	0.703	1.582	0.552	0.597	-0.107	0.5	15	1.575	0.392	12	1.322	0.372
B-7B-6	B-7	B-6	12	332.678	0.706	1.783	0.503	0.698	-0.008	0.5	15	1.768	0.361	12	1.483	0.343
B-6B-5	B-6	B-5	12	324.445	0.709	1.904	0.479	0.761	0.053	0.5						
B-5B-4	B-5	B-4	12	327.966	0.711	1.149	0.735	0.399	-0.312	0.5	15	1.175	0.495	12	0.987	0.467
B-4B-3	B-4	B-3	12	157.612	0.765	1.694	0.559	0.636	-0.129	0.5	15	1.689	0.397	12	1.417	0.376
B-3B-2	B-3	B-2	12	400.827	0.768	1.391	0.662	0.494	-0.274	0.5	15	1.404	0.457	12	1.179	0.433
B-2B-1	B-2	B-1	12	397.626	0.77	0.981	1	0.322	-0.449	0.5	18	1.018	0.444	15	0.876	0.417
B-23B-22	B-23	B-22	8	418.951	0.003	0.541	0.04	0.424	0.422	0.5						
B-22B-21	B-22	B-21	8	362.401	0.205	3.426	0.228	0.9	0.694	0.5	0	0	0	0	0	0
B-21B-20	B-21	B-20	8	325.834	0.208	4.309	0.196	1.238	1.03	0.5	0	0	0	0	0	0
B-20B-19	B-20	B-19	8	248.555	0.493	5.828	0.291	1.332	0.84	0.5	0	0	0	0	0	0
B1I48	B-1	I-47	12	402.228	0.773	2.423	0.426	1.023	0.25	0.5	0	0	0	0	0	0
B-19B-18	B-19	B-18	8	397.679	0.503	3.971	0.391	0.777	0.274	0.5	0	0	0	0	0	0
B19-3B19-2	B19-3	B19-2	8	441.848	0.003	0.906	0.028	0.893	0.89	0.5						
B19-2B19-1	B19-2	B19-1	8	336.736	0.005	1.107	0.039	0.877	0.872	0.5						
B19-1B-19	B19-1	B-19	8	403.024	0.008	1.266	0.047	0.892	0.884	0.5						
B-18B-17	B-18	B-17	8	379.194	0.505	2.07	0.659	0.327	-0.178	0.5	10	2.089	0.456	8	1.754	0.431
B-17B-16	B-17	B-16	8	399.65	0.508	3.806	0.407	0.73	0.222	0.5	0	0	0	0	0	0
B16-GB16-5F	B16-5G	B16-5F	8	266.105	0.003	1.088	0.025	1.162	1.159	0.5						
B-16B-15	B-16	B-15	12	375.267	0.597	3.29	0.281	1.725	1.128	0.5	0	0	0	0	0	0
B16-8B16-7	B16-8	B16-7	8	340.152	0.003	0.779	0.031	0.718	0.715	0.5						
B16-7B16-6	B16-7	B16-6	8	314.138	0.005	0.915	0.045	0.668	0.663	0.5						
B16-6B16-5	B16-6	B16-5	8	317.867	0.008	1.08	0.053	0.709	0.702	0.5						
B16-5FB16-5E	B16-5F	B16-5E	8	263.193	0.005	1.503	0.032	1.363	1.358	0.5						
B16-5EB16-5D	B16-5E	B16-5D	8	190.325	0.02	2.387	0.06	1.443	1.423	0.5	0	0	0	0	0	0
B16-5E-3B16-5E-2	B16-5E-3	B16-5C-2	8	242.835	0.003	0.834	0.03	0.793	0.79	0.5						
B16-5E-2BB16-5E-2A	B16-5E-2B	B16-5E-2A	8	272.148	0.003	1.128	0.024	1.224	1.221	0.5						
B16-5E-2B16-5E-1	B16-5E-2	B16-5E-1	8	348.692	0.008	1.331	0.046	0.958	0.95	0.5						
B16-5E-2AB16-5E-2	B16-5E-2A	B16-5E-2	8	277.78	0.005	1.401	0.034	1.233	1.227	0.5						
B16-5E-1B16-5E	B16-5E-1	B16-5E	8	263.502	0.013	0.748	0.095	0.335	0.322	0.5						
B16-5E-1AB16-5E-1	B16-5E-1A	B16-5E-1	8	237.8	0.003	1.353	0.022	1.59	1.588	0.5						
B16-5DB16-5C	B16-5D	B16-5C	8	258.24	0.023	1.894	0.076	0.984	0.961	0.5						
B16-5CB16-5B	B16-5C	B16-5B	8	417.293	0.033	2.227	0.087	1.058	1.025	0.5	0	0	0	0	0	0
B16-5C-2B16-5C-1	B16-5C-2	B16-5C-1	8	394.597	0.005	0.812	0.049	0.562	0.557	0.5						
B16-5C-1B16-5C	B16-5C-1	B16-5C	8	394.362	0.008	1.16	0.05	0.786	0.779	0.5						
B16-5BB16-5A	B16-5B	B16-5A	8	213.632	0.043	2.259	0.104	0.961	0.918	0.5	0	0	0	0	0	0
B16-5B-3B16-5B-2	B16-5B-3	B16-5B-2	8	293.519	0.003	0.755	0.032	0.686	0.683	0.5						
B16-5B-2B16-5B-1	B16-5B-2	B16-5B-1	8	416.317	0.005	0.984	0.043	0.741	0.736	0.5						
B16-5B-1B16-5B	B16-5B-1	B16-5B	8	358.102	0.008	1.161	0.05	0.787	0.779	0.5						
B16-5B16-4	B16-5	B16-4	8	384.141	0.056	1.974	0.135	0.71	0.654	0.5						
B16-5AB16-5	B16-5A	B16-5	8	242.327	0.046	2.028	0.116	0.804	0.758	0.5	0	0	0	0	0	0
B16-4EB16-4D	B16-4E	B16-4D	8	132.586	0.003	0.903	0.028	0.888	0.886	0.5						
B16-4DB16-4C	B16-4D	B16-4C	8	247.69	0.005	1.131	0.039	0.906	0.901	0.5						
B16-4CB16-4B	B16-4C	B16-4B	8	383.523	0.008	1.354	0.045	0.982	0.974	0.5						
B16-4BB16-4A	B16-4B	B16-4A	8	388.703	0.01	1.369	0.055	0.879	0.869	0.5						
B16-4B16-3	B16-4	B16-3	8	366.85	0.071	1.91	0.164	0.612	0.541	0.5						
B16-4AB16-4	B16-4A	B16-4	8	375.354	0.013	1.426	0.062	0.846	0.833	0.5						
B16-3B16-2	B16-3	B16-2	8	137.223	0.074	2.113	0.156	0.696	0.622	0.5	0	0	0	0	0	0
B16-2CB16-2B	B16-2C	B16-2B	8	246.69	0.003	0.909	0.028	0.897	0.894	0.5						
B16-2BB16-2A	B16-2B	B16-2A	8	391.708	0.005	1.088	0.04	0.856	0.851	0.5						
B16-2B16-1	B16-2	B16-1	8	213.978	0.084	2.206	0.166	0.7	0.617	0.5	0	0	0	0	0	0
B16-2AB16-2	B16-2A	B16-2	8	390.301	0.008	1.184	0.05	0.809	0.802	0.5						
B16-1B-16	B16-1	B-16	8	380.524	0.086	2.329	0.163	0.747	0.661	0.5	0	0	0	0	0	0
B-15B-14	B-15	B-14	12	402.727	0.599	3.374	0.277	1.783	1.184	0.5	0	0	0	0	0	0
B-14B-13	B-14	B-13	12	414.403	0.602	2.929	0.308	1.461	0.859	0.5	0	0	0	0	0	0
B-13B-12	B-13	B-12	12	402.334	0.604	1.992	0.41	0.856	0.252	0.5						
B-12B-11	B-12	B-11	12	401.614	0.607	1.686	0.467	0.682	0.075	0.5						
B-11B-10	B-11	B-10	12	403.137	0.609	1.921	0.424	0.813	0.203	0.5						
B-10B-9	B-10	B-9	12	403.167	0.612	1.997	0.413	0.855	0.243	0.5						
129	132	B-4	8	750	0.052	1.198	0.182	0.36	0.308	0.5						
127	130	132	8	750	0.035	1.062	0.149	0.36	0.326	0.5						
125	128	130	8	750	0.017	0.863	0.107	0.36	0.343	0.5						
123	126	B-8	8	800	0.086	1.526	0.219	0.41	0.324	0.5						
121	124	126	8	800	0.069	1.473	0.192	0.428	0.359	0.5						
119	122	124	8	800	0.052	1.353	0.167	0.428	0.377	0.5						
117	120	122	8	800	0.035	1.199	0.137	0.428	0.394	0.5						
115	118	120	8	800	0.017	0.974	0.098	0.428	0.411	0.5						
91	92	RV-11	8	850	0.069	2.499	0.133	0.908	0.839	0.5	0	0	0	0	0	0
89	90	92	8	850	0.052	2.33	0.115	0.929	0.877	0.5	0	0	0	0	0	0
87	88	90	8	850	0.035	2.062	0.095	0.929	0.895	0.5	0	0	0	0	0	0
85	86	88	8	850	0.017	1.672	0.068	0.929	0.912	0.5						
83	84	14	8	1,100.00	0.086	2.682	0.148	0.913	0.827	0.5	0	0	0	0	0	0
81	82	84	8	1,100.00	0.069	2.509	0.133	0.913	0.844	0.5	0	0	0	0	0	0
79	80	82	8	1,100.00	0.052	2.302	0.116	0.913	0.861	0.5	0	0	0	0	0	0
77	78	80	8	1,100.00	0.035	2.037	0.095	0.913	0.879	0.5	0	0	0	0	0	0
75	76	78	8	1,100.00	0.017	1.652	0.069	0.913	0.896	0.5						
73	72	D-15B	8	1,100.00	0.086	2.654	0.149	0.9	0.813	0.5	0	0	0	0	0	0
71	70	72	8	1,100.00	0.069	2.509	0.133	0.913	0.844	0.5	0	0	0	0	0	0
69	68	70	8	1,100.00	0.052	2.302	0.116	0.913	0.861	0.5	0	0	0	0	0	0
67	66	68	8	1,100.00	0.035	2.037	0.095	0.913	0.879	0.5	0	0	0	0	0	0

ID	From ID	To ID	Diameter (in)	Length (ft)	Existing Flow (cfs)	Existing Velocity (ft/s)	d/D Ratio	Design Flow (cfs)	Design Excess (cfs)	Design d/D Ratio	Replacement Diameter/Depth (in)	Replacement Velocity (ft/s)	Replacement d/D Ratio	Parallel Diameter/Depth (in)	Parallel Velocity (ft/s)	Parallel d/D Ratio
65	64	66	8	1,100.00	0.017	1.652	0.069	0.913	0.896	0.5						
63	62	G16-3F5	8	550	0.086	2.402	0.16	0.781	0.694	0.5	0	0	0	0	0	0
61	60	62	8	550	0.069	2.32	0.14	0.817	0.748	0.5	0	0	0	0	0	0
59	58	60	8	550	0.052	2.129	0.122	0.817	0.765	0.5	0	0	0	0	0	0
57	56	58	8	550	0.035	1.884	0.101	0.817	0.782	0.5						
55	54	56	8	550	0.017	1.528	0.072	0.817	0.8	0.5						
53	52	G-18	8	625	0.069	1.504	0.189	0.441	0.372	0.5						
51	50	52	8	625	0.052	1.186	0.183	0.355	0.304	0.5						
49	48	50	8	625	0.035	1.209	0.136	0.433	0.399	0.5						
47	46	48	8	625	0.017	0.982	0.098	0.433	0.416	0.5						
45	44	RV-8H	8	400	0.021	1.467	0.084	0.712	0.691	0.5						
43	42	44	8	400	0.014	1.538	0.062	0.909	0.895	0.5						
41	40	42	8	400	0.007	1.452	0.04	1.133	1.126	0.5						
39	38	RV-8HF	8	400	0.007	0.961	0.053	0.626	0.619	0.5						
37	36	TR6-2D	8	410	0.028	2.469	0.072	1.326	1.298	0.5	0	0	0	0	0	0
35	34	36	8	410	0.021	1.906	0.071	1.036	1.016	0.5						
33	30	34	8	300	0.014	1.159	0.075	0.606	0.592	0.5						
31	32	30	8	300	0.007	0.939	0.054	0.606	0.599	0.5						
27	28	C-27	8	250	0.028	1.551	0.099	0.681	0.653	0.5						
25	26	28	8	250	0.021	1.397	0.087	0.664	0.643	0.5						
23	24	26	8	250	0.014	1.235	0.072	0.664	0.65	0.5						
21	22	24	8	250	0.007	1.001	0.052	0.664	0.657	0.5						
19	20	M-3	8	600	0.014	0.906	0.089	0.425	0.411	0.5						
17	18	20	8	600	0.007	0.738	0.064	0.428	0.421	0.5						
15	16	IM2-5	8	250	0.107	1.968	0.213	0.538	0.431	0.5						
13	14	16	8	250	0.1	1.94	0.205	0.542	0.442	0.5						
11	12	14	8	250	0.007	0.869	0.057	0.542	0.535	0.5						

APPENDIX D
Financial Analysis

Engineer's Opinion of Probable Cost

Cash Flow

SUNRISE ENGINEERING
11 North 300 West, Washington, Utah 84780
TEL 435.652.8450 | FAX 435.652.8416 | sunrise-eng.com

ENGINEER'S OPINION OF PROBABLE COST

Wastewater 20-year Improvements Plan
Enoch City

April 12, 2017
KCS/CCH

NO.	DESCRIPTION	EST QTY	UNIT	UNIT PRICE	AMOUNT
Flow Meter Installation					
1	Flow Meter and Data Logger	8	EA	$ 6,500.00	$ 52,000.00
2	Installation	1	LS	$ 10,000.00	$ 10,000.00
3				Subtotal	$ 62,000.00
Outfall Line Replacement					
1	Mobilization	1	LS	$ 36,100.00	$ 36,100.00
2	Project Sign	1	EA	$ 1,500.00	$ 1,500.00
3	Pre-Construction DVD	1	EA	$ 500.00	$ 500.00
4	Traffic Control and Site Security	1	LS	$ 1,000.00	$ 1,000.00
5	Subsurface Investigation	12	HR	$ 250.00	$ 3,000.00
6	Materials Sampling & Testing	1	LS	$ 8,000.00	$ 8,000.00
7	Dust Control & Watering	1	LS	$ 2,500.00	$ 2,500.00
8	Construction Staking	1	LS	$ 10,000.00	$ 10,000.00
9	Erosion Control Compliance	1	LS	$ 5,000.00	$ 5,000.00
10	Clear, Grub, and Demolition of Exisitng Line	1	LS	$ 15,000.00	$ 15,000.00
11	Flowable Backfill	50	CY	$ 175.00	$ 8,750.00
12	Remove Existing Manhole	20	EA	$ 1,250.00	$ 25,000.00
13	Bypass Pumping	1	LS	$ 50,000.00	$ 50,000.00
14	Restore Surface Improvements	1	LS	$ 20,000.00	$ 20,000.00
15	Miscellaneous Sewer Connections, Fittings, Plugs, Tie-ins, Disconnects, Caps, etc.	1	LS	$ 20,000.00	$ 20,000.00
16	24-inch Sewer Main (PVC SDR 35 ASTM D 3034)	5,090	LF	$ 51.52	$ 262,236.80
17	30-inch Sewer Main (PVC SDR 35 ASTM D 3034)	1,560	LF	$ 102.00	$ 159,120.00
18	36-inch Sewer Main (PVC SDR 35 ASTM D 3034)	40	LF	$ 147.00	$ 5,880.00
19	60-inch Reinforced Concrete Manhole	20	EA	$ 3,500.00	$ 70,000.00
20	Imported Pipe Bedding	1,400	CY	$ 18.00	$ 25,200.00
21	Imported Trench Backfill	3,000	CY	$ 10.00	$ 30,000.00
22				Subtotal	$ 758,786.80
Grimshaw Lane & 5200 N Replacement Lines					
1	Mobilization	1	LS	$ 10,500.00	$ 10,500.00
2	Project Sign	1	EA	$ 1,000.00	$ 1,000.00
3	Pre-Construction DVD	1	EA	$ 500.00	$ 500.00
4	Traffic Control	1	LS	$ 1,000.00	$ 1,000.00
5	Subsurface Investigation	12	HR	$ 250.00	$ 3,000.00
6	Materials Sampling & Testing	1	LS	$ 4,000.00	$ 4,000.00
7	Dust Control & Watering	1	LS	$ 1,200.00	$ 1,200.00
8	Construction Staking	1	LS	$ 4,000.00	$ 4,000.00
9	Erosion Control Compliance	1	LS	$ 2,000.00	$ 2,000.00
10	Clear, Grub, and Demolition of Exisitng Line	1	LS	$ 4,000.00	$ 4,000.00
11	Flowable Backfill	10	CY	$ 175.00	$ 1,750.00
12	Remove Existing Manhole	6	EA	$ 1,250.00	$ 7,500.00
13	Bypass Pumping	1	LS	$ 10,000.00	$ 10,000.00
14	Restore Surface Improvements	1	LS	$ 7,500.00	$ 7,500.00
15	Miscellaneous Sewer Connections, Fittings, Plugs, Tie-ins, Disconnects, Caps, etc.	1	LS	$ 7,500.00	$ 7,500.00
16	15-inch Sewer Main (PVC SDR 35 ASTM D 3034)	730	LF	$ 20.32	$ 14,833.60
17	18-inch Sewer Main (PVC SDR 35 ASTM D 3034)	400	LF	$ 31.56	$ 12,624.00
18	30-inch Sewer Main (PVC SDR 35 ASTM D 3034)	800	LF	$ 102.00	$ 81,600.00
19	60-inch Reinforced Concrete Manhole	6	EA	$ 3,500.00	$ 21,000.00
20	Imported Pipe Bedding	100	CY	$ 18.00	$ 1,800.00
21	Imported Trench Backfill	180	CY	$ 12.00	$ 2,160.00
22	8" Untreated Base Course	8,000	SF	$ 0.75	$ 6,000.00
23	8" Granular Borrow	8,000	SF	$ 0.55	$ 4,400.00
24	Bituminous Surface Course (2-1/2")	8,000	SF	$ 1.40	$ 11,200.00

25					Subtotal	$ 221,067.60
					Grand Subtotal	$ 1,041,854.40
			15%		Contingency	$ 156,300.00
					General Construction Total	$ 1,198,154.40
Professional Services & Incidentals						
1	Funding & Adminstrative Services		EST			$ -
2	Topographical Survey		EST	$	5,000.00	$ 5,000.00
3	Engineering Design		EST	$	87,300.00	$ 87,300.00
4	Bidding & Negotiating		EST	$	10,000.00	$ 10,000.00
5	Construction Administration Services		EST	$	104,200.00	$ 104,200.00
6	Permit Acquisition		EST	$	10,000.00	$ 10,000.00
7	Preliminary Engineering Report (PER)		EST	$	8,000.00	$ 8,000.00
8	Wastewater Facilities Plan		EST			$ -
9	Water Conservation Plan		EST			$ -
10	Operation and Maintenance Manual		EST	$	2,500.00	$ 2,500.00
11	Plan of Operations		EST			$ -
12	Ground Water Discharge / UPDES /Reuse		EST			$ -
13	SWPPP (Storm Water Pollution Protection Plan)		EST	$	3,000.00	$ 3,000.00
14	Environmental Report (EIS,EA, CATEX, ...)		EST			$ -
15	Archeology (Survey/monitor)		EST			$ -
16	Biological (Survey/monitor)		EST			$ -
17	Building and Safety Plan Review		EST			$ -
18	Geotechnical Report		EST	$	2,500.00	$ 2,500.00
19	Geotechnical and Materials Testing		EST			$ -
20	SCADA Design		EST			$ -
21	SCADA Improvements		EST	$	5,000.00	$ 5,000.00
22	Controls Integration		EST			$ -
23	Cathodic Protection Design		EST			$ -
24	Cathodic Protection Installation		EST			$ -
25	Construction Staking		EST			$ -
26	Property Surveys		EST			$ -
27	Land & RoW Acquisition		EST			$ -
28	Land & RoW Negotiation		EST			$ -
29	GIS Mapping		EST	$	5,000.00	$ 5,000.00
30	GPS points during construction for GIS system		EST			$ -
31	CRD conversion to GIS		EST			$ -
32	GIS PanoView		EST			$ -
33	Community Viz Modeling		EST			$ -
34	Aerial Photography		EST			$ -
35	Aerial Photography Survey Control		EST			$ -
36	Water Rights Research and POD Applications		EST			$ -
37	Well Siting Study		EST			$ -
38	Well PER		EST			$ -
39	Well/Spring Source Protection Plan		EST			$ -
40	Loan Origination Fee		EST			$ -
41	Bond Attorney		EST			$ -
42	Interim Financing Costs		EST			$ -
43	Miscellaneous Engineering Services		EST			$ -
44	Radio Read Meters/Equipment/Software - Materials, no Install		EST			$ -
					Subtotal	$ 242,500.00
					TOTAL PROJECT COST	$ 1,440,654.40

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

Fiscal Year	2012	2013	2014	2015
WASTEWATER SYSTEM DATA				
Annual Population Growth Rate	-	-	-	-
Annual Inflation	3.0%	3.0%	3.0%	3.0%
Average User Rate / ERU / Month	$ 22.00	$ 22.00	$ 22.00	$ 24.00
Average Impact Fee / ERU	$ 1,900.00	$ 1,900.00	$ 1,900.00	$ 1,900.00
Total ERU's at Year End	-	-	-	2,168
New ERU's per Year	20	14	26	31
WASTEWATER SYSTEM REVENUES				
OPERATING				
Charges for Services	$ 490,046.00	$ 498,533.00	$ 503,327.00	$ 481,218.00
Connection Fees	$ -	$ -	$ 8,332.00	$ 3,850.00
Miscellaneous	$ 1,400.00	$ 1,400.00	$ 5,900.00	$ 500.00
Accounts Receivable	$ (1,744.00)	$ (1,436.00)	$ 963.00	$ 4,024.00
Accounts Payable	$ -	$ -	$ -	$ 20,924.00
NON-OPERATING				
Interest Earnings	$ 12,158.00	$ 11,809.00	$ 8,595.00	$ 8,117.00
Impact Fees	$ 38,000.00	$ 26,600.00	$ 49,400.00	$ 58,900.00
TOTAL REVENUES:	$ 501,860.00	$ 510,306.00	$ 527,117.00	$ 518,633.00
WASTEWATER SYSTEM OPERATING EXPENSES				
Salaries, Wages, and Benefits	$ 140,326.00	$ 129,235.00	$ 140,408.00	$ 169,828.00
Materials, Supplies, and Services	$ 169,397.00	$ 189,676.00	$ 159,571.00	$ 197,106.00
Capital Expenses			$ 372,420.00	$ 132,025.00
TOTAL OPERATING EXPENSES:	$ 309,723.00	$ 318,911.00	$ 672,399.00	$ 498,959.00
WASTEWATER SYSTEM EXISTING DEBT SERVICE				
Utah Water Quality General Obligation Bond (1994; $3,125,000; 0%)	$ 108,000.00	$ 108,000.00	$ 108,000.00	$ 108,000.00
Sewer Renenue Bonds to USDA-RD (1997; $375,000; 5.125%)	$ 22,140.00	$ 22,140.00	$ 22,140.00	$ 22,140.00
Other Debt	$ 77,322.00			
TOTAL EXISTING DEBT SERVICE:	$ 207,462.00	$ 130,140.00	$ 130,140.00	$ 130,140.00
WASTEWATER SYSTEM NEW DEBT SERVICE				
Bond A	$ -	$ -	$ -	$ -
Reserve for Bond A	$ -	$ -	$ -	$ -
TOTAL NEW DEBT SERVICE:	$ -	$ -	$ -	$ -
WASTEWATER SYSTEM EXPENSES SUMMARY				
Wastewater System O&M Expenses	$ 309,723.00	$ 318,911.00	$ 672,399.00	$ 498,959.00
Wastewater System Existing Debt Service	$ 207,462.00	$ 130,140.00	$ 130,140.00	$ 130,140.00
Wastewater System New Debt Service	$ -	$ -	$ -	$ -
TOTAL EXPENSES:	$ 517,185.00	$ 449,051.00	$ 802,539.00	$ 629,099.00
WASTEWATER SYSTEM CASH FLOW				
NET CASH FLOW:	$ (15,325.00)	$ 61,255.00	$ (275,422.00)	$ (110,466.00)
WASTEWATER SYSTEM IMPACT FEE FUND				
Total Impact Fee Revenue	$ 38,000.00	$ 26,600.00	$ 49,400.00	$ 58,900.00
Impact Fee Account Interest				
Impact Fees Covering Water Quality General Obligation Bond				
Impact Fees Covering Bond A				
Impact Fees Spent for Single Payment Projects or Self Help		$ (372,420.00)		$ (10,141.96)
Bond Reserve Payments				
IMPACT FEE FUND TOTAL:	$ 1,761,888.93	$ 1,416,068.93	$ 1,465,468.93	$ 1,514,226.97
WASTEWATER SYSTEM CASH FUND				
Total Cash Revenue	$ 501,860.00	$ 510,306.00	$ 527,117.00	$ 518,633.00
Total Cash Expenses	$ (479,185.00)	$ (422,451.00)	$ (753,139.00)	$ (570,199.00)
Cash Spent for Single Payment Projects or Self Help				
CASH FUND TOTAL:	$ 1,948,578.00	$ 2,036,433.00	$ 1,810,411.00	$ 1,758,845.00
SYSTEM IMPROVEMENT SCHEDULE				
Impact Fee Facilities Plan Updates				
Sewer Flow Meters				
Outfall Line Replacement				
Grimshaw Lane & 5200 N Replacement				
Utah Water Quality General Obligation Bond				

Fiscal Year	2016	2017	2018	2019
WASTEWATER SYSTEM DATA				
Annual Population Growth Rate	1.5%	1.5%	1.5%	3.0%
Annual Inflation	3.0%	3.0%	3.0%	3.0%
Average User Rate / ERU / Month	$ 24.00	$ 24.00	$ 24.00	$ 24.00
Average Impact Fee / ERU	$ 1,900.00	$ 738.38	$ 738.38	$ 738.38
Total ERU's at Year End	2,201	2,234	2,267	2,335
New ERU's per Year	35	33	34	68
WASTEWATER SYSTEM REVENUES				
OPERATING				
Charges for Services	$ 487,203.00	$ 638,598.95	$ 648,105.22	$ 662,799.25
Connection Fees	$ 3,200.00	$ 3,320.00	$ 3,444.50	$ 3,599.50
Miscellaneous	$ 650.00	$ 674.38	$ 699.66	$ 731.15
Accounts Receivable	$ -	$ -	$ -	$ -
Accounts Payable	$ -	$ -	$ -	$ -
NON-OPERATING				
Interest Earnings	$ 11,400.00	$ 11,827.50	$ 12,271.03	$ 12,823.23
Impact Fees	$ 66,500.00	$ 24,366.49	$ 25,104.87	$ 50,209.73
TOTAL REVENUES:	$ 502,453.00	$ 654,420.83	$ 664,520.41	$ 679,953.13
WASTEWATER SYSTEM OPERATING EXPENSES				
Salaries, Wages, and Benefits	$ 172,075.00	$ 178,527.81	$ 185,222.61	$ 193,557.62
Materials, Supplies, and Services	$ 160,057.00	$ 166,059.14	$ 172,286.36	$ 180,039.24
Capital Expenses	$ 200,000.00	$ 207,500.00	$ 215,281.25	$ 224,968.91
TOTAL OPERATING EXPENSES:	$ 532,132.00	$ 552,086.95	$ 572,790.21	$ 598,565.77
WASTEWATER SYSTEM EXISTING DEBT SERVICE				
Utah Water Quality General Obligation Bond (1994; $3,125,000; 0%)	$ 108,000.00			
Sewer Renenue Bonds to USDA-RD (1997; $375,000; 5.125%)	$ 22,140.00	$ 22,140.00	$ 22,140.00	$ 22,140.00
Other Debt				
TOTAL EXISTING DEBT SERVICE:	$ 130,140.00	$ 22,140.00	$ 22,140.00	$ 22,140.00
WASTEWATER SYSTEM NEW DEBT SERVICE				
Bond A	$ -	$ -	$ -	$ -
Reserve for Bond A	$ -	$ -	$ -	$ -
TOTAL NEW DEBT SERVICE:	$ -	$ -	$ -	$ -
WASTEWATER SYSTEM EXPENSES SUMMARY				
Wastewater System O&M Expenses	$ 532,132.00	$ 552,086.95	$ 572,790.21	$ 598,565.77
Wastewater System Existing Debt Service	$ 130,140.00	$ 22,140.00	$ 22,140.00	$ 22,140.00
Wastewater System New Debt Service	$ -	$ -	$ -	$ -
TOTAL EXPENSES:	$ 662,272.00	$ 574,226.95	$ 594,930.21	$ 620,705.77
WASTEWATER SYSTEM CASH FLOW				
NET CASH FLOW:	$ (159,819.00)	$ 80,193.88	$ 69,590.20	$ 59,247.36
WASTEWATER SYSTEM IMPACT FEE FUND				
Total Impact Fee Revenue	$ 66,500.00	$ 24,366.49	$ 25,104.87	$ 50,209.73
Impact Fee Account Interest	$ 10,640.00	$ 3,898.64	$ 4,016.78	$ 8,033.56
Impact Fees Covering Water Quality General Obligation Bond		$ (1,188,000.00)	$ -	$ -
Impact Fees Covering Bond A				
Impact Fees Spent for Single Payment Projects or Self Help		$ (137,300.00)	$ -	$ -
Bond Reserve Payments				
IMPACT FEE FUND TOTAL:	$ 1,379,326.97	$ 82,292.09	$ 111,413.74	$ 169,657.03
WASTEWATER SYSTEM CASH FUND				
Total Cash Revenue	$ 502,453.00	$ 654,420.83	$ 664,520.41	$ 679,953.13
Total Cash Expenses	$ (662,272.00)	$ (574,226.95)	$ (594,930.21)	$ (620,705.77)
Cash Spent for Single Payment Projects or Self Help		$ -	$ -	$ -
CASH FUND TOTAL:	$ 1,656,107.00	$ 1,736,300.88	$ 1,805,891.08	$ 1,865,138.44
SYSTEM IMPROVEMENT SCHEDULE				
Impact Fee Facilities Plan Updates		$ 66,000.00		
Sewer Flow Meters		$ 71,300.00		
Outfall Line Replacement				
Grimshaw Lane & 5200 N Replacement				
Utah Water Quality General Obligation Bond		$ 1,188,000.00		

Fiscal Year	2020	2021	2022	2023
WASTEWATER SYSTEM DATA				
Annual Population Growth Rate	3.0%	3.0%	3.0%	3.0%
Annual Inflation	3.0%	3.0%	3.0%	3.0%
Average User Rate / ERU / Month	$ 24.00	$ 24.00	$ 24.00	$ 24.00
Average Impact Fee / ERU	$ 738.38	$ 738.38	$ 738.38	$ 738.38
Total ERU's at Year End	2,405	2,478	2,552	2,628
New ERU's per Year	70	72	74	77
WASTEWATER SYSTEM REVENUES				
OPERATING				
Charges for Services	$ 682,688.99	$ 703,184.06	$ 724,302.62	$ 745,919.38
Connection Fees	$ 3,761.48	$ 3,930.75	$ 4,107.63	$ 4,292.47
Miscellaneous	$ 764.05	$ 798.43	$ 834.36	$ 871.91
Accounts Receivable	$ -	$ -	$ -	$ -
Accounts Payable	$ -	$ -	$ -	$ -
NON-OPERATING				
Interest Earnings	$ 13,400.27	$ 14,003.29	$ 14,633.43	$ 15,291.94
Impact Fees	$ 51,686.49	$ 53,163.24	$ 54,640.00	$ 56,855.14
TOTAL REVENUES:	$ 700,614.79	$ 721,916.52	$ 743,878.05	$ 766,375.70
WASTEWATER SYSTEM OPERATING EXPENSES				
Salaries, Wages, and Benefits	$ 202,267.72	$ 211,369.76	$ 220,881.40	$ 230,821.07
Materials, Supplies, and Services	$ 188,141.01	$ 196,607.35	$ 205,454.68	$ 214,700.14
Capital Expenses	$ 235,092.51	$ 245,671.67	$ 256,726.89	$ 268,279.61
TOTAL OPERATING EXPENSES:	$ 625,501.23	$ 653,648.79	$ 683,062.98	$ 713,800.81
WASTEWATER SYSTEM EXISTING DEBT SERVICE				
Utah Water Quality General Obligation Bond (1994; $3,125,000; 0%)				
Sewer Renenue Bonds to USDA-RD (1997; $375,000; 5.125%)	$ 22,140.00	$ 22,140.00	$ 22,140.00	$ 22,140.00
Other Debt				
TOTAL EXISTING DEBT SERVICE:	$ 22,140.00	$ 22,140.00	$ 22,140.00	$ 22,140.00
WASTEWATER SYSTEM NEW DEBT SERVICE				
Bond A	$ -	$ -	$ -	$ -
Reserve for Bond A	$ -	$ -	$ -	$ -
TOTAL NEW DEBT SERVICE:	$ -	$ -	$ -	$ -
WASTEWATER SYSTEM EXPENSES SUMMARY				
Wastewater System O&M Expenses	$ 625,501.23	$ 653,648.79	$ 683,062.98	$ 713,800.81
Wastewater System Existing Debt Service	$ 22,140.00	$ 22,140.00	$ 22,140.00	$ 22,140.00
Wastewater System New Debt Service	$ -	$ -	$ -	$ -
TOTAL EXPENSES:	$ 647,641.23	$ 675,788.79	$ 705,202.98	$ 735,940.81
WASTEWATER SYSTEM CASH FLOW				
NET CASH FLOW:	$ 52,973.56	$ 46,127.74	$ 38,675.07	$ 30,434.89
WASTEWATER SYSTEM IMPACT FEE FUND				
Total Impact Fee Revenue	$ 51,686.49	$ 53,163.24	$ 54,640.00	$ 56,855.14
Impact Fee Account Interest	$ 8,269.84	$ 8,506.12	$ 8,742.40	$ 9,096.82
Impact Fees Covering Water Quality General Obligation Bond	$ -	$ -	$ -	$ -
Impact Fees Covering Bond A				
Impact Fees Spent for Single Payment Projects or Self Help	$ -	$ -	$ (46,370.96)	$ (322,685.56)
Bond Reserve Payments				
IMPACT FEE FUND TOTAL:	$ 229,613.35	$ 291,282.72	$ 308,294.15	$ 51,560.55
WASTEWATER SYSTEM CASH FUND				
Total Cash Revenue	$ 700,614.79	$ 721,916.52	$ 743,878.05	$ 766,375.70
Total Cash Expenses	$ (647,641.23)	$ (675,788.79)	$ (705,202.98)	$ (735,940.81)
Cash Spent for Single Payment Projects or Self Help	$ -	$ -	$ -	$ (11,882.30)
CASH FUND TOTAL:	$ 1,918,112.00	$ 1,964,239.74	$ 2,002,914.81	$ 2,021,467.39
SYSTEM IMPROVEMENT SCHEDULE			IFFPA	
Impact Fee Facilities Plan Updates			$ 46,370.96	
Sewer Flow Meters				
Outfall Line Replacement				$ 334,567.86
Grimshaw Lane & 5200 N Replacement				
Utah Water Quality General Obligation Bond				

Fiscal Year	2024	2025	2026	2027
WASTEWATER SYSTEM DATA				
Annual Population Growth Rate	3.0%	5.0%	5.0%	5.0%
Annual Inflation	3.0%	3.0%	3.0%	3.0%
Average User Rate / ERU / Month	$ 24.00	$ 24.00	$ 24.00	$ 24.00
Average Impact Fee / ERU	$ 738.38	$ 738.38	$ 738.38	$ 738.38
Total ERU's at Year End	2,707	2,843	2,985	3,134
New ERU's per Year	79	135	142	149
WASTEWATER SYSTEM REVENUES				
OPERATING				
Charges for Services	$ 768,341.60	$ 799,263.48	$ 839,190.66	$ 881,164.59
Connection Fees	$ 4,485.64	$ 4,732.34	$ 4,992.62	$ 5,267.22
Miscellaneous	$ 911.14	$ 961.26	$ 1,014.13	$ 1,069.90
Accounts Receivable	$ -	$ -	$ -	$ -
Accounts Payable	$ -	$ -	$ -	$ -
NON-OPERATING				
Interest Earnings	$ 15,980.07	$ 16,858.98	$ 17,786.22	$ 18,764.46
Impact Fees	$ 58,331.89	$ 99,681.08	$ 104,849.73	$ 110,018.38
TOTAL REVENUES:	$ 789,718.46	$ 821,816.06	$ 862,983.63	$ 906,266.18
WASTEWATER SYSTEM OPERATING EXPENSES				
Salaries, Wages, and Benefits	$ 241,208.01	$ 254,474.45	$ 268,470.55	$ 283,236.43
Materials, Supplies, and Services	$ 224,361.65	$ 236,701.54	$ 249,720.13	$ 263,454.73
Capital Expenses	$ 280,352.19	$ 295,771.56	$ 312,038.99	$ 329,201.14
TOTAL OPERATING EXPENSES:	$ 745,921.85	$ 786,947.55	$ 830,229.67	$ 875,892.30
WASTEWATER SYSTEM EXISTING DEBT SERVICE				
Utah Water Quality General Obligation Bond (1994; $3,125,000; 0%)				
Sewer Renenue Bonds to USDA-RD (1997; $375,000; 5.125%)	$ 22,140.00	$ 22,140.00	$ 22,140.00	$ 22,140.00
Other Debt				
TOTAL EXISTING DEBT SERVICE:	$ 22,140.00	$ 22,140.00	$ 22,140.00	$ 22,140.00
WASTEWATER SYSTEM NEW DEBT SERVICE				
Bond A	$ -	$ -	$ -	$ -
Reserve for Bond A	$ -	$ -	$ -	$ -
TOTAL NEW DEBT SERVICE:	$ -	$ -	$ -	$ -
WASTEWATER SYSTEM EXPENSES SUMMARY				
Wastewater System O&M Expenses	$ 745,921.85	$ 786,947.55	$ 830,229.67	$ 875,892.30
Wastewater System Existing Debt Service	$ 22,140.00	$ 22,140.00	$ 22,140.00	$ 22,140.00
Wastewater System New Debt Service	$ -	$ -	$ -	$ -
TOTAL EXPENSES:	$ 768,061.85	$ 809,087.55	$ 852,369.67	$ 898,032.30
WASTEWATER SYSTEM CASH FLOW				
NET CASH FLOW:	$ 21,656.60	$ 12,728.51	$ 10,613.96	$ 8,233.88
WASTEWATER SYSTEM IMPACT FEE FUND				
Total Impact Fee Revenue	$ 58,331.89	$ 99,681.08	$ 104,849.73	$ 110,018.38
Impact Fee Account Interest	$ 9,333.10	$ 15,948.97	$ 16,775.96	$ 17,602.94
Impact Fees Covering Water Quality General Obligation Bond	$ -	$ -	$ -	$ -
Impact Fees Covering Bond A				
Impact Fees Spent for Single Payment Projects or Self Help	$ -	$ -	$ -	$ (53,756.66)
Bond Reserve Payments				
IMPACT FEE FUND TOTAL:	$ 119,225.55	$ 234,855.61	$ 356,481.30	$ 430,345.96
WASTEWATER SYSTEM CASH FUND				
Total Cash Revenue	$ 789,718.46	$ 821,816.06	$ 862,983.63	$ 906,266.18
Total Cash Expenses	$ (768,061.85)	$ (809,087.55)	$ (852,369.67)	$ (898,032.30)
Cash Spent for Single Payment Projects or Self Help	$ -	$ -	$ -	$ -
CASH FUND TOTAL:	$ 2,043,124.00	$ 2,055,852.51	$ 2,066,466.47	$ 2,074,700.34
SYSTEM IMPROVEMENT SCHEDULE				
Impact Fee Facilities Plan Updates				$ 53,756.66
Sewer Flow Meters				
Outfall Line Replacement				
Grimshaw Lane & 5200 N Replacement				
Utah Water Quality General Obligation Bond				

Fiscal Year	2028	2029	2030	2031
WASTEWATER SYSTEM DATA				
Annual Population Growth Rate	5.0%	5.0%	5.0%	5.0%
Annual Inflation	3.0%	3.0%	3.0%	3.0%
Average User Rate / ERU / Month	$ 24.00	$ 24.00	$ 24.00	$ 24.00
Average Impact Fee / ERU	$ 738.38	$ 738.38	$ 738.38	$ 738.38
Total ERU's at Year End	3,291	3,455	3,628	3,810
New ERU's per Year	157	165	173	181
WASTEWATER SYSTEM REVENUES				
OPERATING				
Charges for Services	$ 925,143.62	$ 971,379.20	$ 1,019,984.16	$ 1,071,076.97
Connection Fees	$ 5,556.92	$ 5,862.55	$ 6,184.99	$ 6,525.16
Miscellaneous	$ 1,128.75	$ 1,190.83	$ 1,256.33	$ 1,325.42
Accounts Receivable	$ -	$ -	$ -	$ -
Accounts Payable	$ -	$ -	$ -	$ -
NON-OPERATING				
Interest Earnings	$ 19,796.51	$ 20,885.32	$ 22,034.01	$ 23,245.88
Impact Fees	$ 115,925.41	$ 121,832.43	$ 127,739.46	$ 133,646.49
TOTAL REVENUES:	$ 951,625.79	$ 999,317.89	$ 1,049,459.48	$ 1,102,173.43
WASTEWATER SYSTEM OPERATING EXPENSES				
Salaries, Wages, and Benefits	$ 298,814.43	$ 315,249.23	$ 332,587.93	$ 350,880.27
Materials, Supplies, and Services	$ 277,944.74	$ 293,231.70	$ 309,359.45	$ 326,374.22
Capital Expenses	$ 347,307.20	$ 366,409.10	$ 386,561.60	$ 407,822.48
TOTAL OPERATING EXPENSES:	$ 924,066.38	$ 974,890.03	$ 1,028,508.98	$ 1,085,076.97
WASTEWATER SYSTEM EXISTING DEBT SERVICE				
Utah Water Quality General Obligation Bond (1994; $3,125,000; 0%)				
Sewer Renenue Bonds to USDA-RD (1997; $375,000; 5.125%)	$ 22,140.00	$ 22,140.00	$ 22,140.00	$ 22,140.00
Other Debt				
TOTAL EXISTING DEBT SERVICE:	$ 22,140.00	$ 22,140.00	$ 22,140.00	$ 22,140.00
WASTEWATER SYSTEM NEW DEBT SERVICE				
Bond A	$ -	$ -	$ -	$ -
Reserve for Bond A	$ -	$ -	$ -	$ -
TOTAL NEW DEBT SERVICE:	$ -	$ -	$ -	$ -
WASTEWATER SYSTEM EXPENSES SUMMARY				
Wastewater System O&M Expenses	$ 924,066.38	$ 974,890.03	$ 1,028,508.98	$ 1,085,076.97
Wastewater System Existing Debt Service	$ 22,140.00	$ 22,140.00	$ 22,140.00	$ 22,140.00
Wastewater System New Debt Service	$ -	$ -	$ -	$ -
TOTAL EXPENSES:	$ 946,206.38	$ 997,030.03	$ 1,050,648.98	$ 1,107,216.97
WASTEWATER SYSTEM CASH FLOW				
NET CASH FLOW:	$ 5,419.42	$ 2,287.87	$ (1,189.50)	$ (5,043.54)
WASTEWATER SYSTEM IMPACT FEE FUND				
Total Impact Fee Revenue	$ 115,925.41	$ 121,832.43	$ 127,739.46	$ 133,646.49
Impact Fee Account Interest	$ 18,548.07	$ 19,493.19	$ 20,438.31	$ 21,383.44
Impact Fees Covering Water Quality General Obligation Bond	$ -	$ -	$ -	$ -
Impact Fees Covering Bond A				
Impact Fees Spent for Single Payment Projects or Self Help	$ -	$ (669,135.72)	$ -	$ -
Bond Reserve Payments				
IMPACT FEE FUND TOTAL:	$ 564,819.44	$ 37,009.34	$ 185,187.11	$ 340,217.04
WASTEWATER SYSTEM CASH FUND				
Total Cash Revenue	$ 951,625.79	$ 999,317.89	$ 1,049,459.48	$ 1,102,173.43
Total Cash Expenses	$ (946,206.38)	$ (997,030.03)	$ (1,050,648.98)	$ (1,107,216.97)
Cash Spent for Single Payment Projects or Self Help	$ -	$ -	$ -	$ -
CASH FUND TOTAL:	$ 2,080,119.76	$ 2,082,407.63	$ 2,081,218.13	$ 2,076,174.59
SYSTEM IMPROVEMENT SCHEDULE				
Impact Fee Facilities Plan Updates				
Sewer Flow Meters				
Outfall Line Replacement		$ 669,135.72		
Grimshaw Lane & 5200 N Replacement				
Utah Water Quality General Obligation Bond				

Fiscal Year	2032	2033	2034	2035
WASTEWATER SYSTEM DATA				
Annual Population Growth Rate	5.0%	5.0%	5.0%	5.0%
Annual Inflation	3.0%	3.0%	3.0%	3.0%
Average User Rate / ERU / Month	$ 24.00	$ 24.00	$ 24.00	$ 24.00
Average Impact Fee / ERU	$ 738.38	$ 738.38	$ 738.38	$ 738.38
Total ERU's at Year End	4,000	4,200	4,410	4,630
New ERU's per Year	190	200	210	220
WASTEWATER SYSTEM REVENUES				
OPERATING				
Charges for Services	$ 1,124,638.02	$ 1,180,797.92	$ 1,239,837.81	$ 1,301,901.70
Connection Fees	$ 6,884.04	$ 7,262.67	$ 7,662.11	$ 8,083.53
Miscellaneous	$ 1,398.32	$ 1,475.23	$ 1,556.37	$ 1,641.97
Accounts Receivable	$ -	$ -	$ -	$ -
Accounts Payable	$ -	$ -	$ -	$ -
NON-OPERATING				
Interest Earnings	$ 24,524.41	$ 25,873.25	$ 27,296.28	$ 28,797.57
Impact Fees	$ 140,291.89	$ 147,675.68	$ 155,059.46	$ 162,443.25
TOTAL REVENUES:	$ 1,157,444.79	$ 1,215,409.06	$ 1,276,352.57	$ 1,340,424.77
WASTEWATER SYSTEM OPERATING EXPENSES				
Salaries, Wages, and Benefits	$ 370,178.69	$ 390,538.51	$ 412,018.13	$ 434,679.13
Materials, Supplies, and Services	$ 344,324.80	$ 363,262.66	$ 383,242.11	$ 404,320.43
Capital Expenses	$ 430,252.72	$ 453,916.62	$ 478,882.04	$ 505,220.55
TOTAL OPERATING EXPENSES:	$ 1,144,756.21	$ 1,207,717.80	$ 1,274,142.28	$ 1,344,220.10
WASTEWATER SYSTEM EXISTING DEBT SERVICE				
Utah Water Quality General Obligation Bond (1994; $3,125,000; 0%)				
Sewer Renenue Bonds to USDA-RD (1997; $375,000; 5.125%)	$ 22,140.00	$ 22,140.00	$ 22,140.00	$ 22,140.00
Other Debt				
TOTAL EXISTING DEBT SERVICE:	$ 22,140.00	$ 22,140.00	$ 22,140.00	$ 22,140.00
WASTEWATER SYSTEM NEW DEBT SERVICE				
Bond A	$ -	$ -	$ -	$ -
Reserve for Bond A	$ -	$ -	$ -	$ -
TOTAL NEW DEBT SERVICE:	$ -	$ -	$ -	$ -
WASTEWATER SYSTEM EXPENSES SUMMARY				
Wastewater System O&M Expenses	$ 1,144,756.21	$ 1,207,717.80	$ 1,274,142.28	$ 1,344,220.10
Wastewater System Existing Debt Service	$ 22,140.00	$ 22,140.00	$ 22,140.00	$ 22,140.00
Wastewater System New Debt Service	$ -	$ -	$ -	$ -
TOTAL EXPENSES:	$ 1,166,896.21	$ 1,229,857.80	$ 1,296,282.28	$ 1,366,360.10
WASTEWATER SYSTEM CASH FLOW				
NET CASH FLOW:	$ (9,451.42)	$ (14,448.74)	$ (19,929.71)	$ (25,935.33)
WASTEWATER SYSTEM IMPACT FEE FUND				
Total Impact Fee Revenue	$ 140,291.89	$ 147,675.68	$ 155,059.46	$ 162,443.25
Impact Fee Account Interest	$ 22,446.70	$ 23,628.11	$ 24,809.51	$ 25,990.92
Impact Fees Covering Water Quality General Obligation Bond	$ -	$ -	$ -	$ -
Impact Fees Covering Bond A				
Impact Fees Spent for Single Payment Projects or Self Help	$ (488,885.10)	$ (60,938.06)	$ -	$ (334,567.86)
Bond Reserve Payments				
IMPACT FEE FUND TOTAL:	$ 14,070.54	$ 124,436.27	$ 304,305.24	$ 158,171.55
WASTEWATER SYSTEM CASH FUND				
Total Cash Revenue	$ 1,157,444.79	$ 1,215,409.06	$ 1,276,352.57	$ 1,340,424.77
Total Cash Expenses	$ (1,166,896.21)	$ (1,229,857.80)	$ (1,296,282.28)	$ (1,366,360.10)
Cash Spent for Single Payment Projects or Self Help	$ -	$ -	$ -	$ -
CASH FUND TOTAL:	$ 2,066,723.17	$ 2,052,274.43	$ 2,032,344.72	$ 2,006,409.39
SYSTEM IMPROVEMENT SCHEDULE				
Impact Fee Facilities Plan Updates	$ 62,318.70			
Sewer Flow Meters				
Outfall Line Replacement				$ 334,567.86
Grimshaw Lane & 5200 N Replacement	$ 426,566.41	$ 60,938.06		
Utah Water Quality General Obligation Bond				

Fiscal Year	2036	2037
WASTEWATER SYSTEM DATA		
Annual Population Growth Rate	5.0%	5.0%
Annual Inflation	3.0%	3.0%
Average User Rate / ERU / Month	$ 24.00	$ 24.00
Average Impact Fee / ERU	$ 738.38	$ 738.38
Total ERU's at Year End	4,862	5,105
New ERU's per Year	232	243
WASTEWATER SYSTEM REVENUES		
OPERATING		
Charges for Services	$ 1,366,852.79	$ 1,435,281.83
Connection Fees	$ 8,528.12	$ 8,997.17
Miscellaneous	$ 1,732.27	$ 1,827.55
Accounts Receivable	$ -	$ -
Accounts Payable	$ -	$ -
NON-OPERATING		
Interest Earnings	$ 30,381.44	$ 32,052.42
Impact Fees	$ 171,303.79	$ 179,425.95
TOTAL REVENUES:	$ 1,407,494.62	$ 1,478,158.96
WASTEWATER SYSTEM OPERATING EXPENSES		
Salaries, Wages, and Benefits	$ 458,586.48	$ 483,808.74
Materials, Supplies, and Services	$ 426,558.05	$ 450,018.74
Capital Expenses	$ 533,007.68	$ 562,323.10
TOTAL OPERATING EXPENSES:	$ 1,418,152.21	$ 1,496,150.58
WASTEWATER SYSTEM EXISTING DEBT SERVICE		
Utah Water Quality General Obligation Bond (1994; $3,125,000; 0%)		
Sewer Renenue Bonds to USDA-RD (1997; $375,000; 5.125%)	$ 22,140.00	$ 22,140.00
Other Debt		
TOTAL EXISTING DEBT SERVICE:	$ 22,140.00	$ 22,140.00
WASTEWATER SYSTEM NEW DEBT SERVICE		
Bond A	$ -	$ -
Reserve for Bond A	$ -	$ -
TOTAL NEW DEBT SERVICE:	$ -	$ -
WASTEWATER SYSTEM EXPENSES SUMMARY		
Wastewater System O&M Expenses	$ 1,418,152.21	$ 1,496,150.58
Wastewater System Existing Debt Service	$ 22,140.00	$ 22,140.00
Wastewater System New Debt Service	$ -	$ -
TOTAL EXPENSES:	$ 1,440,292.21	$ 1,518,290.58
WASTEWATER SYSTEM CASH FLOW		
NET CASH FLOW:	$ (32,797.58)	$ (40,131.62)
WASTEWATER SYSTEM IMPACT FEE FUND		
Total Impact Fee Revenue	$ 171,303.79	$ 179,425.95
Impact Fee Account Interest	$ 27,408.61	$ 28,708.15
Impact Fees Covering Water Quality General Obligation Bond	$ -	$ -
Impact Fees Covering Bond A		
Impact Fees Spent for Single Payment Projects or Self Help	$ -	$ (72,244.45)
Bond Reserve Payments		
IMPACT FEE FUND TOTAL:	$ 356,883.94	$ 492,773.59
WASTEWATER SYSTEM CASH FUND		
Total Cash Revenue	$ 1,407,494.62	$ 1,478,158.96
Total Cash Expenses	$ (1,440,292.21)	$ (1,518,290.58)
Cash Spent for Single Payment Projects or Self Help	$ -	$ -
CASH FUND TOTAL:	$ 1,973,611.80	$ 1,933,480.19
SYSTEM IMPROVEMENT SCHEDULE		
Impact Fee Facilities Plan Updates		$ 72,244.45
Sewer Flow Meters		
Outfall Line Replacement		
Grimshaw Lane & 5200 N Replacement		
Utah Water Quality General Obligation Bond		

APPENDIX E
Impact Fee Certification

Impact Fee Certification

CERTIFICATION OF IMPACT FEE ANALYSIS BY CONSULTANT

In accordance with Utah Code Annotated, § 11-36a-306 Kelvin C. Smith, P.E., on behalf of Sunrise Engineering, Inc., make the following certification:

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

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

Kelvin C. Smith, P.E. makes this certification with the following qualifications:

1. All of the recommendations for implementations of the Impact Fee Facilities Plan ("IFFP") made in the IFFP documents or in the Impact Fee Analysis documents are followed in their entirety by Enoch City, Utah staff and elected officials.

2. If all or a portion of the IFFP's or Impact Fee Analyses are modified or amended, this certification is no longer valid.

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

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

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

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

Sunrise Engineering, Inc.

By: _____

Dated: 6.23.2017