DELTA CITY WASTEWATER MASTER PLAN

76 North 200 West
Delta, UT 84624

March 2019

PREPARED BY:
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SUNRISE ENGINEERING

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EXECUTIVE SUMMARY

The Delta City Wastewater System serves an estimated population of 3,580 residents and approximately 1,041 connections, including approximately 908 residential, 105 commercial and 28 institutional connections.

The wastewater collection system is comprised of approximately 143,088 feet of sewer pipe, including approximately 42,936 feet of vitrified clay pipe, 14,227 feet of asbestos cement pipe, 21,717 feet of concrete pipe, and 52,478 feet of PVC pipe. It is estimated that the original parts of the system, primarily comprised of clay and asbestos cement pipe, are between 60 and 100 years old. Flow meter readings at the wastewater lagoons indicate that at times, the flow into the lagoons exceeds the total water usage on the system, indicating a significant level of infiltration and inflow into the existing collection system from groundwater and stormwater.

There are currently six lift stations operating in the collection system. Most of the wastewater in the system is pumped at least two times, and wastewater from some of the collection zones in the system is pumped three times before reaching the lagoons. Lift Station A and Lift Station C are currently in need of repair and rehabilitation.

A hydraulic model of the collection system was developed to analyze the capacity of the existing collection system under current and future peak loadings. The model indicated that the pipes in the system are generally sized with sufficient capacity, although there are isolated pipe segments that do not provide sufficient capacity to support current and future peak loadings or that suffer from negligible or negative slopes.

The wastewater treatment system is comprised of a series of nine lagoon cells that provide a total of 100 acres and over 144,000,000 gallons of lagoon capacity. The estimated lagoon area required to achieve a mass balance under current system flows is approximately 38 acres, and the estimated area required to support the estimated 20-year projected system flows is approximately 47 acres.

Recommended system improvements in the Capital Improvement Plan are outlined by geographic location based on the lift station zoning. The pre-construction recommendation is to have a video inspection of the entire collection system completed. Improvements to the system should be completed in order of priority based on the results and observations of the video inspection. Improvements to Zone A include bypassing Lift Station A and replacing approximately 43,200 feet of clay pipe, asbestos cement pipe, and concrete pipes and manholes. Zone B and C improvements include replacing the force main line between Lift Station B and the lagoons, upgrading Lift Station C, and include replacing approximately 17,860 feet of clay pipe and asbestos cement pipe and associated manholes with these zones. Improvements to Zones D and E consist of replacing approximately 16,725 feet of concrete pipe and associated manholes. Zone F improvements include upgrading Lift Station F and installing a new force main line from Lift Station F to connect to the new force main interceptor from Lift Station B. Actual quantities and prioritization of pipe replacement will be determined based on the results of the sewer video inspection.

The Engineer's Opinion of Probable Cost for the completed improvements is approximately $18,882,336. The estimated cost presented in this report represent present value cost assuming the recommended projects are constructed at once. If the City chooses to phase the projects over several years, it is anticipated the actual cost of improvements will be higher due to the loss of project efficiencies and rising construction costs.

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this Wastewater Master Plan is to evaluate the existing sewer collection and treatment systems. The master plan will identify recommended improvements to resolve existing deficiencies, project future system loadings based on the projected growth, identify system improvements required to support future growth, and develop a capital improvement plan that outlines the potential costs and recommended schedule for implementing recommended improvements over the 20-year planning period.

2.0 POPULATION ANALYSIS AND PROJECTED GROWTH

Delta City has grown at a modest rate throughout its history. The average annual growth rate, with major fluctuations, for the past century from 1910 to 2010 has been 2.03%. The current estimated population of Delta is 3,580.

While estimated growth rates are susceptible to change, it is necessary to project a community's growth over the duration of the planning period in order to estimate the increased demands and loadings on the community's infrastructure. Required improvements and expansions can then be planned for in a responsible and systematic manner. In developing a projected growth rate for this study, projections from the Utah Governor's Office of Management and Budget (GOMB) and data from historical Census estimates were reviewed. The GOMB projects an average annual growth rate of 0.38% for Delta City between the years 2020 and 2040. Census estimates between 2000 and 2016 indicate an actual average growth rate of 0.56% during this period. For the purposes of this study, a projected average annual growth rate of 1.00% will be used for the 20-year planning period. Table 2.1 shows the projected population growth for this period.

Table 2.1: Delta City 20 Year Population Growth Projection

Year	Projected Population
2018	3,580
2023	3,762
2028	3,954
2033	4,156
2038	4,368

It is projected that most of the growth during the planning period will occur within the existing sewer service area and will be serviced by the existing sewer collection system.

3.0 SYSTEM USER ANALYSIS

3.1 CURRENT WASTEWATER CONNECTIONS AND ERC'S

In this plan, reference will be made to Equivalent Residential Connections (ERC's). One ERC is defined as the amount of wastewater discharged to the system by an average single-family residential connection. ERC's can be used to compare the wastewater flows produced by commercial, industrial, and institutional entities to a single residential connection. A detailed explanation for the determination of ERC equivalent values for the various connection types is included in Appendix A.

There are currently 1,041 sewer connections on the Delta collection system. Table 3.1 shows the current connection types and ERC equivalents for the Delta System.

Table 3.1: Delta City Connections by Type and ERC Multipliers

EXISTING			
	Connections	**ERC/Connection**	**ERC's**
Residential	908	1	908
Commercial	105	1.5	158
Government/Institutional	28	5.0	140
Total	**1041**		**1206**

The average number of residents per ERC is estimated by dividing the estimated 2018 population of 3,580 by the number of residential connections, which gives a rounded average of 4 residents per ERC.

3.2 PROJECTED WASTEWATER CONNECTIONS AND ERC'S

The number of wastewater ERC's expected at the end of the 20-year planning period can be calculated using the compound interest formula and inserting the projected growth rate of 1.00% and the existing number of wastewater ERC's.

The projected number of residential ERC's for the planning period is calculated with the compound interest formula as follows:

$$F = ERC \times (1 + r)^t$$

$$F = 1{,}206\ ERCs\ \times (1 + 0.01)^{20} = 1{,}470\ ERC$$

Table 3.2: 20-Year Projected ERC's shows the projected number of ERC's for each category.

Table 3.2: 20-Year Projected Connections by Type and ERC Multipliers

FUTURE (20 YR)			
	Connections	**ERC/Connection**	**ERC's**
Residential	1108	1	1108
Commercial	128	1.5	192
Government/Institutional	34	5.0	170
Total	**1270**		**1470**

4.0 FLOW DATA EVALUATION AND FLOW CRITERIA

4.1 CURRENT CONDITIONS

Delta City measures the influent to the sewer lagoons to document the actual flows into the lagoons and to estimate the system flows in the collection system. The monthly totals and daily averages for 2017 are shown in Table 4.1.

Table 4.1: Delta City Collection System Flows for 2017

2017	Flows (gal)	Days/Month	Avg Gal/Day	Avg gpcpd
Jan	12,830,000	31	413,870.97	116.78
Feb	12,830,000	28	458,214.29	129.29
Mar	13,554,000	31	437,225.81	123.37
Apr	9,880,000	30	329,333.33	92.92
May	9,301,000	31	300,032.26	84.66
Jun	8,072,000	30	269,066.67	75.92
Jul	7,773,000	31	250,741.94	70.75
Aug	7,956,000	31	256,645.16	72.41
Sep	8,091,000	30	269,700.00	76.10
Oct	7,636,000	31	246,322.58	69.50
Nov	7,436,000	30	247,866.67	69.94
Dec	8,369,000	31	269,967.74	76.17
Total	**113,728,000**		**Average:**	**88.15**

Based on the growth rate discussed in Section 2.0, the estimated population in 2017 was 3,544 residents. Using this estimated population and the measured flow data, Delta City's annual average per capita flow rate was calculated to be 88.15 gallons per capita per day (gpcpd), which includes groundwater infiltration and surface water inflows. Utah Code R317-3-2 provides design requirements for new sewers, including the average daily per capita flow rate of 100 gallons per capita per day (gpcpd). With the current estimate of 4 residents per ERC, the average per ERC flow rate is 400 gallons per day.

Section R317-3-2 also provides design flows of 400 gpcpd for sizing laterals and collector sewers, and 250 gpcpd for sizing interceptors and outfall sewers. These values equate to 1,200 gallons per ERC per day for laterals and collectors, and 750 gallons per ERC per day for interceptors and outfall sewers.

4.2 FUTURE CONDITIONS

Based on the population projection outlined in Section 3.0, the estimated population will be 4,368 residents in the year 2038. Using an annual average daily flow of 100 gpcpd, the assumed average daily flow for the 20-year design period is 0.437 MGD, or roughly 303 gpm. Peaking flows of 1,200 gallons per ERC per day for laterals and collectors, and 750 gallons per ERC per day for interceptors and outfall sewers still apply with the projected 20-year condition.

5.0 COLLECTION SYSTEM

The Delta City collection system piping is comprised of laterals, collector sewers, interceptor sewers, and the outfall sewer line. Each segment of piping is connected by manholes, and lower elevation areas of the system are lifted to the interceptors and outfall lines using lift stations and force mains. Brief descriptions of these elements are provided as follows:

Lateral – A sewer lateral line is the pipe that connects a private property to the publicly owned sewer line. The portion of the sewer lateral from the building to the property line is typically owned and maintained by the property owner, while the section from the property line to the main line is typically owned and maintained by the utility provider. A cleanout is typically installed at or near the property line. The typical residential sewer lateral is 4" in diameter.

Collector – A collector sewer line is the line to which the sewer laterals are connected. Also referred to as a branch line. The collector carries the wastewater from the laterals to the interceptor lines.

Interceptor & Outfall – Interceptor and outfall lines may be used somewhat interchangeably. The interceptor line(s) receive wastewater from one or many collector lines and carry the wastewater to a treatment plant. The outfall is described as the discharge point of the collection system to the treatment system.

Lift Station – Lift stations, also called pump stations, are used for pumping wastewater from a lower to a higher elevation, particularly where the elevation of the source is not sufficient for gravity flow into the downstream sections of the collection system.

5.1 PIPELINES

The Delta City collection system consists of approximately 131,358 linear feet of gravity sewer line, 11,730 linear feet of pressurized sewer line, and 345 manholes that are 4 feet in diameter and vary from 4 to 14 feet in depth. The gravity sewer is comprised of sections of vitrified clay pipe (VCP), asbestos cement pipe (transite), concrete pipe, and PVC pipe ranging in diameter from 6" to 15". A summary of the pipe types and sizes is provided in Table 5.1.1 and Table 5.1.2. See Exhibit 1 maps for piping sizes and types.

Table 5.1.1: Summary of Gravity Pipe Material

Summary of Gravity Pipe Material		
Material	**Total length**	**% of total system**
Clay Tile	42,936	33%
Concrete	21,717	17%
Transite	14,227	11%
PVC	52,478	40%
% Total	**131,358**	**100%**

Table 5.1.2: Summary of Gravity Pipe Sizes

Summary of Gravity Pipe Sizes		
Pipe Diameter (inches)	**Total length**	**% of total system**
6	555	0%
8	101,392	77%
10	20,139	15%
12	6,856	5%
15	2,416	2%
% Total	131,358	100%

Aging collection system infrastructure should also be a consideration when assessing the condition and capacity of the system to support current and future growth. Table 5.1.3 provides a summary of estimated pipe age for portions of the collection system for which dated construction drawings were available.

Table 5.1.3: Summary of Gravity Pipe Aging

Summary of Pipe Aging		
Pipe Type & Age	**Total length**	**% of total system**
PVC: 0-30 Years	22,890	17%
Concrete: 30-50 Years	12,761	10%
Clay Tile, Transite: 60 + Years	39,456	30%
Total	75,107	57%

5.1.1 System General History

It is generally understood that groundwater drains were installed throughout the original sections of Delta City prior to the establishment of the sanitary system. The drains were installed to drain groundwater and irrigation water from the City to the river. The ground drain system was comprised of perforated or open joint pipe that encouraged inflow from the ground. It is believed that the original sanitary collection was through these existing drainage pipes, allowing the sanitary sewage to collect with the groundwater and irrigation water and empty into the river. Only after the construction of the lagoons (original date unknown) was the sewage diverted to the lagoons instead of the river.

It is possible that the older portions of the existing collection system are comprised of the original groundwater drain system. Lift stations and force main pipelines were introduced in order to divert the wastewater to the lagoon. As the City grew and additional sanitary connections were needed, additional pipelines of differing pipe types were added to the system.

The sewer flow data can be compared against the metered culinary water winter usage to estimate the amount of groundwater infiltration and stormwater inflow into the collection system. Table 5.1.4 shows a comparison of the metered culinary water usage with the measured sewer flows for December 2016 – March 2017, and December 2017.

Table 5.1.4: Delta City Culinary Winter Usage Comparison with Sewer Flows

20016-2017	Water Usage (gal)	WW Flows	Difference
Dec (2016)	9,339,000	9,831,000	-492,000.00
Jan	12,102,000	12,830,000	-728,000.00
Feb	10,246,000	12,830,000	-2,584,000.00
Mar	12,923,000	13,554,000	-631,000.00
Dec (2017)	10,078,000	8,369,000	1,709,000.00

The sewer collection system flows were moderately to significantly higher than the culinary water usage between December 2016 and March 2017, indicating a high amount of infiltration/inflow during this period. It is interesting to note that the sewer flows were approximately 1,709,000 gallons less than the culinary water usage in December 2017, which may indicate that the infiltration or inflows were no longer occurring due to dry conditions or other factors. It is also noted that Delta City performed emergency sewer lining procedures on failing portions of the sewer main that runs under Main Street in the fall of 2017, which may be a contributing factor to the reduction in sewer flows after that period. Another possible contributing factor is the extremely dry early winter that Delta experienced in winter of 2017-2018, which may have influenced the groundwater table and the surface water runoffs.

5.1.2 Existing Gravity Pipe Materials

As mentioned in Section 5.1, the Delta City sanitary collection system is comprised of various materials. Most of the known system has been in the ground for more than 60 years. This older pipe consists of materials such as vitrified clay pipe, concrete pipe, and transite. Each of the different pipe materials have their own strengths and weaknesses as summarized below, which can have an impact on the life expectancy of the pipeline.

- **Vitrified Clay Pipe (VCP)**
  - VCP is brittle and will fail within a few years if not installed and bedded correctly, or in conditions of shifting soil.
  - VCP is susceptible to root intrusion at the joints and service connections and pipe collapses when the integrity of the pipe is compromised.
  - The life expectancy of VCP when installed correctly, is approximately 50 years.
- **Concrete Pipe**
  - Concrete pipe is susceptible to corrosion from hydrogen sulfide gas which is commonly generated in collection system pipes. Corrosion can be as high has one-inch of thickness lost per year in highly corrosive applications.
  - Corrosion typically occurs in the top and sides of the pipe that are not submerged, leaving "topless" sections of pipe. In these situations, cavities typically form in the surrounding soils and the pipe is susceptible to collapse.
  - The life expectancy of concrete pipe is less than 50 years in sanitary sewer collection systems.

- **Transite**
  - Transite is an asbestos-cement product, where the asbestos fiber was used to provide tensile strength.
  - The use of transite pipe was phased out in the 1970's due to the carcinogenic asbestos fibers.
  - Transite pipe is obsolete and difficult to repair due to the lack of available fittings and couplings.
  - The life expectancy of transite pipe is approximately 50 years.

5.1.3 Recommended Pipeline Improvements

The pipeline material's age and the condition of the pipes in the existing system play a substantial role in the infiltration experienced in the system. It is recommended that the City consider replacing all VCP and transite pipe with PVC SDR 35. It is also recommended that the City complete a video inspection of the entire Delta Sanitary System to identify locations of failing concrete pipes. Failing pipelines should be replaced with PVC sewer pipe, which is the current standard for sanitary sewer pipe.

5.2 MANHOLES

As mentioned above, there are an estimated 345 manholes in Delta City's existing collection system. The manholes are typically 4 feet in diameter and vary in depth from 2.75 feet to 14 feet deep, although there are a few larger and deeper manholes in the system.

There are approximately 45 locations where the pipeline ends without a known manhole or cleanout to access the line. Manholes are needed for inspection, cleaning, and removal of obstructions in the sewer line. They also help with the ventilation of the sewer system, reducing the impact of H_2S gas.

5.2.1 Recommended Manhole Improvements

It is recommended that pipeline ends without sewer access have manholes installed. It is also recommended that manholes be replaced in the locations of pipeline replacement.

5.3 LIFT STATIONS

Delta City has six lift stations in the wastewater collection system. The lift stations and associated collection zones are shown on Exhibit 5. A description of each lift station is provided as follows.

5.3.1 Lift Station A

Lift Station A is located on the southeast corner of 400 South and 300 West. This lift station utilizes two 5 hp submersible pumps.

Site visit observations include:

- The pump rails were determined to be in adequate condition, but there was severe concrete deterioration within the wet well.
- It was reported that the gravity lines downstream from Lift Station A are in poor condition.
- Valves may need to be exercised, blasted, and recoated.

Figure 1: Lift Station A

Recommended Lift Station A Improvements:

Currently, all the wastewater coming from Zone A meets at the southeast corner of 400 South and 300 West (Lift Station A), where it is pumped east into Zone B. With the redesign of approximately 1,600 linear feet of existing pipeline between Lift Station A and Lift Station F, it appears to be feasible to bypass Lift Station A and redirect the flows to Lift Station F.

It is recommended that the City eliminate Lift Station A to reduce system reduce operation and maintenance costs and provide additional system efficiencies by reducing the number of times the wastewater from Zone A is pumped.

5.3.2 Lift Station B

Lift Station B is located south of 400 South, at 300 East, and serves approximately two-thirds of the city. The station includes two 20 hp submersible pumps and a bypass wet well.

Station B was observed to be in good operational condition with the exception of the force main between Station B and the lagoons, which has experienced recent failures. The City recently installed a new gravity line to the east of Station B to allow Station B flows to be diverted to Station E in the event of future force main failure between Station B and the lagoons.

Recommended Lift Station B Improvements:

Due to the observed problems, it is recommended this force main should be replaced between Lift Station B and the lagoons.

5.3.3 Lift Station C

Lift Station C is located at 200 E and Main Street on the north side of the intersection. Lift Station C currently has two submersible pumps of differing size, 3 hp and 5 hp.

Figure 2: Lift Station C

Site visit observations included the following items:

- The flanged ductile fittings are significantly corroded.
- Access stairs significantly corroded.
- The valve vault is paved over and inaccessible.
- The depth probe is not installed vertically.
- There is no backup wet well, or alternative force main under Hwy 6.

It has been reported that this pump station can't keep up when the West Millard Swimming Pool is drained.

Recommended Lift Station C Improvements:

It is recommended that the City consider a full replacement of the lift station and valve vault. The new lift station should be sized to meet the projected demands of the zone it is serving, including the West Millard Swimming Pool. It is also recommended that the City install a complete backup well with backup pump and controls. The City may consider relocating the station to the south side of the intersection if a feasible location can be identified. Otherwise, a backup force main should be directionally drilled under Hwy 6.

5.3.4 Lift Station D

Lift Station D, located just east of the corner of 200 North and 420 East, consists of two 5 horsepower submersible pumps. The pumps are run on single-phase power and reside in a newly rebuilt wet well. Lift Station D was rebuilt approximately 5 years ago and is in good operating condition.

5.3.5 Lift Station E

Lift Station E is located in the southeast end of town, at approximately 1500 East and 750 South. The lift station consists of two 10 horsepower pumps.

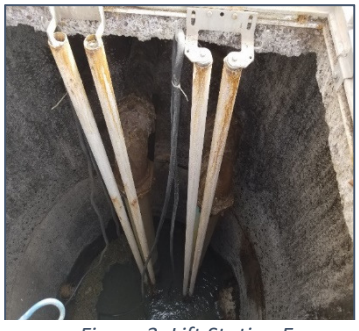

Figure 3: Lift Station E

Site visit observations included:

- The conduit for the control wiring and motor conductors has been broken outside the building, exposing wires.
- The ductile iron fittings in the wet well show corrosion
- The lift station has a simplex backup; however, there is no back up pump presently installed.

Recommended Lift Station E Improvements:

It is recommended that the City keep a backup pump available for use as needed. Station valves should be exercised and blasted and recoated if necessary, and maintenance items should be addressed.

5.3.6 Lift Station F

Located at the southwest corner of town at approximately 320 W Shadow Run Road, Lift Station F consists of two 5 hp pumps. Because of the location and demand, the pump only runs a couple of days a week.

Site visit observations included:

- The pump rails are in good condition.
- The original controls and generator are in place.
- The flanged ductile iron pipe within the wet well is corroding.
- There is some differential settling evident under the concrete surrounding the wet well.

Recommended Lift Station F Improvements:

If the City decides to bypass and eliminate Station A, Station F will need to be replaced with an upgraded lift station and new force main to connect with the new Lift Station B force main.

5.3.7 General Recommendations for All Stations

A detailed performance analysis of each lift station is recommended in order to identify actual pumping capacity and efficiencies, and to identify and prioritize recommendations for repairs or replacement of lift station components.

5.3.8 Additional Options

In addition to the recommendations stated above, there are alternatives available to the City that they may chose to pursue in the future.

- **Bypass Lift Station B.** Lift Station B currently serves approximately two-thirds of the city; however, if the City chooses to eliminate Lift Station A and bypass the flows to Zone F, the demand at Lift Station B would decrease considerably. With that in consideration, a redesign of approximately 7,100 linear feet of sanitary pipeline to the south of Lift Station B and then east to Lift Station E would enable the bypass of Station B. The flow from Zone B would be redirected to Zone E, then pumped through Lift Station E to the treatment lagoons.

  If the City chooses to eliminate Lift Station B and redirect Zone B to Lift Station E, Station E will need to be upgraded to accommodate the additional flows. It is also recommended that the force main from Station E to the lagoons be replaced at the same time.

- **Bypass Lift Station C and D.** It may also be possible to eliminate Station C and Station D by installing deep interceptor lines to carry the flow to Station B or Station E. A threshold survey would be required in these zones to determine the actual required depth of the deep interceptors and possible reconfiguration of the collection zones. The wet wells at Station B and Station E would also need to be lowered to accommodate the deeper lines.

6.0 COLLECTION SYSTEM ANALYSIS

6.1 COLLECTION SYSTEM MODEL

The existing and future Delta City wastewater collection systems were evaluated using H2OMap Sewer, a hydraulic modeling computer program. The H2OMap Sewer model is a mathematical representation of the pipes, manholes, and wastewater flows found in the wastewater collection system. The use of the collection system model allows for different scenarios to be developed along with a means to check how changes to one portion of the system will affect the system as a whole. For example, potential upgrades can be modeled prior to construction to determine if they will provide the adequate capacity or not, which can provide major cost savings to the City when upgrades are needed. Using a collection system model also provides the ability to determine the effect that a subdivision or major customer may pose on system and what upgrades may be necessary for that user. Essentially, the system model allows the City to be proactive rather than reactive to changes in the system.

The model was created after survey data was collected on the existing system. Manhole rim elevations where collected, then the lids were lifted, and a measurement taken from the rim to the flow line. Pipe inverts were calculated by subtracting the manhole depth from the rim elevations.

In Section 5.2—Manholes, it discusses that there are 45 locations where the existing pipeline ends without access to a known manhole or cleanout. In order to run the H2OMap Sewer model, manholes were added in the model at these locations. It was assumed that the slope of the existing pipe is the minimum of 0.0033 ft/ft.

The existing lift stations were then added to the system, based on the information from the site visit. Pump capacity and efficiencies were estimated in the absence of actual model specific pump specifications.

6.1.1 Lift Station Zoning

The Delta City sanitary system has six lift stations, which assist in conveying the wastewater to the treatment lagoons southeast of the city. The current condition of each of the lift stations was discussed in Section 5.3 of this report, along with a discussion of recommendations for improvements.

The purpose of this section is to better identify the portion of the system that feeds the different lift stations. To better illustrate the zoning, please refer to Figure 6.1 – Delta City Sewer Zoning and the zoning maps provided in Exhibit 3. These zoning sections were estimated based on the slope of pipes and direction of flow. Figure 6.1 also illustrates the locations of the lift stations with regard to the entire system. It is interesting to note that wastewater from Zone D is pumped three times before it reaches the lagoons (Station D, Station C, Station B).

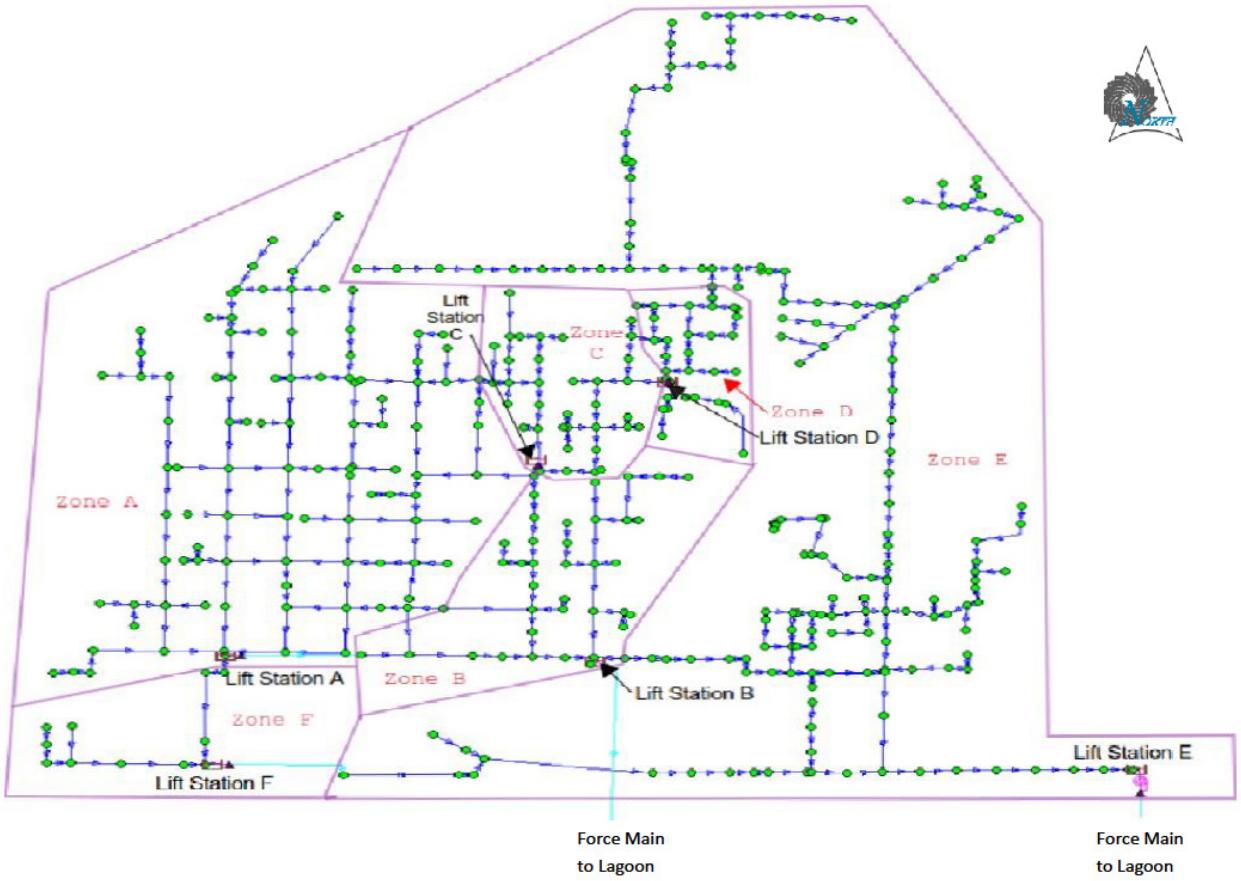

Figure 6.1: Delta City Sewer Zoning

6.1.2 System Slopes

As mentioned above, survey data for the manhole rim elevations were collected and pipe inverts obtained by measuring down from the existing manhole rims. It was through this method that existing pipe slopes were estimated. Upon reviewing the system as a whole, it was noted that the slopes of the pipes throughout the entire system are very minimal, and in some segments, negative slopes were observed. The pipeline slopes vary from 0.00% to 3.60%, with the majority of the system experiencing slopes between 0.20% and 0.50%.

Utah Code R317-3-2 provides a table with minimum slopes based on pipe size to achieve the required minimum velocity of 2 feet per second when flowing full. These minimum slopes are shown in Table 6.1 below. It is important to note that the slopes listed below are minimum slopes; slopes greater than these are desirable.

Table 6.1: Minimum Sewer Slopes by Pipe Size

Sewer Size inch	Minimum Slope
8	0.334%
10	0.248%
12	0.194%
15	0.144%
18	0.113%
21	0.092%
24	0.077%
27	0.066%

6.1.3 System Depth

As mentioned above, survey data for the manhole rim elevations were collected and pipe inverts obtained by measuring down from the existing manhole rims. These distances varied in depth from 2.75 feet to 15 feet deep, with the majority of the system having an invert between six and eleven feet below the existing manhole rim.

6.2 EXISITING COLLECTION SYSTEM ANALYSIS

In order to determine what portions of the system are in need of improvement, the software program H2OMap Sewer was used to model the existing system for current needs. The system was modeled with the current design flows as described in Section 4.1—Current Flow Criteria, which was estimated to about 0.358 MGD, or an average flowrate of 248 gpm. The existing flow was applied to the system based on a visual estimation of loading conditions by attempting to estimate the number of connections that feed into each collector. The outlet flow of the model was then compared to the estimated design flow rate to verify the sum of the loadings applied to the individual manholes equaled the total design flow. As previously mentioned, a peaking factor of four (4.0) for the collector pipelines and two and a half (2.5) for the interceptor pipelines was applied to the system load, per State guidelines.

While analyzing the model for the existing wastewater system, there were ten locations that were identified to have negative slopes and another twelve segments with virtually no slope.

The results of the existing system are located in Appendix B, as Model Scenario 1A and Model Scenario 1B. Model Scenario 1A displays the results of the existing wastewater system with the peaking factor of 2.5 for interceptor pipelines. Model Scenario 1B displays the results of the existing wastewater system with a peaking factor of 4.0. The data highlighted in red specify locations where either the slope of the pipe was in question or the capacity exceeded 90%.

According to the results shown on Model Scenario 1A and 1B, there are three segments of collector pipe and two segments of interceptor pipe that are at or close to maximum capacity, and approximately ten pipe segments that may be installed with negligible or negative slopes. These areas are shown in Exhibit 4 for reference.

6.3 20-YEAR ANTICIPATED COLLECTION SYSTEM ANALYSIS

The system was also modeled for the 20-year anticipated flow conditions. In modeling the 20-year projection, it was assumed that the majority of the growth would occur within the existing City limits, with additional growth assumed at the edges of town for a more conservative approach. By applying the increase throughout, the model tests the system to determine if it is adequate for the projected future growth.

The estimated design flow rate in 2038 is 0.437 MGD, or roughly 303.5 gpm. Peaking flows of 1,200 gallons per ERC per day for laterals and collectors, and 750 gallons per ERC per day for interceptors and outfall sewers were applied as discussed in Section 4.0.

After running the model with the 20-year anticipated demands, several interceptor and collector pipes were identified as having capacity or slope deficiencies. Model Scenario 2A and Model Scenario 2B in Appendix B reflect the results of the H2OMap Sewer model using the 20-year projected flow rates with the existing collection system. The data highlighted in red indicates locations where either the slope of the pipe was in question or the capacity exceeded 90%. These areas are shown in Exhibit 4 for reference.

6.4. RECOMMENDATIONS

Reviewing the elemental data for the existing sewer system, there were ten locations that were identified to have negative slopes and another twelve segments with no substantial slope.

The hydraulic model identified two locations as being loaded above 100% of capacity under current day flows, and another four locations as being loaded above 100% capacity under 20-year projected flows. To be loaded above the available capacity indicates that these sections of pipe would become pressurized under these peak demands that were used to model the system. These segments of pipe are portions of the interceptor pipes just upstream from Lift Station E and Lift Station B. If the City chooses to redesign the system to eliminate Lift Station B (see Section 6.1.4.2), the capacity problems experienced in these locations can be addressed as part of that project.

7.0 TREATMENT SYSTEM

The Delta City wastewater treatment system is comprised of a series of total containment lagoons located southeast of Delta (approximately 2000 East and 1500 South). The lagoon layout is shown in Exhibit 2. As illustrated on the lagoon outline, the lagoon system includes nine separate cells. The different cells are cycled in and out of use in a rotation. For example, Cells 1A and 2A were recently taken out of the system, allowing them to dry. In turn, Cell 1 has recently started receiving wastewater and is currently at three-fourths its capacity and rising. It is assumed that once capacity in Cell 1 is reached, the City will cycle in another of the nine cells.

The existing lagoon system is total containment, meaning that it does not discharge to a body of water or the surrounding land. As such, no discharge permit or treatment limits are currently required for the lagoons. It is understood that the lagoons were built in the mid-1980's using a clay liner to control infiltration. The clay liner in dry cells could potentially dry out and crack; therefore, the City should routinely check the liner condition in the dry cells prior to returning wastewater to them. If the liner cracks, the cells will allow excess leakage and will not meet standards.

Table 7.1 is a summary analysis of the existing lagoon system.

Table 7.1: Lagoon Analysis Summary

	Total Surface Area (Acres)	Total Lagoon Area (Sq Ft)	Top of Dike Elevation	High Water Elevation	Bottom Elevation	Total Depth (ft)	Max Water Depth (ft)	Volume (gal)
Cell 1	20.20	878,158	4,622.60	4,619.60	4,616.60	6.00	3.00	18,583,657
Cell 2	9.00	388,714	4,622.00	4,619.00	4,614.00	8.00	5.00	13,026,254
Cell 3	9.00	390,968	4,622.00	4,619.00	4,614.00	8.00	5.00	13,099,904
Cell 4	6.90	299,615	4,621.70	4,618.70	4,613.70	8.00	5.00	9,034,972
Cell 5	8.90	385,044	4,621.40	4,618.40	4,613.40	8.00	5.00	12,882,245
Cell 6	9.00	389,188	4,621.40	4,618.40	4,613.40	8.00	5.00	13,030,761
Cell 1A	10.30	447,399	4,621.90	4,618.90	4,612.90	9.00	6.00	17,682,436
Cell 2A	13.40	581,326	4,621.85	4,618.85	4,612.85	9.00	6.00	23,549,799
Cell 3A	13.30	578,269	4,621.80	4,618.80	4,612.80	9.00	6.00	23,473,134
TOTAL	**100.00**							**144,363,161**

7.1 HYDRAULIC BALANCE

The calculations of the required lagoon area (A) is based on the water balance calculation: Water In = Water Out. Water entering the lagoons comes through two means: inflow from the City and precipitation. The water leaving the lagoons does so by percolation and evaporation. The annual water balance equation is as follows:

Annual Inflow + Precipitation (A) = Percolation (A) + Evaporation (A)

Lagoons losses due to percolation into the ground are calculated with the formula Q=KiA where:

Q = flow (inch/day/unit area)
K = Permeability Constant (inches/day)
i = Hydraulic gradient (water depth/liner thickness)
A = Area (acres)

7.1.1 Current Hydraulic Balance

Based on the current population of 3,580 the water balance equation was calculated to determine the necessary lagoon area for treatment. The maximum hydraulic conductivity of the lagoon bottom as set by the Department of Water Quality shall not exceed 1.0×10^{-6}, which equates to a permeability constant of 0.034 inches per day.

Therefore, the percolation into the ground is related to the lagoon area by the following:

$$Q = KiA$$

$$Q = 0.034 \times 6 \times A = 0.204A$$

Annual precipitation was based off the Delta, Utah monthly climate summary, with a period of record between 1938-2005. Pan evaporation data was gathered from the Western Regional Climate Center for Milford, Utah, with a period of record between 1906-2005. The design parameters for the water balance equation are as follows:

Annual Precipitation (ft/yr) = 0.66
Annual Percolation @ .204 in/day (ft/yr) = 6.21
Annual Evaporation (ft/yr) = 4.89
Annual Inflow (gal/yr) = 130,670,000
Annual Inflow (Ac-ft/yr) = 401

Using the water balance formula mentioned above, the required lagoon area (A) for the current system can be determined as follows:

$$Annual\ Inflow + Precipitation(A) = Percolation(A) + Evaporation\ (A)$$

$$\frac{401\ ac-ft}{year} + \frac{0.66\ ft(A)}{year} = \frac{6.21ft(A)}{year} + \frac{4.89ft(A)}{year}$$

$$\frac{401\ ac-ft}{year} = \frac{-0.66\ ft(A)}{year} + \frac{6.21ft(A)}{year} + \frac{4.89ft(A)}{year}$$

$$\frac{401\ ac-ft}{year} = \frac{10.44\ ft(A)}{year}$$

$$A = 38.41\ acres$$

Based on the current demands put on the existing sanitary system, the City currently requires lagoon surface area of at least 38.41 acres to properly treat the wastewater. The existing treatment lagoon system has an excess capacity for the City's current needs.

7.1.2 Projected Hydraulic Balance

The 20-year projected population of Delta City was estimated at 4,368. The design parameters for the water balance equation as described in Section 7.1.1 are as follows for the 20-year projected influent:

Annual Precipitation (ft/yr) = 0.66
Annual Percolation @ .204 in/day (ft/yr) = 6.21
Annual Evaporation (ft/yr) = 4.89
Annual Inflow (gal/yr) = 159,432,000
Annual Inflow (Ac-ft/yr) = 489.28

Using the water balance formula mentioned above, the required lagoon area (A) for the current system can be determined as follows:

$$Annual\ Inflow + Precipitation(A) = Percolation(A) + Evaporation\ (A)$$

$$\frac{489.28\ ac-ft}{year} + \frac{0.66\ ft(A)}{year} = \frac{6.21 ft(A)}{year} + \frac{4.89 ft(A)}{year}$$

$$\frac{489.28\ ac-ft}{year} = \frac{-0.66\ ft(A)}{year} + \frac{6.21 ft(A)}{year} + \frac{4.89 ft(A)}{year}$$

$$\frac{489.28\ ac-ft}{year} = \frac{10.44\ ft(A)}{year}$$

$$A = 46.87\ acres$$

The projected system should require a lagoon surface area of at least 46.87 acres to provide the necessary volume capacity. As mentioned in Section 7.0, the existing lagoon has an approximate total surface area of 100 acres. Based on the parameters mentioned above, the existing treatment lagoons are adequately sized for the 20-year planning period.

7.2 STRUCTURE AND FLUME

The influent currently enters the treatment lagoon through a ramp flume and headworks structure. It was noted during the April 2018 field visit that there was build up at the flume that is potentially affecting the accuracy of the measurements. It is recommended that the structure be cleaned out, and that calibration tests be performed on the flume to check the accuracy of the readings.

7.3 TREATMENT SYSTEM RECOMMENDATIONS

After reviewing the sizing requirements for treatment lagoon needs, it has been established that the existing lagoon system is adequate for the 20-year planning period. It is recommended that the City routinely check clay liners of the dry cells. Cracked liners would require rehabilitation to recreate a water tight liner to meet the seepage requirements set by the State. Additionally, the headworks structure should be cleaned out and calibration tests shall be performed on the flume to check the accuracy of the readings.

8.0 CAPITAL IMPROVEMENTS PLAN

The Capital Improvements Plan provides a summary of recommended improvements to the system and an engineer's opinion of probable costs for the proposed improvements based on the current estimated value of the improvements. The recommended improvements are listed below in order of an estimated priority, based on the anticipated condition of the system. Once the collection system video inspection is completed, the improvements may be better prioritized based on the current condition of the system.

8.1 PRE-CONSTRUCTION RECOMMENDATIONS

A critical step in determining the appropriate phasing of system improvements will be to perform a detailed investigation of the existing system and a detailed performance analysis of the current lift stations. Therefore, it is recommended that the City have the full collection system cleaned and then have a sewer video inspection performed as soon as possible to identify the current condition of the existing pipes and manholes. It is also recommended that the City have a performance evaluation, such as a LiftShield diagnostic assessment completed on each of the lift stations that will remain in operation.

The engineer's opinion of probable cost for the sewer system cleaning and video inspection is $196,500. Actual costs may vary based on the contractor's current rates at the time of inspection.

8.2 RECOMMENDED SYSTEM IMPROVEMENTS

The improvements in this section are grouped by zones for simplicity. Though the recommended improvements below are grouped by their geographic zone, the City can determine the priority of the improvements once the collection system video inspection is completed. As a means of cost savings and efficiency, certain improvements should occur in sequence or concurrently. These improvements are noted as such.

Zone A

- **Bypass Lift Station A**. With the redesign of approximately 1,600 linear feet of pipeline between Lift Station A and Lift Station F, the City could eliminate Lift Station A, bypassing the flow to Lift Station F. If the City chooses to eliminate Lift Station A, Lift Station F will need to be redesigned and upgraded to handle the increased flow. It is also recommended that the Lift Station A Bypass project happen concurrently or prior to any pipe redesign that may happen in Zone A.

- **Replace all VCP, transite, and concrete pipe in Zone A.** This represents the replacement of approximately 43,200 feet of sewer mains, 102 manholes, 531 service connections and cleanouts, and the replacement of all sewer laterals from the property line to the sewer main. The engineer's opinion of probable cost also includes the necessary pavement repairs associated with the replacement of sewer mains within City streets.

Zones B and C

- **Replace force main from Lift Station B to the lagoons**. The replacement of approximately 8,300 linear feet of new force main.

- **Upgrade Lift Station C**. As discussed in Section 5.3.3, a full replacement of Lift Station C should be considered. The lift station should be sized to meet the projected demands of the zone, including the West Millard Swimming Pool.

- **Replace all VCP, transite, and concrete pipe in Zone B and Zone C**. This represents the replacement of approximately 17,860 feet of sewer mains, 60 manholes, 184 service connections and cleanouts, and the replacement of all sewer laterals from the property line to the sewer main. The engineer's opinion of probable cost also includes the necessary pavement repairs associated with the replacement of sewer mains within City streets.

Zones D and E

- **Replace all VCP, transite, and concrete pipe in Zone D and Zone E**. This represents the replacement of approximately 16,725 feet of sewer mains, 83 manholes, 209 service connections and cleanouts, and the replacement of all sewer laterals from the property line to the sewer main. The engineer's opinion of probable cost also includes the necessary pavement repairs associated with the replacement of sewer mains within City streets. The concrete pipe in Zone D and Zone E serve some of the more recently developed areas in Delta, and as such may still be in serviceable condition. Improvements in these zones should be based on the results of the sewer video inspection and may not be necessary for many years.

Zones F

- **Upgrade Lift Station F**. Lift Station F will need to be redesigned and sized to meet the combined projected demand of Zones A and F if the City decides to bypass and eliminate Station A. With this improvement project, a new adequately sized force main will be required. The proposed force main would connect to the proposed force main conveying wastewater from Lift Station B to the existing lagoon.

The components of the recommended system improvements and the respective engineer's opinion of probable cost are summarized in Table 8.2. The complete engineer's opinion of probable cost is included in Appendix C. The total cost shown in the engineer's opinion of probable cost represent the estimated present-day cost if all the recommended improvements were completed in a single project. This includes the general project items and the incidentals and professional services. Actual construction will likely take place in phases established by the results and observations from the sewer video inspection; therefore, the actual total cost will vary based on phasing.

Table 8.2: Summary of Recommended System Improvements

Recommended Improvements	
MOBILIZATION (5%)	$ 810,000
NEW GRAVITY MAIN - STATION A TO STATION F	$ 215,280
LIFT STATION F UPGRADES	$ 305,000
NEW FORCE MAIN FROM STATION F TO STATION	$ 223,000
SEWER REPLACEMENT - ZONE A	$ 6,302,927
NEW FORCE MAIN FROM STATION B TO LAGOONS	$ 345,100
LIFT STATION C UPGRADES	$ 195,000
SEWER REPLACEMENT - ZONE B & C	$ 2,383,065
SEWER REPLACEMENT - ZONE D & E- CITY STREET	$ 2,302,075
GENERAL PROJECT ITEMS	$ 428,000
CONTINGENCY	$ 2,701,889
INCIDENTALS & PROFESSIONAL SERVICES	$ 2,671,000
TOTAL	$ 18,882,336

9.0 USER RATE ANALYSIS & PROJECT FUNDING OPTIONS

The current sewer rate is $22.00 per ERC (single family residence). The approved budget for FY 2019 indicates that the actual operating expenses for the year ending June 30, 2018 were $366,545. $93,718 of this expense is listed as depreciation, leaving a net operating expense of $272,827. With 1,206 ERC's billed, the average monthly sewer rate would need to be $18.85 just to cover the actual operating expenses.

The FY 2019 budget projects that the operating expenses for the year ending June 30, 2019 will be $650,974. $100,000 of this expense is listed as depreciation, leaving a net operating expense of $550,974. The average user rate would need to be $38.07 to cover this expense with user fees. It is noted that the increase from FY 2018 to FY 2019 is due to a large projected capital outlay, additional contractual services, and additional materials and supplies, all of which may be related to the current master planning and proposed system investigation recommendations.

The funding agencies that could be approached for funding assistance for all or part of the cost of the improvements include the Water Quality Board, Permanent Community Impact Fund Board (CIB), USDA-Rural Development (RD), and the United States Army Corps of Engineers (USACE).

The CIB and the Water Quality Board consider a community's Median Adjusted Gross Income (MAGI) when determining the percentage of loan and grant to approve for a sewer improvement project. The maximum affordable sewer bill as determined by the Division of Water Quality is 1.4% of the monthly MAGI. Delta City's 2017 MAGI is $43,944, and the corresponding maximum affordable sewer bill is $51.27. Once a community has taken on enough debt to require the average rate to meet the maximum affordable sewer bill, the community then qualifies for grant funding from the CIB and Water Quality Board. However, it should be noted that the maximum affordable sewer bill is not a cap, and higher rates may be required if the funding agencies do not have the grant funds available or choose not to allocate the grant funds to the community to keep the rates below the 1.4%.

The USDA-RD also considers the median income for the community, but only to determine the funding structure for which the community qualifies. Delta City qualifies for the USDA-RD poverty category, which makes the City eligible for up to 45% grant, although the actual availability of grant funds does not always match the amount for which the community is eligible. The USDA-RD also requires that the community's rates are as high as "similar systems".

USACE 595 program funds are federal grant funds that may be awarded in conjunction with other project funding. In order to apply for 595 funds, the community must first make application to all other state and federal funding agencies for which the community qualifies. The 595 funds, if awarded, provide supplemental grant funds as a 75% match to the community's contribution.

As noted above, the City may choose to approach a single funding agency for all of the improvements, or a combination of agencies for a single or multiple phase project approach. Two sample funding scenarios are provided in Appendix D to demonstrate the possible range of required sewer rates to support the proposed improvements described in Section 8.0.

The first scenario assumes that the City obtains funding from the USDA-RD for the full amount of $18,882,336 at 45% grant and 55% loan at 2.75% over 40 years. The resulting required average sewer rate would be $59.83.

The second scenario assumes that the City obtains 70% of the project funding from USDA-RD at 45% grant and 55% loan, and the other 30% of the project funding from the Water Quality Board at 20% grant and 10% loan at 1% over 30 years. The resulting required average sewer rate for this scenario would be $54.49, which is slightly higher than the 1.4% maximum affordable sewer rate. It is noted that other agencies, such as CIB or USACE could be approached to supplement the funding with additional grant funds to keep the average sewer rate below the maximum affordable sewer rate as well.

If the City decides to phase the projects over several years, it is anticipated that the resulting end average sewer rate will be higher than if the improvements are all done at once due to the loss of project efficiencies and rising construction costs, although the more gradual increase in sewer rates may make this a more feasible alternative for the City.

EXHIBIT 1

Existing Collection System Overview

DELTA CITY

SEWER SYSTEM

Legend

Material

- Clay Tile
- Concrete (Non-Reinforced)
- Polyvinyl Chloride
- Transite
- Pressurized Mains

DELTA CITY

SEWER SYSTEM

Legend

SEWER MAINS

DIAMETER

- 6"
- 8"
- 10"
- 12"
- 15"
- PRESSURE MAIN

LIFT STATION A

LIFT STATION B

LIFT STATION C

LIFT STATION D

LIFT STATION E

LIFT STATION F

EXHIBIT 2

Existing Lagoon System Overview

Delta City

Wastewater Lagoons

SUNRISE ENGINEERING
25 EAST 500 NORTH
FILLMORE, UTAH 84631
TEL 435.743.6151 · FAX 435.743.7900
www.sunrise-eng.com

EXHIBIT 3

Collection System Zone Maps

DELTA CITY

SEWER SYSTEM

COLLECTION ZONES

Legend

Material

- Clay Tile
- Concrete (Non-Reinforced)
- Polyvinyl Chloride
- Transite
- Pressurized Mains

ZONE A

ZONE B

ZONE C

ZONE D

ZONE E

ZONE E

ZONE F

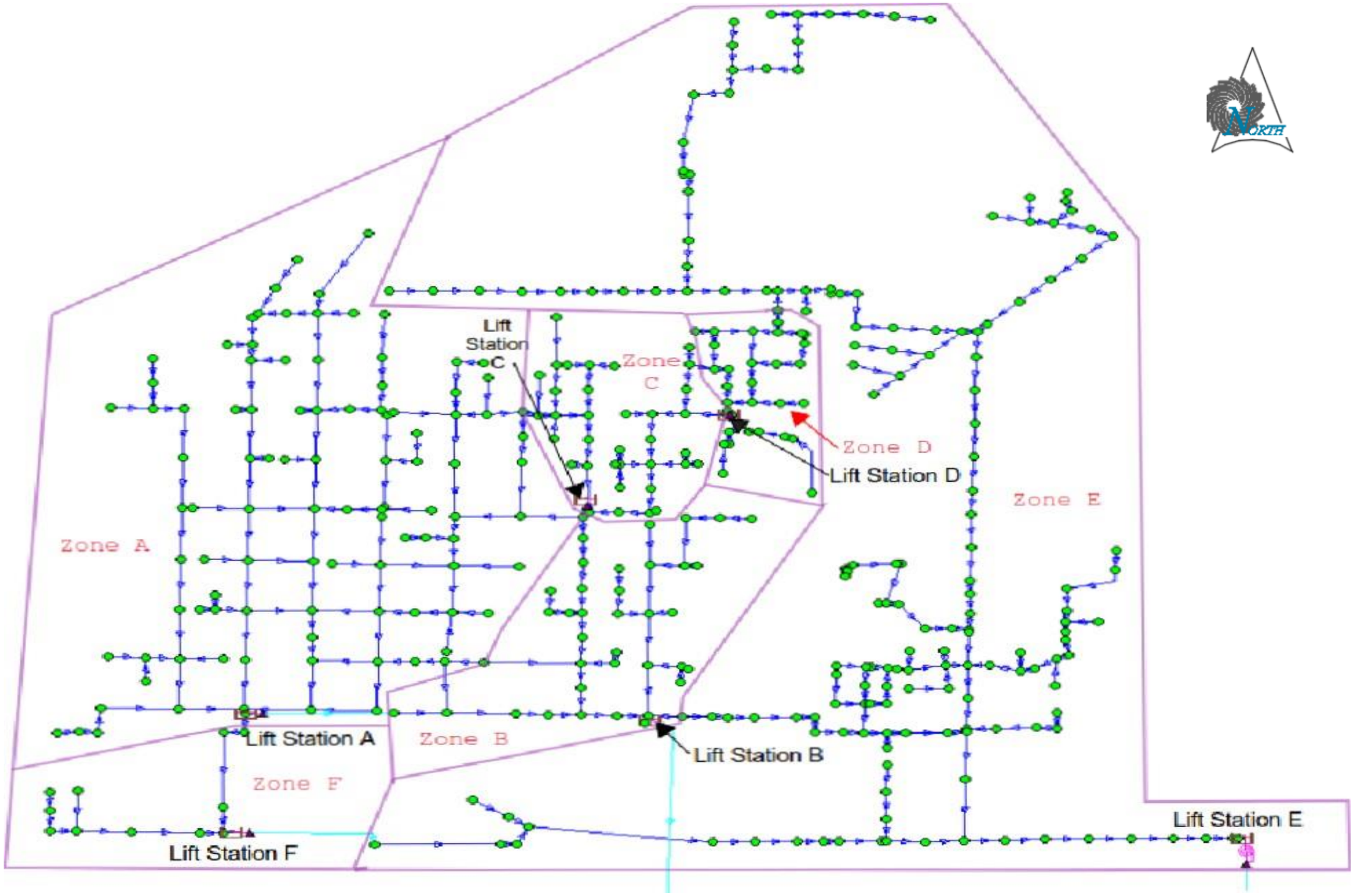
Lift Station C
Zone C
Zone D
Lift Station D
Zone E
Zone A
Lift Station A
Zone B
Lift Station B
Zone F
Lift Station F
Lift Station E
Force Main to Lagoon
Force Main to Lagoon

EXHIBIT 4

Sewer Model Pipe Slope and Capacity Deficiencies

DELTA CITY

SEWER SYSTEM

PIPES WITH POSSIBLE NEGATIVE SLOPES
OR CAPACITY ISSUES - 2018

Legend

Material

- Clay Tile
- Concrete (Non-Reinforced)
- Polyvinyl Chloride
- Transite
- Pressurized Mains

Legend

- Negative Slope
- Capacity Deficiency

DELTA CITY

SEWER SYSTEM

PIPES WITH POSSIBLE NEGATIVE SLOPES OR CAPACITY ISSUES - 2038

Legend

Material

- Clay Tile
- Concrete (Non-Reinforced)
- Polyvinyl Chloride
- Transite
- Pressurized Mains

Legend

- Negative Slope
- Capacity Deficiency

APPENDIX A:

Explanation of ERC Determinations

DETERMINATION OF ERC MULTIPLIER VALUES

Delta City provided the following table of connection types within the system in February 2018.

	Connections
Residential	908
Commercial	65
Laundromat/Car Wash	4
Meat Shop	2
Café/Restaurant	10
Churches	14
Hospitals	2
Motels	6
Café, 2 Office	1
Government	15
School Sewer, Per Student	5
5 Offices	1
1 Café, 2 full 2 half	1
1 Café, 1 full 1 half	1
School (Administrative)	6
Total	**1041**

Utah Code R317-4 Table 3 provides average wastewater flows for various types of commercial establishments. Using the values from Table 3 and estimates for the numbers of washers, units, and students, the following estimates were made for commercial wastewater flows:

Laundromat

$$6\ washers\ \times \frac{580\ gpd}{Washer} = 3480\ gpd$$

Hospital

$$28\ bedspaces\ \times \frac{250\ gpd}{Bed\ space} = 7{,}000\ gpd$$

Motels

$$160\ total\ units\ \times \frac{125\ gpd}{Unit} = 20{,}000\ gpd$$

School

$$1889\ total\ students\ \times \frac{20\ gpd}{Student} = 37{,}780\ gpd$$

The average flow per ERC was estimated by dividing the 2018 population of 3580 by the 980 residential connections on the system, for an average of 4 residents per ERC. The average flows per ERC is therefore estimated to be 400 gpd based on 100 gpcpd.

Equivalent ERC multipliers were then established for each connection type based on the estimated wastewater flow from each type of establishment. The ERC multipliers and resulting ERC's are shown in the following table.

	Connections	ERC/Connection	ERC's
Residential	908	1	908
Commercial	65	1	65
Laundromat/Car Wash	4	2.25	9
Meat Shop	2	1	2
Café/Restaurant	10	1	10
Churches	14	1	14
Hospitals	2	9	18
Motels	6	8.5	51
Café, 2 Office	1	1	1
Government	15	1	15
School Sewer, Per Student	5	20	100
5 Offices	1	1	1
1 Café, 2 full 2 half	1	1	1
1 Café, 1 full 1 half	1	1	1
School (Administrative)	6	1	6
Total	**1041**		**1202**

The different types of establishments were then grouped into residential, commercial, and government/institutional connection types. The total number of ERC's for each connection group from the table above was divided by the total number of connections in that connection group to establish an average ERC per connection value. These average ERC/connection multipliers are shown in the table below.

EXISTING			
	Connections	**ERC/Connection**	**ERC's**
Residential	908	1	908
Commercial	105	1.5	158
Government/Institutional	28	5.0	140
Total	**1041**		**1206**

APPENDIX B:
System Model Output

MODEL SCENARIO 1A
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
1	Interceptor	10	599	0.40%	21.09	610.42	4%	1.164	0.106
2	Collector	8	623	0.40%	17.495	344.037	5%	1.15	0.102
3	Collector	8	595	0.40%	11.736	334.247	4%	1	0.085
4	Collector	8	339	0.30%	0	312.33	0%	0	0
6	Collector	8	392	0.40%	1.56	331.042	1%	0.54	0.033
7	Collector	8	305	0.40%	6.25	331.85	2%	0.824	0.063
8	Collector	8	628	0.50%	77.11	390.363	20%	1.939	0.201
9	Collector	8	333	0.60%	5.467	413.457	1%	0.922	0.054
10	Collector	12	357	0.20%	96.512	718.558	13%	1.42	0.248
11	Collector	8	692	0.10%	0.741	135.232	1%	0.231	0.035
12	Collector	8	601	0.10%	15.987	202.979	8%	0.772	0.127
14	Collector	8	369	0.50%	3.436	401.499	1%	0.785	0.044
15	Collector	8	215	0.30%	0	312.4	0%	0	0
16	Collector	8	236	0.50%	10.932	395.57	3%	1.102	0.076
17	Collector	8	381	0.40%	18.87	347.29	5%	1.184	0.106
18	Collector	8	264	0.40%	1.56	355.605	0%	0.567	0.032
19	Collector	8	218	0.30%	0	318.19	0%	0	0
20	Collector	8	238	1.20%	1.434	592.996	0%	0.789	0.024
21	Collector	8	146	0.40%	0	361.84	0%	0	0
22	Collector	8	299	0.30%	0.906	281.988	0%	0.409	0.028
23	Collector	8	293	0.50%	3.125	365.98	1%	0.715	0.044
24	Collector	8	307	0.40%	0	358.21	0%	0	0
25	Collector	8	243	0.30%	0	312.45	0%	0	0
26	Collector	8	202	0.30%	0	312.337	0%	0	0
27	Collector	8	454	0.30%	0	312.38	0%	0	0
28	Collector	8	121	0.30%	0	312.235	0%	0	0
29	Collector	8	133	0.30%	0	312.482	0%	0	0
30	Collector	8	328	0.40%	3.125	351.801	1%	0.695	0.044
31	Collector	8	301	0.40%	88.379	338.125	26%	1.816	0.233
32	Collector	8	336	0.30%	5.415	312.321	2%	0.756	0.061
33	Collector	8	226	0.30%	0	312.391	0%	0	0
34	Collector	8	329	0.90%	2.345	522.712	0%	0.839	0.032
35	Collector	8	144	0.30%	1.927	312.276	1%	0.553	0.037
36	Collector	8	612	0.40%	20.62	364.525	6%	1.258	0.108
37	Collector	10	328	0.40%	83.645	650.44	13%	1.828	0.202
38	Collector	8	264	0.20%	3.905	264.732	2%	0.61	0.057
39	Collector	8	248	0.50%	1.927	398.51	1%	0.655	0.033
40	Collector	8	360	0.30%	5.782	277.517	2%	0.71	0.067
41	Collector	8	373	0.20%	0.921	241.61	0%	0.369	0.03
43	Collector	12	593	0.20%	42.018	678.736	6%	1.069	0.169
44	Collector	12	569	0.30%	0	921.01	0%	0	0
45	Collector	8	334	0.30%	0	312.426	0%	0	0

MODEL SCENARIO 1A
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
46	Collector	8	554	0.20%	16.402	269.35	6%	0.95	0.112
47	Collector	8	625	0.30%	0	312.36	0%	0	0
48	Collector	8	315	0.30%	18.745	272.47	7%	0.996	0.118
49	Collector	6	555	0.30%	3.207	141.631	2%	0.661	0.052
50	Collector	8	321	0.50%	3.125	378.75	1%	0.732	0.043
51	Collector	8	632	0.30%	0	312.368	0%	0	0
52	Interceptor	10	599	0.20%	13.275	465.60	3%	0.838	0.097
53	Collector	8	620	0.10%	5.218	129.787	4%	0.405	0.091
54	Collector	8	410	0.30%	0	312.335	0%	0	0
55	Collector	8	623	0.10%	6.76	192.519	4%	0.576	0.085
56	Collector	8	627	0.40%	1.56	361.017	0%	0.573	0.032
57	Collector	8	354	0.30%	1.927	312.34	1%	0.553	0.037
58	Collector	8	429	0.30%	0	312.38	0%	0	0
59	Interceptor	10	596	0.40%	40.2	589.703	7%	1.376	0.147
60	Interceptor	15	644	0.10%	310.614	1060.321	29%	1.672	0.463
61	Collector	8	349	0.40%	0	361.014	0%	0	0
62	Collector	8	271	0.40%	7.032	345.836	2%	0.878	0.066
64	Collector	8	157	0.40%	2.345	351.35	1%	0.637	0.039
65	Collector	8	401	0.40%	26.547	344.74	8%	1.303	0.125
66	Collector	8	169	0.60%	28.107	408.962	7%	1.495	0.118
67	Interceptor	10	41	-0.10%	143.32		100%	0.585	0.833
68	Interceptor	10	397	0.20%	139.42	424.174	33%	1.553	0.329
69	Collector	8	300	0.40%	12.032	342.337	4%	1.025	0.086
70	Collector	8	217	0.30%	0	312.298	0%	0	0
73	Collector	8	238	0.50%	1.927	392.86	1%	0.648	0.034
74	Collector	8	347	0.40%	15.627	355.763	4%	1.139	0.095
75	Collector	8	236	0.40%	4.687	363.69	1%	0.805	0.053
76	Collector	8	180	0.50%	3.905	373.943	1%	0.776	0.048
77	Collector	8	383	0.40%	6.247	348.23	2%	0.852	0.062
78	Collector	8	257	0.30%	1.56	285.581	1%	0.487	0.035
79	Interceptor	12	629	0.20%	42.018	715.39	6%	1.109	0.164
80	Collector	8	903	0.30%	3.855	300.212	1%	0.664	0.053
81	Collector	8	649	0.30%	21.09	303.62	7%	1.113	0.119
83	Collector	8	239	0.20%	24.945	241.986	10%	0.996	0.145
84	Collector	8	1391	0.30%	24.945	289.02	9%	1.13	0.132
85	Collector	8	400	0.30%	24.945	314.036	8%	1.198	0.127
86	Collector	8	327	0.40%	3.12	343.03	1%	0.683	0.045
87	Collector	8	223	0.40%	23.427	343.997	7%	1.254	0.118
88	Collector	8	173	0.70%	1.56	459.78	0%	0.678	0.028
89	Interceptor	10	400	0.00%	204.183	180.373	113%	0.834	0.833
90	Interceptor	10	741	0.20%	172.993	436.00	40%	1.678	0.365
91	Collector	8	373	0.70%	0.78	445.816	0%	0.537	0.021

MODEL SCENARIO 1A
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
92	Collector	8	240	0.40%	9.685	360.92	3%	0.997	0.075
93	Collector	8	340	0.30%	0	312.65	0%	0	0
94	Collector	8	217	0.50%	3.125	367.781	1%	0.717	0.044
95	Interceptor	10	398	0.20%	73.963	430.716	17%	1.316	0.234
96	Collector	8	262	0.20%	48.976	243.084	20%	1.214	0.203
97	Collector	8	361	0.40%	7.03	338.932	2%	0.866	0.066
98	Collector	8	417	0.30%	11.715	298.777	4%	0.924	0.09
99	Collector	8	390	0.20%	3.905	226.433	2%	0.547	0.061
100	Collector	8	449	0.40%	3.125	338.22	1%	0.677	0.045
101	Collector	8	399	1.90%	0	746.248	0%	0	0
102	Collector	8	353	0.50%	0	379.902	0%	0	0
103	Collector	8	235	2.80%	0	908.81	0%	0	0
104	Collector	8	588	2.00%	12.082	770.885	2%	1.81	0.058
105	Collector	8	301	0.00%	2.34		100%	0.015	0.667
106	Collector	8	432	0.20%	0.78	261.727	0%	0.371	0.027
107	Collector	8	872	0.40%	1.56	362.986	0%	0.575	0.032
108	Collector	8	407	0.30%	2.342	299.62	1%	0.57	0.042
109	Collector	8	236	0.70%	0	443.204	0%	0	0
110	Collector	8	491	0.30%	0	312.398	0%	0	0
111	Collector	8	299	0.00%	0.829	58.028	1%	0.133	0.056
112	Collector	8	581	0.30%	0	312.364	0%	0	0
113	Collector	8	295	0.60%	15.858	420.122	4%	1.285	0.089
114	Collector	8	157	0.30%	0	312.418	0%	0	0
115	Collector	8	508	0.30%	26.011	312.377	8%	1.208	0.13
116	Collector	8	390	0.40%	68.411	362.25	19%	1.776	0.196
117	Collector	8	269	0.40%	0	343.674	0%	0	0
118	Collector	8	89	0.60%	0	418.459	0%	0	0
119	Collector	8	157	0.50%	0	380.707	0%	0	0
121	Collector	8	240	0.40%	0.966	321.807	0%	0.457	0.027
122	Collector	8	724	0.30%	0	312.37	0%	0	0
123	Collector	8	477	0.20%	0.78	211.678	0%	0.32	0.029
124	Collector	8	287	0.50%	90.724	369.465	25%	1.95	0.225
125	Collector	10	624	0.10%	61.371	356.317	17%	1.089	0.234
126	Collector	8	303	0.40%	3.855	360.497	1%	0.754	0.049
127	Collector	8	177	0.50%	3.905	376.977	1%	0.781	0.048
128	Collector	8	289	0.30%	1.56	317.203	1%	0.524	0.034
129	Collector	8	270	0.30%	0	312.474	0%	0	0
130	Collector	8	915	0.20%	1.007	264.221	0%	0.404	0.03
131	Collector	8	61	0.30%	0	312.024	0%	0	0
132	Collector	8	194	0.30%	0	312.431	0%	0	0
133	Collector	12	566	0.20%	92.607	658.479	14%	1.319	0.253
134	Collector	12	339	0.30%	0	921.061	0%	0	0

MODEL SCENARIO 1A
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
135	Collector	12	467	0.30%	0	921.011	0%	0	0
137	Collector	8	283	1.30%	0	620.492	0%	0	0
138	Interceptor	10	322	0.30%	0	580.465	0%	0	0
139	Collector	8	300	0.20%	3.905	245.547	2%	0.579	0.059
140	Collector	8	185	1.30%	0	612.676	0%	0	0
141	Collector	8	280	0.40%	0.78	332.042	0%	0.438	0.024
142	Collector	8	297	0.60%	3.905	428.555	1%	0.854	0.045
143	Collector	8	277	0.70%	8.957	443.919	2%	1.125	0.066
144	Collector	8	335	4.50%	11.302	1156.831	1%	2.354	0.047
145	Collector	8	343	0.30%	12.082	285.816	4%	0.904	0.093
146	Collector	8	60	2.50%	14.427	864.173	2%	2.068	0.06
147	Collector	8	46	5.30%	14.427	1255.595	1%	2.684	0.05
148	Collector	8	112	2.20%	0	808.44	0%	0	0
149	Collector	8	123	1.90%	0	751.34	0%	0	0
150	Collector	8	293	0.00%	0	52.229	0%	0	0
151	Collector	8	225	0.40%	0	341.323	0%	0	0
152	Collector	8	235	0.50%	0	365.303	0%	0	0
153	Collector	8	319	0.40%	9.286	324.499	3%	0.914	0.077
154	Collector	8	186	0.20%	11.631	267.55	4%	0.854	0.095
155	Collector	8	336	0.20%	2.342	270.594	1%	0.531	0.044
156	Collector	8	262	0.30%	3.818	296.358	1%	0.656	0.053
157	Collector	8	237	1.30%	2.34	617.266	0%	0.942	0.03
158	Collector	8	514	0.30%	0.78	310.272	0%	0.418	0.025
159	Collector	8	419	0.20%	0	251.52	0%	0	0
160	Collector	8	402	0.50%	0.78	398.155	0%	0.497	0.022
161	Collector	8	365	0.60%	0.78	417.715	0%	0.513	0.021
162	Collector	8	297	0.00%	0.78		100%	0.005	0.667
163	Collector	8	302	0.30%	0.78	314.579	0%	0.422	0.024
164	Collector	8	301	0.20%	0.78	270.026	0%	0.379	0.026
165	Collector	8	301	0.20%	20.677	254.265	8%	0.977	0.129
166	Collector	8	352	0.20%	24.577	225.773	11%	0.945	0.149
167	Collector	8	398	0.20%	26.922	212.095	13%	0.928	0.16
170	Collector	8	358	0.30%	8.407	277.099	3%	0.794	0.08
172	Collector	8	173	0.40%	1.56	360.338	0%	0.572	0.032
173	Collector	8	114	0.50%	0.78	392.856	0%	0.492	0.022
174	Collector	8	247	0.50%	2.34	384.931	1%	0.678	0.037
175	Collector	8	210	0.40%	5.465	359.876	2%	0.837	0.057
176	Collector	8	133	0.20%	8.151	270.831	3%	0.774	0.079
178	Collector	8	397	0.20%	34.133	257.801	13%	1.142	0.164
179	Collector	8	352	0.30%	38.038	291.284	13%	1.285	0.163
180	Collector	8	395	0.30%	41.943	278.183	15%	1.279	0.175
181	Collector	8	137	0.60%	61.471	414.016	15%	1.895	0.174

MODEL SCENARIO 1A
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
182	Collector	8	128	1.10%	0.78	576.353	0%	0.642	0.018
183	Collector	8	416	0.60%	0.78	423.617	0%	0.518	0.021
184	Interceptor	10	307	0.20%	62.251	425.244	15%	1.241	0.215
185	Collector	8	384	0.50%	0	397.73	0%	0	0
186	Collector	8	400	0.50%	0	399.091	0%	0	0
187	Collector	8	298	0.50%	3.125	372.303	1%	0.723	0.043
188	Interceptor	10	595	0.10%	15.62	323.105	5%	0.681	0.125
189	Collector	10	601	0.60%	9.454	775.365	1%	1.08	0.065
191	Collector	8	298	0.30%	12.497	319.011	4%	0.987	0.09
192	Collector	8	295	0.30%	9.372	294.242	3%	0.855	0.082
193	Collector	8	295	0.20%	9.372	262.021	4%	0.789	0.086
194	Collector	8	627	0.20%	26.59	240.211	11%	1.01	0.15
195	Collector	8	592	0.40%	21.123	348.304	6%	1.227	0.111
196	Collector	8	270	0.30%	13.595	281.961	5%	0.928	0.1
197	Collector	8	298	0.80%	0	471.48	0%	0	0
198	Collector	8	310	0.80%	8.592	487.041	2%	1.185	0.062
199	Collector	8	307	0.40%	0.829	345.43	0%	0.458	0.024
200	Collector	8	306	0.30%	19.763	316.37	6%	1.124	0.113
201	Collector	8	169	0.30%	0	312.46	0%	0	0
202	Collector	8	58	0.30%	0	312.13	0%	0	0
203	Collector	8	293	0.00%	0.126	52.22	0%	0.069	0.024
204	Collector	8	211	0.50%	11.276	368.20	3%	1.058	0.08
205	Collector	8	234	0.30%	39.955	295.70	14%	1.317	0.166
206	Collector	8	226	0.40%	0	363.856	0%	0	0
207	Collector	8	231	0.40%	45.42	325.67	14%	1.464	0.168
208	Collector	8	189	1.50%	14.401	656.916	2%	1.707	0.068
209	Collector	8	111	0.50%	63.726	373.85	17%	1.78	0.186
210	Collector	8	66	-3.60%	66.851		100%	0.427	0.667
211	Collector	8	134	0.40%	1.56	362.61	0%	0.575	0.032
212	Collector	8	46	0.10%	68.411	194.99	35%	1.135	0.273
213	Collector	8	320	0.40%	69.317	346.94	20%	1.728	0.202
214	Collector	8	310	0.40%	73.172	332.98	22%	1.704	0.212
215	Collector	8	291	0.40%	77.077	364.24	21%	1.844	0.208
216	Collector	8	293	0.30%	1.927	312.35	1%	0.553	0.037
217	Collector	8	352	0.50%	0	380.83	0%	0	0
218	Collector	8	37	-0.20%	0		0%	0	0
219	Interceptor	10	400	0.30%	63.811	522.29	12%	1.446	0.197
220	Interceptor	10	400	0.10%	64.591	357.523	18%	1.108	0.24
221	Interceptor	10	399	0.20%	64.591	439.33	15%	1.283	0.216
222	Interceptor	10	401	0.10%	66.151	285.27	23%	0.948	0.273
223	Collector	8	321	0.30%	0	283.86	0%	0	0
224	Interceptor	10	625	0.10%	17.965	323.93	6%	0.711	0.133

MODEL SCENARIO 1A
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
225	Interceptor	10	597	0.30%	27.337	580.45	5%	1.214	0.123
226	Collector	8	525	0.30%	0	312.359	0%	0	0
227	Collector	8	597	0.20%	16.683	240.27	7%	0.881	0.119
228	Collector	8	630	0.40%	14.59	362.92	4%	1.131	0.091
229	Collector	8	595	0.40%	10.659	342.18	3%	0.988	0.081
230	Collector	8	312	0.20%	28.12	240.64	12%	1.028	0.154
231	Collector	8	319	0.30%	24.215	289.66	8%	1.122	0.13
232	Collector	8	51	2.10%	23.435	788.276	3%	2.245	0.079
234	Collector	8	628	0.20%	8.107	260.26	3%	0.752	0.081
235	Collector	8	628	0.20%	40.644	235.203	17%	1.124	0.188
236	Collector	8	460	0.30%	0	312.39	0%	0	0
237	Collector	10	602	0.20%	54.764	459.591	12%	1.263	0.194
238	Collector	10	250	0.30%	63.531	533.17	12%	1.466	0.194
239	Collector	10	298	0.10%	65.096	361.575	18%	1.119	0.239
240	Collector	10	302	0.60%	66.656	768.51	9%	1.925	0.166
241	Collector	8	278	0.20%	1.56	219.507	1%	0.406	0.04
242	Collector	8	124	0.40%	3.905	336.82	1%	0.722	0.05
243	Collector	8	297	0.40%	88.379	349.273	25%	1.859	0.229
245	Collector	8	577	-0.80%	3.855		100%	0.025	0.667
246	Collector	8	327	0.30%	3.855	319.904	1%	0.694	0.051
247	Collector	8	287	0.50%	88.379	376.67	24%	1.963	0.22
250	Collector	8	70	0.90%	1.925	503.671	0%	0.77	0.03
251	Collector	8	111	0.40%	7.34	348.817	2%	0.895	0.067
252	Interceptor	10	399	0.20%	76.308	406.068	19%	1.273	0.245
253	Interceptor	10	163	0.10%	77.868	348.525	22%	1.147	0.268
256	Collector	10	595	0.40%	16.906	660.489	3%	1.151	0.092
257	Collector	10	59	0.90%	0	912.97	0%	0	0
258	Interceptor	12	625	0.20%	226.755	676.657	34%	1.729	0.399
259	Collector	8	207	0.20%	0	267.51	0%	0	0
260	Collector	8	183	0.40%	1.927	348.467	1%	0.596	0.036
261	Collector	10	278	0.50%	148.245	695.52	21%	2.258	0.261
262	Collector	8	629	0.10%	28.68	204.387	14%	0.92	0.169
263	Collector	8	280	0.40%	2.293	334.80	1%	0.612	0.039
266	Collector	10	299	0.40%	71.341	594.096	12%	1.637	0.195
267	Collector	10	302	0.30%	72.121	509.59	14%	1.472	0.212
268	Collector	10	297	0.30%	82.085	544.963	15%	1.603	0.219
269	Interceptor	8	85	0.40%	417.219	1,840.34	23%	2.703	0.405
270	Collector	8	270	0.30%	2.342	294.976	1%	0.564	0.042
272	Collector	8	162	0.50%	2.345	398.72	1%	0.695	0.037
273	Collector	8	101	0.50%	7.815	381.05	2%	0.97	0.066
274	Collector	8	218	0.50%	32.81	369.13	9%	1.455	0.134
275	Collector	8	272	0.40%	10.152	358.203	3%	1.005	0.077

MODEL SCENARIO 1A
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
276	Collector	8	390	0.50%	9.685	379.58	3%	1.032	0.073
277	Collector	8	171	0.80%	11.245	495.965	2%	1.302	0.069
278	Interceptor	10	238	0.20%	77.868	453.71	17%	1.385	0.234
279	Interceptor	10	399	0.10%	93.798	275.876	34%	1.019	0.335
280	Interceptor	10	363	0.20%	140.2	433.58	32%	1.58	0.326
281	Collector	8	201	0.50%	12.812	379.206	3%	1.122	0.084
282	Interceptor	10	37	0.00%	93.798	170.30	55%	0.712	0.441
283	Collector	8	286	0.50%	2.34	383.118	1%	0.676	0.037
284	Collector	8	196	-0.40%	0.78		100%	0.005	0.667
285	Collector	8	181	0.40%	0.78	357.953	0%	0.461	0.023
286	Collector	8	141	0.40%	9.687	350.15	3%	0.976	0.076
288	Collector	8	517	0.30%	21.09	303.728	7%	1.114	0.119
289	Collector	8	216	0.30%	21.09	316.27	7%	1.146	0.117
290	Collector	8	301	0.40%	3.855	333.829	1%	0.715	0.05
291	Collector	8	106	0.30%	24.945	314.01	8%	1.198	0.127
292	Collector	8	399	-0.10%	0		0%	0	0
293	Collector	8	159	0.70%	24.945	454.08	6%	1.553	0.106
295	Collector	8	401	0.20%	24.945	214.644	12%	0.915	0.153
296	Collector	8	398	0.20%	24.945	231.829	11%	0.967	0.148
297	Collector	8	326	0.40%	1.56	337.525	1%	0.547	0.033
298	Collector	8	275	0.40%	6.245	345.27	2%	0.847	0.062
299	Collector	8	380	0.10%	31.19	124.10	25%	0.659	0.228
300	Collector	8	34	0.60%	24.945	412.775	6%	1.453	0.111
301	Interceptor	10	375	0.10%	204.183	310.247	66%	1.353	0.493
302	Interceptor	10	391	0.10%	204.183	305.61	67%	1.337	0.498
303	Interceptor	10	573	0.10%	171.428	380.61	45%	1.514	0.392
304	Interceptor	10	315	0.30%	204.183	541.97	38%	2.058	0.354
305	Interceptor	10	241	0.00%	204.183	177.21	115%	0.834	0.833
306	Collector	8	300	1.00%	18.332	543.06	3%	1.606	0.084
307	Collector	8	194	0.90%	14.427	511.06	3%	1.433	0.077
308	Interceptor	15	519	0.30%	308.081	1,669.73	19%	2.313	0.364
309	Collector	8	592	0.30%	0	312.40	0%	0	0
310	Collector	8	320	0.30%	2.707	293.67	1%	0.587	0.045
311	Collector	8	295	0.40%	1.927	361.46	1%	0.612	0.035
312	Collector	8	336	0.30%	1.927	297.633	1%	0.535	0.038
313	Collector	8	327	0.40%	1.927	361.356	1%	0.612	0.035
314	Collector	8	250	0.50%	0	387.30	0%	0	0
315	Collector	8	302	0.40%	1.927	330.05	1%	0.574	0.037
316	Collector	8	316	0.60%	1.927	421.78	1%	0.681	0.033
317	Collector	8	297	0.20%	1.927	234.77	1%	0.453	0.043
318	Collector	8	341	0.30%	1.927	311.88	1%	0.552	0.038
320	Collector	8	348	0.50%	17.182	367.84	5%	1.199	0.098

MODEL SCENARIO 1A
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
321	Collector	8	226	0.40%	3.902	349.173	1%	0.74	0.05
322	Collector	8	173	0.40%	5.782	335.813	2%	0.811	0.061
323	Collector	8	137	0.30%	5.782	315.656	2%	0.777	0.063
324	Collector	8	265	0.50%	1.927	386.51	1%	0.641	0.034
325	Collector	8	601	0.30%	1.927	319.387	1%	0.561	0.037
327	Collector	8	504	0.30%	5.415	296.818	2%	0.73	0.063
328	Collector	8	305	0.30%	2.84	315.794	1%	0.627	0.045
331	Collector	8	337	0.50%	3.407	378.877	1%	0.752	0.045
332	Collector	8	234	0.30%	34.133	292.031	12%	1.247	0.154
333	Collector	8	52	0.80%	34.133	482.646	7%	1.779	0.12
334	Collector	8	159	0.40%	34.133	351.029	10%	1.421	0.14
335	Collector	8	271	0.20%	31.013	258.253	12%	1.112	0.156
336	Collector	8	105	0.40%	30.047	331.329	9%	1.314	0.136
337	Collector	8	293	0.40%	2.812	364.399	1%	0.69	0.042
338	Collector	8	355	0.30%	0	318.991	0%	0	0
339	Collector	8	496	0.30%	0	312.363	0%	0	0
340	Interceptor	15	304	0.20%	310.614	1341.543	23%	1.982	0.409
341	Interceptor	15	312	0.10%	311.394	1037.86	30%	1.647	0.469
342	Interceptor	15	335	0.10%	395.819	886.702	45%	1.564	0.585
343	Interceptor	15	302	0.30%	395.819	1542.364	26%	2.345	0.432
344	Collector	8	594	0.20%	28.199	212.457	13%	0.941	0.164
345	Collector	8	595	0.20%	39.917	255.154	16%	1.186	0.178
346	Collector	8	594	0.30%	14.756	320.165	5%	1.039	0.097
347	Collector	8	548	0.30%	3.905	312.41	1%	0.685	0.052
348	Collector	10	319	-0.10%	145.12		100%	0.593	0.833
349	Collector	12	595	0.20%	58.252	757.989	8%	1.273	0.188
350	Collector	12	327	0.10%	87.961	532.931	17%	1.118	0.275
351	Collector	12	268	0.70%	87.961	1373.928	6%	2.186	0.171
352	Collector	8	269	0.90%	0	512.067	0%	0	0
353	Collector	8	196	0.30%	0	300.69	0%	0	0
354	Collector	8	281	1.10%	0	572.91	0%	0	0
355	Collector	8	62	-0.80%	0		100%	0	0
356	Collector	8	146	1.80%	2.159	719.73	0%	1.022	0.027
357	Interceptor	10	180	0.30%	80.993	561.2	14%	1.631	0.214
358	Collector	8	103	0.10%	7.815	185.636	4%	0.587	0.093
359	Collector	8	307	0.80%	3.855	491.052	1%	0.935	0.042
360	Collector	8	235	0.40%	8.907	362.832	3%	0.975	0.072
361	Collector	8	262	0.20%	20.31	268.308	8%	1.009	0.124
362	Collector	8	247	0.40%	19.53	355.319	6%	1.216	0.106
363	Collector	8	217	0.30%	0	312.301	0%	0	0
364	Collector	8	326	0.30%	6.615	320.65	2%	0.818	0.066
365	Collector	8	217	0.40%	0	331.679	0%	0	0

MODEL SCENARIO 1A
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
366	Interceptor	10	290	0.50%	71.618	723.288	10%	1.884	0.177
367	Collector	8	361	0.40%	3.125	341.421	1%	0.681	0.045
368	Collector	8	87	0.00%	6.161		100%	0.039	0.667
369	Collector	8	315	1.50%	8.175	655.284	1%	1.436	0.052
370	Collector	8	248	0.30%	24.945	291.422	9%	1.136	0.132
371	Collector	8	151	-0.40%	24.945		100%	0.159	0.667
372	Interceptor	10	403	0.20%	204.183	415.62	49%	1.69	0.412
373	Interceptor	10	402	0.10%	204.183	343.895	59%	1.465	0.462
374	Collector	8	297	0.10%	2.258	182.894	1%	0.4	0.052
375	Collector	8	592	0.10%	14.756	192.832	8%	0.728	0.125
376	Collector	10	595	0.20%	181.612	482.674	38%	1.832	0.354
377	Collector	10	595	0.50%	88.557	689.043	13%	1.936	0.202
378	Collector	12	566	0.40%	2.384	1036.113	0%	0.603	0.035
379	Collector	12	338	0.10%	96.512	448.86	22%	1.015	0.315
380	Collector	8	350	0.70%	8.541	453.8	2%	1.126	0.063
381	Interceptor	10	629	0.50%	64.42	684.205	9%	1.756	0.173
382	Collector	12	617	0.30%	2.532	879.003	0%	0.548	0.039
383	Collector	8	205	0.30%	0	287.423	0%	0	0
384	Collector	8	480	0.30%	1.927	312.354	1%	0.553	0.037
385	Collector	8	589	0.60%	7.342	412.265	2%	1.006	0.062
386	Collector	8	367	0.20%	31.19	216.811	14%	0.983	0.171
387	Collector	8	110	0.40%	5.782	342.504	2%	0.823	0.06
388	Collector	8	123	0.60%	5.782	430.713	1%	0.965	0.054
389	Collector	8	126	0.20%	1.927	231.95	1%	0.449	0.043
390	Collector	8	176	0.40%	24.987	340.564	7%	1.269	0.122
391	Collector	8	215	0.50%	3.125	382.659	1%	0.737	0.043
392	Collector	8	225	0.40%	8.59	342.809	3%	0.927	0.073
393	Collector	8	87	-0.10%	34.133		100%	0.218	0.667
394	Collector	8	157	0.40%	2.812	328.605	1%	0.642	0.044
395	Collector	8	240	0.40%	36.05	324.547	11%	1.366	0.15
396	Collector	8	80	0.00%	0		0%	0	0
397	Collector	8	110	5.80%	0	1305.235	0%	0	0
398	Interceptor	8	94	0.40%	417.219	1840.809	23%	2.703	0.405
399	Collector	10	279	0.30%	1.56	536.195	0%	0.483	0.033
400	Collector	10	299	0.30%	67.436	502.848	13%	1.43	0.206
401	Collector	8	160	2.00%	2.578	774.803	0%	1.136	0.028
402	Collector	8	158	0.10%	2.578	180.403	1%	0.412	0.056
403	Collector	8	298	0.40%	11.715	364.02	3%	1.062	0.082
404	Collector	8	116	0.40%	0	348.065	0%	0	0
405	Collector	8	151	0.30%	1.56	295.79	1%	0.499	0.035
406	Collector	8	246	0.30%	1.56	295.64	1%	0.499	0.035
407	Collector	8	405	0.30%	1.56	295.722	1%	0.499	0.035

MODEL SCENARIO 1A
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
408	Collector	8	181	0.30%	1.56	295.76	1%	0.499	0.035
409	Collector	8	177	0.30%	1.56	295.71	1%	0.499	0.035
410	Collector	8	257	0.30%	1.56	295.809	1%	0.499	0.035
411	Collector	8	199	0.30%	3.12	295.76	1%	0.616	0.048
412	Collector	8	716	0.30%	21.875	315.07	7%	1.155	0.119
413	Collector	8	284	0.30%	21.875	312.361	7%	1.148	0.119
414	Collector	8	174	0.30%	19.53	312.38	6%	1.11	0.113
417	Collector	8	206	0.30%	19.53	312.78	6%	1.111	0.113
420	Collector	8	80	1.10%	3.855	560.71	1%	1.025	0.039
421	Collector	8	105	0.30%	3.855	312.47	1%	0.682	0.052
423	Collector	8	375	0.30%	3.855	312.35	1%	0.682	0.052
424	Collector	8	79	2.40%	4.635	836.631	1%	1.433	0.036
425	Collector	8	16	1.00%	0	544.782	0%	0	0
426	Collector	8	9	0.30%	0	312.421	0%	0	0
428	Collector	8	185	0.30%	0	312.395	0%	0	0
430	Collector	8	201	0.30%	3.125	312.472	1%	0.64	0.047
431	Collector	8	297	0.30%	3.125	297.775	1%	0.619	0.048
433	Collector	8	54	0.30%	92.284	312.284	30%	1.735	0.248
443	Collector	8	1195	0.30%	24.945	312.392	8%	1.194	0.127
447	Interceptor	10	68	0.20%	204.183	484.75	42%	1.895	0.377
449	Interceptor	10	5	0.40%	204.183	623.59	33%	2.28	0.328
465	Collector	8	491	0.30%	0	312.398	0%	0	0
467	Collector	8	157	0.30%	0	312.418	0%	0	0
471	Collector	8	281	0.30%	0	312.36	0%	0	0
479	Collector	8	194	0.30%	0	312.43	0%	0	0
495	Collector	8	118	0.80%	2.159	483.212	0%	0.775	0.032
501	Well Connection	10	5	0.90%	308.081	935.39	33%	3.426	0.329
515	Interceptor	36	10	0.00%	417.219	949.207	44%	0.29	1.392
517	Interceptor	36	10	0.00%	204.183	949.207	22%	0.238	0.945
519	Collector	8	654	0.10%	6.607	207.93	3%	0.604	0.081
521	Collector	8	306	0.50%	2.578	368.686	1%	0.678	0.04

MODEL SCENARIO 1B
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
1	Interceptor	10	599	0.40%	33.74	610.42	6%	1.34	0.13
2	Collector	8	623	0.40%	27.99	344.04	8%	1.32	0.13
3	Collector	8	595	0.40%	18.78	334.25	6%	1.15	0.11
4	Collector	8	339	0.30%	0.00	312.33	0%	0.00	0.00
6	Collector	8	392	0.40%	2.50	331.04	1%	0.62	0.04
7	Collector	8	305	0.40%	10.00	331.85	3%	0.95	0.08
8	Collector	8	628	0.50%	123.37	390.36	32%	2.21	0.26
9	Collector	8	333	0.60%	8.75	413.46	2%	1.06	0.07
10	Collector	12	357	0.20%	154.42	718.56	22%	1.62	0.32
11	Collector	8	692	0.10%	1.18	135.23	1%	0.27	0.04
12	Collector	8	601	0.10%	25.58	202.98	13%	0.89	0.16
14	Collector	8	369	0.50%	5.50	401.50	1%	0.91	0.06
15	Collector	8	215	0.30%	0.00	312.40	0%	0.00	0.00
16	Collector	8	236	0.50%	17.49	395.57	4%	1.27	0.10
17	Collector	8	381	0.40%	30.19	347.29	9%	1.36	0.13
18	Collector	8	264	0.40%	2.50	355.61	1%	0.65	0.04
19	Collector	8	218	0.30%	0.00	318.19	0%	0.00	0.00
20	Collector	8	238	1.20%	2.29	593.00	0%	0.91	0.03
21	Collector	8	146	0.40%	0.00	361.84	0%	0.00	0.00
22	Collector	8	299	0.30%	1.45	281.99	1%	0.47	0.03
23	Collector	8	293	0.50%	5.00	365.98	1%	0.82	0.06
24	Collector	8	307	0.40%	0.00	358.21	0%	0.00	0.00
25	Collector	8	243	0.30%	0.00	312.45	0%	0.00	0.00
26	Collector	8	202	0.30%	0.00	312.34	0%	0.00	0.00
27	Collector	8	454	0.30%	0.00	312.38	0%	0.00	0.00
28	Collector	8	121	0.30%	0.00	312.24	0%	0.00	0.00
29	Collector	8	133	0.30%	0.00	312.48	0%	0.00	0.00
30	Collector	8	328	0.40%	5.00	351.80	1%	0.80	0.06
31	Collector	8	301	0.40%	141.41	338.13	42%	2.06	0.30
32	Collector	8	336	0.30%	8.66	312.32	3%	0.87	0.08
33	Collector	8	226	0.30%	0.00	312.39	0%	0.00	0.00
34	Collector	8	329	0.90%	3.75	522.71	1%	0.97	0.04
35	Collector	8	144	0.30%	3.08	312.28	1%	0.64	0.05
36	Collector	8	612	0.40%	32.99	364.53	9%	1.45	0.14
37	Collector	10	328	0.40%	133.83	650.44	21%	2.09	0.26
38	Collector	8	264	0.20%	6.25	264.73	2%	0.70	0.07
39	Collector	8	248	0.50%	3.08	398.51	1%	0.76	0.04
40	Collector	8	360	0.30%	9.25	277.52	3%	0.82	0.08
41	Collector	8	373	0.20%	1.47	241.61	1%	0.43	0.04
43	Collector	12	593	0.20%	68.30	678.74	10%	1.23	0.21
44	Collector	12	569	0.30%	0.00	921.01	0%	0.00	0.00
45	Collector	8	334	0.30%	0.00	312.43	0%	0.00	0.00
46	Collector	8	554	0.20%	26.24	269.35	10%	1.09	0.14
47	Collector	8	625	0.30%	0.00	312.36	0%	0.00	0.00
48	Collector	8	315	0.30%	29.99	272.47	11%	1.14	0.15
49	Collector	6	555	0.30%	5.12	141.63	4%	0.76	0.07

MODEL SCENARIO 1B
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
50	Collector	8	321	0.50%	5.00	378.75	1%	0.84	0.05
51	Collector	8	632	0.30%	0.00	312.37	0%	0.00	0.00
52	Interceptor	10	599	0.20%	21.24	465.60	5%	0.96	0.12
53	Collector	8	620	0.10%	8.35	129.79	6%	0.47	0.12
54	Collector	8	410	0.30%	0.00	312.34	0%	0.00	0.00
55	Collector	8	623	0.10%	10.82	192.52	6%	0.66	0.11
56	Collector	8	627	0.40%	2.50	361.02	1%	0.66	0.04
57	Collector	8	354	0.30%	3.08	312.34	1%	0.64	0.05
58	Collector	8	429	0.30%	0.00	312.38	0%	0.00	0.00
59	Interceptor	10	596	0.40%	64.32	589.70	11%	1.58	0.19
60	Interceptor	15	644	0.10%	496.98	1060.32	47%	1.89	0.60
61	Collector	8	349	0.40%	0.00	361.01	0%	0.00	0.00
62	Collector	8	271	0.40%	11.25	345.84	3%	1.01	0.08
64	Collector	8	157	0.40%	3.75	351.35	1%	0.74	0.05
65	Collector	8	401	0.40%	42.48	344.74	12%	1.50	0.16
66	Collector	8	169	0.60%	44.97	408.96	11%	1.72	0.15
67	Interceptor	10	41	-0.10%	229.31		100%	0.94	0.83
68	Interceptor	10	397	0.20%	223.07	424.17	53%	1.76	0.43
69	Collector	8	300	0.40%	19.25	342.34	6%	1.18	0.11
70	Collector	8	217	0.30%	0.00	312.30	0%	0.00	0.00
73	Collector	8	238	0.50%	3.08	392.86	1%	0.75	0.04
74	Collector	8	347	0.40%	25.00	355.76	7%	1.31	0.12
75	Collector	8	236	0.40%	7.50	363.69	2%	0.93	0.07
76	Collector	8	180	0.50%	6.25	373.94	2%	0.90	0.06
77	Collector	8	383	0.40%	10.00	348.23	3%	0.98	0.08
78	Collector	8	257	0.30%	2.50	285.58	1%	0.56	0.04
79	Interceptor	12	629	0.20%	68.30	715.39	10%	1.28	0.21
80	Collector	8	903	0.30%	6.17	300.21	2%	0.77	0.07
81	Collector	8	649	0.30%	33.74	303.62	11%	1.28	0.15
83	Collector	8	239	0.20%	39.91	241.99	17%	1.14	0.18
84	Collector	8	1391	0.30%	39.91	289.02	14%	1.30	0.17
85	Collector	8	400	0.30%	39.91	314.04	13%	1.37	0.16
86	Collector	8	327	0.40%	4.99	343.03	2%	0.79	0.06
87	Collector	8	223	0.40%	37.48	344.00	11%	1.44	0.15
88	Collector	8	173	0.70%	2.50	459.78	1%	0.78	0.04
89	Interceptor	10	400	0.00%	326.69	180.37	181%	1.34	0.83
90	Interceptor	10	741	0.20%	276.79	436.00	64%	1.89	0.48
91	Collector	8	373	0.70%	1.25	445.82	0%	0.62	0.03
92	Collector	8	240	0.40%	15.50	360.92	4%	1.15	0.09
93	Collector	8	340	0.30%	0.00	312.65	0%	0.00	0.00
94	Collector	8	217	0.50%	5.00	367.78	1%	0.83	0.05
95	Interceptor	10	398	0.20%	118.34	430.72	28%	1.50	0.30
96	Collector	8	262	0.20%	78.36	243.08	32%	1.38	0.26
97	Collector	8	361	0.40%	11.25	338.93	3%	1.00	0.08
98	Collector	8	417	0.30%	18.74	298.78	6%	1.06	0.11
99	Collector	8	390	0.20%	6.25	226.43	3%	0.63	0.08

MODEL SCENARIO 1B
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
100	Collector	8	449	0.40%	5.00	338.22	2%	0.78	0.06
101	Collector	8	399	1.90%	0.00	746.25	0%	0.00	0.00
102	Collector	8	353	0.50%	0.00	379.90	0%	0.00	0.00
103	Collector	8	235	2.80%	0.00	908.81	0%	0.00	0.00
104	Collector	8	588	2.00%	19.33	770.89	3%	2.09	0.07
105	Collector	8	301	0.00%	3.74		100%	0.02	0.67
106	Collector	8	432	0.20%	1.25	261.73	1%	0.43	0.03
107	Collector	8	872	0.40%	2.50	362.99	1%	0.66	0.04
108	Collector	8	407	0.30%	3.75	299.62	1%	0.66	0.05
109	Collector	8	236	0.70%	0.00	443.20	0%	0.00	0.00
110	Collector	8	491	0.30%	0.00	312.40	0%	0.00	0.00
111	Collector	8	299	0.00%	1.33	58.03	2%	0.15	0.07
112	Collector	8	581	0.30%	0.00	312.36	0%	0.00	0.00
113	Collector	8	295	0.60%	25.37	420.12	6%	1.48	0.11
114	Collector	8	157	0.30%	0.00	312.42	0%	0.00	0.00
115	Collector	8	508	0.30%	41.62	312.38	13%	1.39	0.16
116	Collector	8	390	0.40%	109.46	362.25	30%	2.03	0.25
117	Collector	8	269	0.40%	0.00	343.67	0%	0.00	0.00
118	Collector	8	89	0.60%	0.00	418.46	0%	0.00	0.00
119	Collector	8	157	0.50%	0.00	380.71	0%	0.00	0.00
121	Collector	8	240	0.40%	1.55	321.81	1%	0.53	0.03
122	Collector	8	724	0.30%	0.00	312.37	0%	0.00	0.00
123	Collector	8	477	0.20%	1.25	211.68	1%	0.37	0.04
124	Collector	8	287	0.50%	145.16	369.47	39%	2.22	0.29
125	Collector	10	624	0.10%	98.19	356.32	28%	1.24	0.30
126	Collector	8	303	0.40%	6.17	360.50	2%	0.87	0.06
127	Collector	8	177	0.50%	6.25	376.98	2%	0.90	0.06
128	Collector	8	289	0.30%	2.50	317.20	1%	0.60	0.04
129	Collector	8	270	0.30%	0.00	312.47	0%	0.00	0.00
130	Collector	8	915	0.20%	1.61	264.22	1%	0.47	0.04
131	Collector	8	61	0.30%	0.00	312.02	0%	0.00	0.00
132	Collector	8	194	0.30%	0.00	312.43	0%	0.00	0.00
133	Collector	12	566	0.20%	148.17	658.48	23%	1.51	0.32
134	Collector	12	339	0.30%	0.00	921.06	0%	0.00	0.00
135	Collector	12	467	0.30%	0.00	921.01	0%	0.00	0.00
137	Collector	8	283	1.30%	0.00	620.49	0%	0.00	0.00
138	Interceptor	10	322	0.30%	0.00	580.47	0%	0.00	0.00
139	Collector	8	300	0.20%	6.25	245.55	3%	0.67	0.07
140	Collector	8	185	1.30%	0.00	612.68	0%	0.00	0.00
141	Collector	8	280	0.40%	1.25	332.04	0%	0.51	0.03
142	Collector	8	297	0.60%	6.25	428.56	2%	0.99	0.06
143	Collector	8	277	0.70%	14.33	443.92	3%	1.30	0.08
144	Collector	8	335	4.50%	18.08	1156.83	2%	2.71	0.06
145	Collector	8	343	0.30%	19.33	285.82	7%	1.04	0.12
146	Collector	8	60	2.50%	23.08	864.17	3%	2.38	0.08
147	Collector	8	46	5.30%	23.08	1255.60	2%	3.09	0.06

MODEL SCENARIO 1B
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
148	Collector	8	112	2.20%	0.00	808.44	0%	0.00	0.00
149	Collector	8	123	1.90%	0.00	751.34	0%	0.00	0.00
150	Collector	8	293	0.00%	0.00	52.23	0%	0.00	0.00
151	Collector	8	225	0.40%	0.00	341.32	0%	0.00	0.00
152	Collector	8	235	0.50%	0.00	365.30	0%	0.00	0.00
153	Collector	8	319	0.40%	14.87	324.50	5%	1.05	0.10
154	Collector	8	186	0.20%	18.62	267.55	7%	0.98	0.12
155	Collector	8	336	0.20%	3.75	270.59	1%	0.61	0.06
156	Collector	8	262	0.30%	6.12	296.36	2%	0.76	0.07
157	Collector	8	237	1.30%	3.74	617.27	1%	1.09	0.04
158	Collector	8	514	0.30%	1.25	310.27	0%	0.48	0.03
159	Collector	8	419	0.20%	0.00	251.52	0%	0.00	0.00
160	Collector	8	402	0.50%	1.25	398.16	0%	0.57	0.03
161	Collector	8	365	0.60%	1.25	417.72	0%	0.59	0.03
162	Collector	8	297	0.00%	1.25		100%	0.01	0.67
163	Collector	8	302	0.30%	1.25	314.58	0%	0.49	0.03
164	Collector	8	301	0.20%	1.25	270.03	1%	0.44	0.03
165	Collector	8	301	0.20%	33.08	254.27	13%	1.12	0.16
166	Collector	8	352	0.20%	39.32	225.77	17%	1.08	0.19
167	Collector	8	398	0.20%	43.08	212.10	20%	1.06	0.20
170	Collector	8	358	0.30%	13.45	277.10	5%	0.91	0.10
172	Collector	8	173	0.40%	2.50	360.34	1%	0.66	0.04
173	Collector	8	114	0.50%	1.25	392.86	0%	0.57	0.03
174	Collector	8	247	0.50%	3.74	384.93	1%	0.78	0.05
175	Collector	8	210	0.40%	8.74	359.88	2%	0.96	0.07
176	Collector	8	133	0.20%	13.04	270.83	5%	0.89	0.10
178	Collector	8	397	0.20%	54.61	257.80	21%	1.31	0.21
179	Collector	8	352	0.30%	60.86	291.28	21%	1.47	0.21
180	Collector	8	395	0.30%	67.11	278.18	24%	1.46	0.22
181	Collector	8	137	0.60%	98.35	414.02	24%	2.17	0.22
182	Collector	8	128	1.10%	1.25	576.35	0%	0.74	0.02
183	Collector	8	416	0.60%	1.25	423.62	0%	0.60	0.03
184	Interceptor	10	307	0.20%	99.60	425.24	23%	1.42	0.27
185	Collector	8	384	0.50%	0.00	397.73	0%	0.00	0.00
186	Collector	8	400	0.50%	0.00	399.09	0%	0.00	0.00
187	Collector	8	298	0.50%	5.00	372.30	1%	0.83	0.05
188	Interceptor	10	595	0.10%	24.99	323.11	8%	0.78	0.16
189	Collector	10	601	0.60%	15.12	775.37	2%	1.25	0.08
191	Collector	8	298	0.30%	20.00	319.01	6%	1.14	0.11
192	Collector	8	295	0.30%	15.00	294.24	5%	0.98	0.10
193	Collector	8	295	0.20%	15.00	262.02	6%	0.91	0.11
194	Collector	8	627	0.20%	42.54	240.21	18%	1.16	0.19
195	Collector	8	592	0.40%	33.80	348.30	10%	1.41	0.14
196	Collector	8	270	0.30%	21.75	281.96	8%	1.07	0.13
197	Collector	8	298	0.80%	0.00	471.48	0%	0.00	0.00
198	Collector	8	310	0.80%	13.75	487.04	3%	1.37	0.08

MODEL SCENARIO 1B
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
199	Collector	8	307	0.40%	1.33	345.43	0%	0.53	0.03
200	Collector	8	306	0.30%	31.62	316.37	10%	1.29	0.14
201	Collector	8	169	0.30%	0.00	312.46	0%	0.00	0.00
202	Collector	8	58	0.30%	0.00	312.13	0%	0.00	0.00
203	Collector	8	293	0.00%	0.20	52.22	0%	0.08	0.03
204	Collector	8	211	0.50%	18.04	368.20	5%	1.22	0.10
205	Collector	8	234	0.30%	63.93	295.70	22%	1.51	0.21
206	Collector	8	226	0.40%	0.00	363.86	0%	0.00	0.00
207	Collector	8	231	0.40%	72.67	325.67	22%	1.67	0.21
208	Collector	8	189	1.50%	23.04	656.92	4%	1.97	0.09
209	Collector	8	111	0.50%	101.96	373.85	27%	2.03	0.24
210	Collector	8	66	-3.60%	106.96		100%	0.68	0.67
211	Collector	8	134	0.40%	2.50	362.61	1%	0.66	0.04
212	Collector	8	46	0.10%	109.46	194.99	56%	1.28	0.36
213	Collector	8	320	0.40%	110.91	346.94	32%	1.97	0.26
214	Collector	8	310	0.40%	117.08	332.98	35%	1.94	0.27
215	Collector	8	291	0.40%	123.32	364.24	34%	2.10	0.27
216	Collector	8	293	0.30%	3.08	312.35	1%	0.64	0.05
217	Collector	8	352	0.50%	0.00	380.83	0%	0.00	0.00
218	Collector	8	37	-0.20%	0.00		100%	0.00	0.00
219	Interceptor	10	400	0.30%	102.10	522.29	20%	1.66	0.25
220	Interceptor	10	400	0.10%	103.35	357.52	29%	1.26	0.31
221	Interceptor	10	399	0.20%	103.35	439.33	24%	1.47	0.28
222	Interceptor	10	401	0.10%	105.84	285.27	37%	1.08	0.35
223	Collector	8	321	0.30%	0.00	283.86	0%	0.00	0.00
224	Interceptor	10	625	0.10%	28.74	323.93	9%	0.82	0.17
225	Interceptor	10	597	0.30%	43.74	580.45	8%	1.40	0.16
226	Collector	8	525	0.30%	0.00	312.36	0%	0.00	0.00
227	Collector	8	597	0.20%	26.70	240.27	11%	1.01	0.15
228	Collector	8	630	0.40%	23.35	362.92	6%	1.30	0.12
229	Collector	8	595	0.40%	17.06	342.18	5%	1.14	0.10
230	Collector	8	312	0.20%	44.99	240.64	19%	1.18	0.20
231	Collector	8	319	0.30%	38.74	289.66	13%	1.29	0.17
232	Collector	8	51	2.10%	37.50	788.28	5%	2.58	0.10
234	Collector	8	628	0.20%	12.97	260.26	5%	0.87	0.10
235	Collector	8	628	0.20%	64.15	235.20	27%	1.28	0.24
236	Collector	8	460	0.30%	0.00	312.39	0%	0.00	0.00
237	Collector	10	602	0.20%	87.62	459.59	19%	1.45	0.25
238	Collector	10	250	0.30%	101.65	533.17	19%	1.68	0.25
239	Collector	10	298	0.10%	104.15	361.58	29%	1.28	0.31
240	Collector	10	302	0.60%	106.65	768.51	14%	2.21	0.21
241	Collector	8	278	0.20%	2.50	219.51	1%	0.47	0.05
242	Collector	8	124	0.40%	6.25	336.82	2%	0.83	0.06
243	Collector	8	297	0.40%	141.41	349.27	41%	2.11	0.30
245	Collector	8	577	-0.80%	6.17		100%	0.04	0.67
246	Collector	8	327	0.30%	6.17	319.90	2%	0.80	0.06

MODEL SCENARIO 1B
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
247	Collector	8	287	0.50%	141.41	376.67	38%	2.23	0.28
250	Collector	8	70	0.90%	3.08	503.67	1%	0.89	0.04
251	Collector	8	111	0.40%	11.74	348.82	3%	1.03	0.08
252	Interceptor	10	399	0.20%	122.09	406.07	30%	1.45	0.31
253	Interceptor	10	163	0.10%	124.59	348.53	36%	1.31	0.34
256	Collector	10	595	0.40%	27.05	660.49	4%	1.33	0.12
257	Collector	10	59	0.90%	0.00	912.97	0%	0.00	0.00
258	Interceptor	12	625	0.20%	362.80	676.66	54%	1.95	0.52
259	Collector	8	207	0.20%	0.00	267.51	0%	0.00	0.00
260	Collector	8	183	0.40%	3.08	348.47	1%	0.69	0.04
261	Collector	10	278	0.50%	236.31	695.52	34%	2.57	0.34
262	Collector	8	629	0.10%	45.70	204.39	22%	1.05	0.21
263	Collector	8	280	0.40%	3.66	334.80	1%	0.71	0.05
266	Collector	10	299	0.40%	114.15	594.10	19%	1.87	0.25
267	Collector	10	302	0.30%	115.39	509.59	23%	1.68	0.27
268	Collector	10	297	0.30%	131.34	544.96	24%	1.83	0.28
269	Interceptor	8	85	0.40%	667.55	1840.34	36%	3.08	0.52
270	Collector	8	270	0.30%	3.75	294.98	1%	0.65	0.05
272	Collector	8	162	0.50%	3.75	398.72	1%	0.80	0.05
273	Collector	8	101	0.50%	12.50	381.05	3%	1.12	0.08
274	Collector	8	218	0.50%	52.50	369.13	14%	1.67	0.17
275	Collector	8	272	0.40%	16.24	358.20	5%	1.16	0.10
276	Collector	8	390	0.50%	15.50	379.58	4%	1.19	0.09
277	Collector	8	171	0.80%	17.99	495.97	4%	1.50	0.09
278	Interceptor	10	238	0.20%	124.59	453.71	28%	1.58	0.30
279	Interceptor	10	399	0.10%	150.08	275.88	54%	1.15	0.44
280	Interceptor	10	363	0.20%	224.32	433.58	52%	1.79	0.43
281	Collector	8	201	0.50%	20.50	379.21	5%	1.29	0.11
282	Interceptor	10	37	0.00%	150.08	170.30	88%	0.79	0.61
283	Collector	8	286	0.50%	3.74	383.12	1%	0.78	0.05
284	Collector	8	196	-0.40%	1.25		100%	0.01	0.67
285	Collector	8	181	0.40%	1.25	357.95	0%	0.53	0.03
286	Collector	8	141	0.40%	15.50	350.15	4%	1.12	0.10
288	Collector	8	517	0.30%	33.74	303.73	11%	1.28	0.15
289	Collector	8	216	0.30%	33.74	316.27	11%	1.32	0.15
290	Collector	8	301	0.40%	6.17	333.83	2%	0.82	0.06
291	Collector	8	106	0.30%	39.91	314.01	13%	1.37	0.16
292	Collector	8	399	-0.10%	0.00		100%	0.00	0.00
293	Collector	8	159	0.70%	39.91	454.08	9%	1.79	0.13
295	Collector	8	401	0.20%	39.91	214.64	19%	1.05	0.20
296	Collector	8	398	0.20%	39.91	231.83	17%	1.11	0.19
297	Collector	8	326	0.40%	2.50	337.53	1%	0.63	0.04
298	Collector	8	275	0.40%	9.99	345.27	3%	0.98	0.08
299	Collector	8	380	0.10%	49.90	124.10	40%	0.75	0.29
300	Collector	8	34	0.60%	39.91	412.78	10%	1.67	0.14
301	Interceptor	10	375	0.10%	326.69	310.25	105%	1.34	0.83

MODEL SCENARIO 1B
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
302	Interceptor	10	391	0.10%	326.69	305.61	107%	1.34	0.83
303	Interceptor	10	573	0.10%	274.29	380.61	72%	1.69	0.52
304	Interceptor	10	315	0.30%	326.69	541.97	60%	2.32	0.47
305	Interceptor	10	241	0.00%	326.69	177.21	184%	1.34	0.83
306	Collector	8	300	1.00%	29.33	543.06	5%	1.85	0.11
307	Collector	8	194	0.90%	23.08	511.06	5%	1.65	0.10
308	Interceptor	15	519	0.30%	492.92	1669.73	30%	2.64	0.47
309	Collector	8	592	0.30%	0.00	312.40	0%	0.00	0.00
310	Collector	8	320	0.30%	4.33	293.67	2%	0.68	0.06
311	Collector	8	295	0.40%	3.08	361.46	1%	0.71	0.04
312	Collector	8	336	0.30%	3.08	297.63	1%	0.62	0.05
313	Collector	8	327	0.40%	3.08	361.36	1%	0.71	0.04
314	Collector	8	250	0.50%	0.00	387.30	0%	0.00	0.00
315	Collector	8	302	0.40%	3.08	330.05	1%	0.66	0.05
316	Collector	8	316	0.60%	3.08	421.78	1%	0.79	0.04
317	Collector	8	297	0.20%	3.08	234.77	1%	0.52	0.05
318	Collector	8	341	0.30%	3.08	311.88	1%	0.64	0.05
320	Collector	8	348	0.50%	27.49	367.84	8%	1.38	0.12
321	Collector	8	226	0.40%	6.24	349.17	2%	0.85	0.06
322	Collector	8	173	0.40%	9.25	335.81	3%	0.94	0.08
323	Collector	8	137	0.30%	9.25	315.66	3%	0.90	0.08
324	Collector	8	265	0.50%	3.08	386.51	1%	0.74	0.04
325	Collector	8	601	0.30%	3.08	319.39	1%	0.65	0.05
327	Collector	8	504	0.30%	8.66	296.82	3%	0.84	0.08
328	Collector	8	305	0.30%	4.54	315.79	1%	0.72	0.06
331	Collector	8	337	0.50%	5.45	378.88	1%	0.87	0.06
332	Collector	8	234	0.30%	54.61	292.03	19%	1.43	0.20
333	Collector	8	52	0.80%	54.61	482.65	11%	2.04	0.15
334	Collector	8	159	0.40%	54.61	351.03	16%	1.63	0.18
335	Collector	8	271	0.20%	49.62	258.25	19%	1.27	0.20
336	Collector	8	105	0.40%	48.08	331.33	15%	1.51	0.17
337	Collector	8	293	0.40%	4.50	364.40	1%	0.80	0.05
338	Collector	8	355	0.30%	0.00	318.99	0%	0.00	0.00
339	Collector	8	496	0.30%	0.00	312.36	0%	0.00	0.00
340	Interceptor	15	304	0.20%	496.98	1341.54	37%	2.25	0.53
341	Interceptor	15	312	0.10%	498.23	1037.86	48%	1.87	0.61
342	Interceptor	15	335	0.10%	633.31	886.70	71%	1.75	0.78
343	Interceptor	15	302	0.30%	633.31	1542.36	41%	2.66	0.56
344	Collector	8	594	0.20%	45.11	212.46	21%	1.08	0.21
345	Collector	8	595	0.20%	63.86	255.15	25%	1.35	0.23
346	Collector	8	594	0.30%	23.62	320.17	7%	1.20	0.12
347	Collector	8	548	0.30%	6.25	312.41	2%	0.79	0.07
348	Collector	10	319	-0.10%	231.31		100%	0.95	0.83
349	Collector	12	595	0.20%	94.09	757.99	12%	1.46	0.24
350	Collector	12	327	0.10%	140.74	532.93	26%	1.28	0.35
351	Collector	12	268	0.70%	140.74	1373.93	10%	2.51	0.22

MODEL SCENARIO 1B
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
352	Collector	8	269	0.90%	0.00	512.07	0%	0.00	0.00
353	Collector	8	196	0.30%	0.00	300.69	0%	0.00	0.00
354	Collector	8	281	1.10%	0.00	572.91	0%	0.00	0.00
355	Collector	8	62	-0.80%	0.00		100%	0.00	0.00
356	Collector	8	146	1.80%	3.46	719.73	1%	1.18	0.03
357	Interceptor	10	180	0.30%	129.59	561.20	23%	1.86	0.27
358	Collector	8	103	0.10%	12.50	185.64	7%	0.67	0.12
359	Collector	8	307	0.80%	6.17	491.05	1%	1.08	0.05
360	Collector	8	235	0.40%	14.25	362.83	4%	1.12	0.09
361	Collector	8	262	0.20%	32.50	268.31	12%	1.16	0.16
362	Collector	8	247	0.40%	31.25	355.32	9%	1.40	0.13
363	Collector	8	217	0.30%	0.00	312.30	0%	0.00	0.00
364	Collector	8	326	0.30%	10.58	320.65	3%	0.94	0.08
365	Collector	8	217	0.40%	0.00	331.68	0%	0.00	0.00
366	Interceptor	10	290	0.50%	114.59	723.29	16%	2.16	0.22
367	Collector	8	361	0.40%	5.00	341.42	2%	0.79	0.06
368	Collector	8	87	0.00%	9.87		100%	0.06	0.67
369	Collector	8	315	1.50%	13.08	655.28	2%	1.66	0.07
370	Collector	8	248	0.30%	39.91	291.42	14%	1.30	0.17
371	Collector	8	151	-0.40%	39.91		100%	0.26	0.67
372	Interceptor	10	403	0.20%	326.69	415.62	79%	1.88	0.56
373	Interceptor	10	402	0.10%	326.69	343.90	95%	1.60	0.65
374	Collector	8	297	0.10%	3.62	182.89	2%	0.46	0.07
375	Collector	8	592	0.10%	23.62	192.83	12%	0.84	0.16
376	Collector	10	595	0.20%	289.50	482.67	60%	2.06	0.47
377	Collector	10	595	0.50%	141.69	689.04	21%	2.22	0.26
378	Collector	12	566	0.40%	3.82	1036.11	0%	0.70	0.04
379	Collector	12	338	0.10%	154.42	448.86	34%	1.16	0.41
380	Collector	8	350	0.70%	13.66	453.80	3%	1.30	0.08
381	Interceptor	10	629	0.50%	103.07	684.21	15%	2.01	0.22
382	Collector	12	617	0.30%	4.06	879.00	1%	0.63	0.05
383	Collector	8	205	0.30%	0.00	287.42	0%	0.00	0.00
384	Collector	8	480	0.30%	3.08	312.35	1%	0.64	0.05
385	Collector	8	589	0.60%	11.75	412.27	3%	1.16	0.08
386	Collector	8	367	0.20%	49.90	216.81	23%	1.12	0.22
387	Collector	8	110	0.40%	9.25	342.50	3%	0.95	0.08
388	Collector	8	123	0.60%	9.25	430.71	2%	1.11	0.07
389	Collector	8	126	0.20%	3.08	231.95	1%	0.52	0.05
390	Collector	8	176	0.40%	39.98	340.56	12%	1.46	0.15
391	Collector	8	215	0.50%	5.00	382.66	1%	0.85	0.05
392	Collector	8	225	0.40%	13.74	342.81	4%	1.07	0.09
393	Collector	8	87	-0.10%	54.61		100%	0.35	0.67
394	Collector	8	157	0.40%	4.50	328.61	1%	0.74	0.06
395	Collector	8	240	0.40%	57.68	324.55	18%	1.56	0.19
396	Collector	8	80	0.00%	0.00		0%	0.00	0.00
397	Collector	8	110	5.80%	0.00	1305.24	0%	0.00	0.00

MODEL SCENARIO 1B
SEWER SYSTEM MODEL OUTPUT
2018 EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
398	Interceptor	8	94	0.40%	667.55	1840.81	36%	3.08	0.52
399	Collector	10	279	0.30%	2.50	536.20	1%	0.56	0.04
400	Collector	10	299	0.30%	107.90	502.85	22%	1.64	0.26
401	Collector	8	160	2.00%	4.13	774.80	1%	1.31	0.04
402	Collector	8	158	0.10%	4.13	180.40	2%	0.48	0.07
403	Collector	8	298	0.40%	18.74	364.02	5%	1.22	0.10
404	Collector	8	116	0.40%	0.00	348.07	0%	0.00	0.00
405	Collector	8	151	0.30%	2.50	295.79	1%	0.58	0.04
406	Collector	8	246	0.30%	2.50	295.64	1%	0.58	0.04
407	Collector	8	405	0.30%	2.50	295.72	1%	0.58	0.04
408	Collector	8	181	0.30%	2.50	295.76	1%	0.58	0.04
409	Collector	8	177	0.30%	2.50	295.71	1%	0.58	0.04
410	Collector	8	257	0.30%	2.50	295.81	1%	0.58	0.04
411	Collector	8	199	0.30%	4.99	295.76	2%	0.71	0.06
412	Collector	8	716	0.30%	35.00	315.07	11%	1.33	0.15
413	Collector	8	284	0.30%	35.00	312.36	11%	1.32	0.15
414	Collector	8	174	0.30%	31.25	312.38	10%	1.28	0.14
417	Collector	8	206	0.30%	31.25	312.78	10%	1.28	0.14
420	Collector	8	80	1.10%	6.17	560.71	1%	1.18	0.05
421	Collector	8	105	0.30%	6.17	312.47	2%	0.79	0.07
423	Collector	8	375	0.30%	6.17	312.35	2%	0.79	0.07
424	Collector	8	79	2.40%	7.42	836.63	1%	1.65	0.04
425	Collector	8	16	1.00%	0.00	544.78	0%	0.00	0.00
426	Collector	8	9	0.30%	0.00	312.42	0%	0.00	0.00
428	Collector	8	185	0.30%	0.00	312.40	0%	0.00	0.00
430	Collector	8	201	0.30%	5.00	312.47	2%	0.74	0.06
431	Collector	8	297	0.30%	5.00	297.78	2%	0.71	0.06
433	Collector	8	54	0.30%	147.66	312.28	47%	1.97	0.32
443	Collector	8	1195	0.30%	39.91	312.39	13%	1.37	0.16
447	Interceptor	10	68	0.20%	326.69	484.75	67%	2.13	0.50
449	Interceptor	10	5	0.40%	326.69	623.59	52%	2.58	0.43
465	Collector	8	491	0.30%	0.00	312.40	0%	0.00	0.00
467	Collector	8	157	0.30%	0.00	312.42	0%	0.00	0.00
471	Collector	8	281	0.30%	0.00	312.36	0%	0.00	0.00
479	Collector	8	194	0.30%	0.00	312.43	0%	0.00	0.00
495	Collector	8	118	0.80%	3.46	483.21	1%	0.89	0.04
501	Well Connection	10	5	0.90%	492.92	935.39	53%	3.87	0.43
515	Interceptor	36	10	0.00%	667.55	949.21	70%	0.32	1.86
517	Interceptor	36	10	0.00%	326.69	949.21	34%	0.27	1.21
519	Collector	8	654	0.10%	10.57	207.93	5%	0.70	0.10
521	Collector, Assumed pipe	8	306	0.50%	4.13	368.69	1%	0.78	0.05

MODEL SCENARIO 2A

SEWER SYSTEM MODEL OUTPUT

2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
1	Interceptor	10	599	0.40%	25.725	610.42	4%	1.235	0.117
2	Collector	8	623	0.40%	21.345	344.037	6%	1.22	0.113
3	Collector	8	595	0.40%	14.316	334.247	4%	1.062	0.094
4	Collector	8	339	0.30%	0	312.33	0%	0	0
6	Collector	8	392	0.40%	1.902	331.042	1%	0.573	0.036
7	Collector	8	305	0.40%	7.625	331.85	2%	0.875	0.07
8	Collector	8	628	0.50%	94.048	390.363	24%	2.05	0.223
9	Collector	8	333	0.60%	6.672	413.457	2%	0.979	0.059
10	Collector	12	357	0.20%	117.729	718.558	16%	1.504	0.274
11	Collector	8	692	0.10%	0.903	135.232	1%	0.245	0.039
12	Collector	8	601	0.10%	19.46	202.979	10%	0.818	0.139
14	Collector	8	369	0.50%	4.192	401.499	1%	0.834	0.048
15	Collector	8	215	0.30%	0	312.4	0%	0	0
16	Collector	8	236	0.50%	13.322	395.57	3%	1.169	0.084
17	Collector	8	381	0.40%	23.024	347.29	7%	1.256	0.116
18	Collector	8	264	0.40%	1.902	355.605	1%	0.603	0.035
19	Collector	8	218	0.30%	0	318.19	0%	0	0
20	Collector	8	238	1.20%	1.749	592.996	0%	0.838	0.027
21	Collector	8	146	0.40%	0	361.84	0%	0	0
22	Collector	8	299	0.30%	1.091	281.988	0%	0.433	0.03
23	Collector	8	293	0.50%	3.812	365.98	1%	0.759	0.048
24	Collector	8	307	0.40%	0	358.21	0%	0	0
25	Collector	8	243	0.30%	0	312.45	0%	0	0
26	Collector	8	202	0.30%	0	312.337	0%	0	0
27	Collector	8	454	0.30%	0	312.38	0%	0	0
28	Collector	8	121	0.30%	0	312.235	0%	0	0
29	Collector	8	133	0.30%	0	312.482	0%	0	0
30	Collector	8	328	0.40%	3.812	351.801	1%	0.739	0.049
31	Collector	8	301	0.40%	107.79	338.125	32%	1.918	0.259
32	Collector	8	336	0.30%	6.605	312.321	2%	0.803	0.067
33	Collector	8	226	0.30%	0	312.391	0%	0	0
34	Collector	8	329	0.90%	2.86	522.712	1%	0.892	0.035
35	Collector	8	144	0.30%	2.352	312.276	1%	0.587	0.041
36	Collector	8	612	0.40%	25.142	364.525	7%	1.334	0.119
37	Collector	10	328	0.40%	102.002	650.44	16%	1.936	0.223
38	Collector	8	264	0.20%	4.762	264.732	2%	0.648	0.062
39	Collector	8	248	0.50%	2.352	398.51	1%	0.696	0.037
40	Collector	8	360	0.30%	7.055	277.517	3%	0.754	0.073
41	Collector	8	373	0.20%	1.124	241.61	1%	0.392	0.033
43	Collector	12	593	0.20%	51.564	678.736	8%	1.136	0.186
44	Collector	12	569	0.30%	0	921.01	0%	0	0
45	Collector	8	334	0.30%	0	312.426	0%	0	0
46	Collector	8	554	0.20%	20.01	269.35	7%	1.007	0.123
47	Collector	8	625	0.30%	0	312.36	0%	0	0
48	Collector	8	315	0.30%	22.87	272.47	8%	1.056	0.131
49	Collector	6	555	0.30%	3.901	141.631	3%	0.701	0.057

MODEL SCENARIO 2A

SEWER SYSTEM MODEL OUTPUT

2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
50	Collector	8	321	0.50%	3.812	378.75	1%	0.778	0.047
51	Collector	8	632	0.30%	0	312.368	0%	0	0
52	Interceptor	10	599	0.20%	16.192	465.60	4%	0.889	0.106
53	Collector	8	620	0.10%	6.365	129.787	5%	0.429	0.1
54	Collector	8	410	0.30%	0	312.335	0%	0	0
55	Collector	8	623	0.10%	8.246	192.519	4%	0.612	0.094
56	Collector	8	627	0.40%	1.902	361.017	1%	0.609	0.035
57	Collector	8	354	0.30%	2.352	312.34	1%	0.587	0.041
58	Collector	8	429	0.30%	0	312.38	0%	0	0
59	Interceptor	10	596	0.40%	49.042	589.703	8%	1.459	0.162
60	Interceptor	15	644	0.10%	378.907	1060.321	36%	1.764	0.516
61	Collector	8	349	0.40%	0	361.014	0%	0	0
62	Collector	8	271	0.40%	8.58	345.836	3%	0.933	0.072
64	Collector	8	157	0.40%	2.86	351.35	1%	0.676	0.043
65	Collector	8	401	0.40%	32.385	344.74	9%	1.382	0.138
66	Collector	8	169	0.60%	34.287	408.962	8%	1.585	0.13
67	Interceptor	10	41	-0.10%	175.318		100%	0.716	0.833
68	Interceptor	10	397	0.20%	170.603	424.174	40%	1.639	0.368
69	Collector	8	300	0.40%	14.68	342.337	4%	1.088	0.094
70	Collector	8	217	0.30%	0	312.298	0%	0	0
73	Collector	8	238	0.50%	2.352	392.86	1%	0.689	0.037
74	Collector	8	347	0.40%	19.05	355.763	5%	1.208	0.105
75	Collector	8	236	0.40%	5.72	363.69	2%	0.855	0.058
76	Collector	8	180	0.50%	4.762	373.943	1%	0.825	0.053
77	Collector	8	383	0.40%	7.622	348.23	2%	0.904	0.068
78	Collector	8	257	0.30%	1.902	285.581	1%	0.517	0.039
79	Interceptor	12	629	0.20%	51.564	715.39	7%	1.179	0.182
80	Collector	8	903	0.30%	4.705	300.212	2%	0.705	0.058
81	Collector	8	649	0.30%	25.705	303.62	9%	1.18	0.131
83	Collector	8	239	0.20%	30.735	241.986	13%	1.059	0.16
84	Collector	8	1391	0.30%	30.735	289.02	11%	1.201	0.147
85	Collector	8	400	0.30%	30.735	314.036	10%	1.274	0.141
86	Collector	8	327	0.40%	3.805	343.03	1%	0.725	0.049
87	Collector	8	223	0.40%	28.58	343.997	8%	1.33	0.13
88	Collector	8	173	0.70%	1.902	459.78	0%	0.72	0.031
89	Interceptor	10	400	0.00%	249.868	180.373	139%	1.021	0.833
90	Interceptor	10	741	0.20%	211.515	436.00	49%	1.768	0.409
91	Collector	8	373	0.70%	0.938	445.816	0%	0.568	0.023
92	Collector	8	240	0.40%	11.787	360.92	3%	1.057	0.083
93	Collector	8	340	0.30%	0	312.65	0%	0	0
94	Collector	8	217	0.50%	3.797	367.781	1%	0.761	0.048
95	Interceptor	10	398	0.20%	90.795	430.716	21%	1.394	0.26
96	Collector	8	262	0.20%	59.683	243.084	25%	1.283	0.225
97	Collector	8	361	0.40%	8.577	338.932	3%	0.92	0.073
98	Collector	8	417	0.30%	14.265	298.777	5%	0.98	0.099
99	Collector	8	390	0.20%	4.75	226.433	2%	0.581	0.067

MODEL SCENARIO 2A

SEWER SYSTEM MODEL OUTPUT

2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
100	Collector	8	449	0.40%	3.812	338.22	1%	0.719	0.05
101	Collector	8	399	1.90%	0.698	746.248	0%	0.742	0.016
102	Collector	8	353	0.50%	0.698	379.902	0%	0.464	0.021
103	Collector	8	235	2.80%	0.233	908.81	0%	0.607	0.009
104	Collector	8	588	2.00%	14.697	770.885	2%	1.921	0.064
105	Collector	8	301	0.00%	2.84		100%	0.018	0.667
106	Collector	8	432	0.20%	0.938	261.727	0%	0.392	0.029
107	Collector	8	872	0.40%	1.902	362.986	1%	0.611	0.035
108	Collector	8	407	0.30%	2.857	299.62	1%	0.605	0.046
109	Collector	8	236	0.70%	0	443.204	0%	0	0
110	Collector	8	491	0.30%	0	312.398	0%	0	0
111	Collector	8	299	0.00%	1.012	58.028	2%	0.141	0.061
112	Collector	8	581	0.30%	0	312.364	0%	0	0
113	Collector	8	295	0.60%	19.351	420.122	5%	1.364	0.097
114	Collector	8	157	0.30%	0	312.418	0%	0	0
115	Collector	8	508	0.30%	31.736	312.377	10%	1.281	0.144
116	Collector	8	390	0.40%	83.441	362.25	23%	1.879	0.218
117	Collector	8	269	0.40%	0	343.674	0%	0	0
118	Collector	8	89	0.60%	0	418.459	0%	0	0
119	Collector	8	157	0.50%	0	380.707	0%	0	0
121	Collector	8	240	0.40%	1.178	321.807	0%	0.486	0.029
122	Collector	8	724	0.30%	0	312.37	0%	0	0
123	Collector	8	477	0.20%	0.938	211.678	0%	0.339	0.032
124	Collector	8	287	0.50%	110.649	369.465	30%	2.061	0.25
125	Collector	10	624	0.10%	74.856	356.317	21%	1.152	0.259
126	Collector	8	303	0.40%	4.702	360.497	1%	0.801	0.053
127	Collector	8	177	0.50%	4.762	376.977	1%	0.829	0.053
128	Collector	8	289	0.30%	1.902	317.203	1%	0.557	0.037
129	Collector	8	270	0.30%	0	312.474	0%	0	0
130	Collector	8	915	0.20%	1.229	264.221	1%	0.429	0.033
131	Collector	8	61	0.30%	0	312.024	0%	0	0
132	Collector	8	194	0.30%	0	312.431	0%	0	0
133	Collector	12	566	0.20%	112.967	658.479	17%	1.396	0.28
134	Collector	12	339	0.30%	0	921.061	0%	0	0
135	Collector	12	467	0.30%	0	921.011	0%	0	0
137	Collector	8	283	1.30%	0	620.492	0%	0	0
138	Interceptor	10	322	0.30%	0	580.465	0%	0	0
139	Collector	8	300	0.20%	4.762	245.547	2%	0.615	0.064
140	Collector	8	185	1.30%	0	612.676	0%	0	0
141	Collector	8	280	0.40%	0.938	332.042	0%	0.463	0.026
142	Collector	8	297	0.60%	4.75	428.555	1%	0.906	0.049
143	Collector	8	277	0.70%	10.9	443.919	3%	1.194	0.072
144	Collector	8	335	4.50%	13.76	1156.831	1%	2.499	0.051
145	Collector	8	343	0.30%	14.697	285.816	5%	0.959	0.103
146	Collector	8	60	2.50%	17.557	864.173	2%	2.195	0.066
147	Collector	8	46	5.30%	17.557	1255.595	1%	2.848	0.055

MODEL SCENARIO 2A

SEWER SYSTEM MODEL OUTPUT

2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
148	Collector	8	112	2.20%	0.233	808.44	0%	0.56	0.009
149	Collector	8	123	1.90%	0.233	751.34	0%	0.532	0.009
150	Collector	8	293	0.00%	0.233	52.229	0%	0.084	0.032
151	Collector	8	225	0.40%	0.465	341.323	0%	0.381	0.019
152	Collector	8	235	0.50%	0.698	365.303	0%	0.452	0.022
153	Collector	8	319	0.40%	11.324	324.499	4%	0.97	0.085
154	Collector	8	186	0.20%	14.184	267.55	5%	0.906	0.104
155	Collector	8	336	0.20%	2.857	270.594	1%	0.564	0.048
156	Collector	8	262	0.30%	4.654	296.358	2%	0.696	0.058
157	Collector	8	237	1.30%	2.84	617.266	1%	0.999	0.033
158	Collector	8	514	0.30%	0.938	310.272	0%	0.442	0.027
159	Collector	8	419	0.20%	0	251.52	0%	0	0
160	Collector	8	402	0.50%	0.938	398.155	0%	0.525	0.024
161	Collector	8	365	0.60%	0.938	417.715	0%	0.543	0.023
162	Collector	8	297	0.00%	0.938		100%	0.006	0.667
163	Collector	8	302	0.30%	0.938	314.579	0%	0.446	0.027
164	Collector	8	301	0.20%	0.938	270.026	0%	0.401	0.029
165	Collector	8	301	0.20%	25.18	254.265	10%	1.035	0.142
166	Collector	8	352	0.20%	29.922	225.773	13%	1	0.164
167	Collector	8	398	0.20%	32.782	212.095	16%	0.982	0.177
170	Collector	8	358	0.30%	10.257	277.099	4%	0.843	0.088
172	Collector	8	173	0.40%	1.902	360.338	1%	0.608	0.035
173	Collector	8	114	0.50%	0.938	392.856	0%	0.52	0.024
174	Collector	8	247	0.50%	2.84	384.931	1%	0.719	0.041
175	Collector	8	210	0.40%	6.652	359.876	2%	0.888	0.063
176	Collector	8	133	0.20%	9.942	270.831	4%	0.822	0.087
178	Collector	8	397	0.20%	41.578	257.801	16%	1.208	0.181
179	Collector	8	352	0.30%	46.34	291.284	16%	1.36	0.18
180	Collector	8	395	0.30%	51.103	278.183	18%	1.353	0.194
181	Collector	8	137	0.60%	74.885	414.016	18%	2.005	0.192
182	Collector	8	128	1.10%	1.635	576.353	0%	0.805	0.026
183	Collector	8	416	0.60%	1.635	423.617	0%	0.65	0.03
184	Interceptor	10	307	0.20%	76.52	425.244	18%	1.316	0.239
185	Collector	8	384	0.50%	0.698	397.73	0%	0.479	0.021
186	Collector	8	400	0.50%	0.698	399.091	0%	0.481	0.021
187	Collector	8	298	0.50%	3.812	372.303	1%	0.769	0.048
188	Interceptor	10	595	0.10%	19.052	323.105	6%	0.722	0.137
189	Collector	10	601	0.60%	11.523	775.365	2%	1.147	0.071
191	Collector	8	298	0.30%	15.247	319.011	5%	1.047	0.099
192	Collector	8	295	0.30%	11.435	294.242	4%	0.908	0.09
193	Collector	8	295	0.20%	11.435	262.021	4%	0.837	0.095
194	Collector	8	627	0.20%	32.445	240.211	14%	1.07	0.165
195	Collector	8	592	0.40%	25.773	348.304	7%	1.301	0.123
196	Collector	8	270	0.30%	16.587	281.961	6%	0.984	0.11
197	Collector	8	298	0.80%	0	471.48	0%	0	0
198	Collector	8	310	0.80%	10.485	487.041	2%	1.259	0.068

MODEL SCENARIO 2A

SEWER SYSTEM MODEL OUTPUT

2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
199	Collector	8	307	0.40%	1.012	345.43	0%	0.487	0.026
200	Collector	8	306	0.30%	24.113	316.37	8%	1.192	0.125
201	Collector	8	169	0.30%	0	312.46	0%	0	0
202	Collector	8	58	0.30%	0	312.13	0%	0	0
203	Collector	8	293	0.00%	0.154	52.22	0%	0.074	0.027
204	Collector	8	211	0.50%	13.754	368.20	4%	1.123	0.088
205	Collector	8	234	0.30%	48.731	295.70	17%	1.395	0.183
206	Collector	8	226	0.40%	0	363.856	0%	0	0
207	Collector	8	231	0.40%	55.396	325.67	17%	1.55	0.186
208	Collector	8	189	1.50%	17.567	656.916	3%	1.812	0.075
209	Collector	8	111	0.50%	77.726	373.85	21%	1.884	0.206
210	Collector	8	66	-3.60%	81.538		100%	0.52	0.667
211	Collector	8	134	0.40%	1.902	362.61	1%	0.611	0.035
212	Collector	8	46	0.10%	83.441	194.99	43%	1.196	0.305
213	Collector	8	320	0.40%	84.532	346.94	24%	1.828	0.224
214	Collector	8	310	0.40%	89.237	332.98	27%	1.801	0.236
215	Collector	8	291	0.40%	94	364.24	26%	1.95	0.231
216	Collector	8	293	0.30%	2.352	312.35	1%	0.587	0.041
217	Collector	8	352	0.50%	0	380.83	0%	0	0
218	Collector	8	37	-0.20%	0		100%	0	0
219	Interceptor	10	400	0.30%	78.423	522.29	15%	1.535	0.218
220	Interceptor	10	400	0.10%	79.36	357.523	22%	1.174	0.267
221	Interceptor	10	399	0.20%	79.36	439.33	18%	1.361	0.24
222	Interceptor	10	401	0.10%	81.263	285.27	29%	1.004	0.304
223	Collector	8	321	0.30%	0	283.86	0%	0	0
224	Interceptor	10	625	0.10%	21.912	323.93	7%	0.754	0.147
225	Interceptor	10	597	0.30%	33.347	580.45	6%	1.288	0.136
226	Collector	8	525	0.30%	0	312.359	0%	0	0
227	Collector	8	597	0.20%	20.349	240.27	9%	0.934	0.131
228	Collector	8	630	0.40%	17.797	362.92	5%	1.2	0.1
229	Collector	8	595	0.40%	13.002	342.18	4%	1.049	0.089
230	Collector	8	312	0.20%	34.29	240.64	14%	1.088	0.17
231	Collector	8	319	0.30%	29.527	289.66	10%	1.189	0.144
232	Collector	8	51	2.10%	28.59	788.276	4%	2.382	0.087
234	Collector	8	628	0.20%	9.889	260.26	4%	0.798	0.089
235	Collector	8	628	0.20%	49.325	235.203	21%	1.188	0.207
236	Collector	8	460	0.30%	0	312.39	0%	0	0
237	Collector	10	602	0.20%	66.797	459.591	15%	1.338	0.215
238	Collector	10	250	0.30%	77.49	533.17	15%	1.552	0.215
239	Collector	10	298	0.10%	79.4	361.575	22%	1.184	0.265
240	Collector	10	302	0.60%	81.303	768.51	11%	2.041	0.183
241	Collector	8	278	0.20%	1.902	219.507	1%	0.431	0.044
242	Collector	8	124	0.40%	4.762	336.82	1%	0.767	0.055
243	Collector	8	297	0.40%	107.79	349.273	31%	1.964	0.254
245	Collector	8	577	-0.80%	4.702		100%	0.03	0.667
246	Collector	8	327	0.30%	4.702	319.904	2%	0.737	0.056

MODEL SCENARIO 2A

SEWER SYSTEM MODEL OUTPUT

2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
247	Collector	8	287	0.50%	107.79	376.67	29%	2.075	0.244
250	Collector	8	70	0.90%	2.35	503.671	1%	0.819	0.033
251	Collector	8	111	0.40%	8.927	348.817	3%	0.95	0.073
252	Interceptor	10	399	0.20%	93.655	406.068	23%	1.348	0.272
253	Interceptor	10	163	0.10%	95.558	348.525	27%	1.214	0.298
256	Collector	10	595	0.40%	20.625	660.489	3%	1.222	0.101
257	Collector	10	59	0.90%	0	912.97	0%	0	0
258	Interceptor	12	625	0.20%	276.6	676.657	41%	1.823	0.445
259	Collector	8	207	0.20%	0	267.51	0%	0	0
260	Collector	8	183	0.40%	2.352	348.467	1%	0.634	0.039
261	Collector	10	278	0.50%	180.573	695.52	26%	2.387	0.29
262	Collector	8	629	0.10%	34.93	204.387	17%	0.974	0.186
263	Collector	8	280	0.40%	2.795	334.80	1%	0.65	0.043
266	Collector	10	299	0.40%	87.003	594.096	15%	1.734	0.215
267	Collector	10	302	0.30%	87.94	509.59	17%	1.558	0.234
268	Collector	10	297	0.30%	100.099	544.963	18%	1.697	0.242
269	Interceptor	8	85	0.40%	508.877	344.26	148%	3.248	0.667
270	Collector	8	270	0.30%	2.857	294.976	1%	0.599	0.046
272	Collector	8	162	0.50%	2.86	398.72	1%	0.739	0.04
273	Collector	8	101	0.50%	9.517	381.05	3%	1.03	0.073
274	Collector	8	218	0.50%	40.01	369.13	11%	1.542	0.148
275	Collector	8	272	0.40%	12.385	358.203	4%	1.067	0.085
276	Collector	8	390	0.50%	11.787	379.58	3%	1.095	0.081
277	Collector	8	171	0.80%	13.69	495.965	3%	1.381	0.076
278	Interceptor	10	238	0.20%	95.558	453.71	21%	1.468	0.26
279	Interceptor	10	399	0.10%	114.963	275.876	42%	1.076	0.375
280	Interceptor	10	363	0.20%	171.54	433.58	40%	1.668	0.364
281	Collector	8	201	0.50%	15.63	379.206	4%	1.191	0.092
282	Interceptor	10	37	0.00%	114.963	170.30	68%	0.747	0.502
283	Collector	8	286	0.50%	2.84	383.118	1%	0.717	0.041
284	Collector	8	196	-0.40%	0.938		100%	0.006	0.667
285	Collector	8	181	0.40%	0.938	357.953	0%	0.488	0.025
286	Collector	8	141	0.40%	11.82	350.15	3%	1.036	0.084
288	Collector	8	517	0.30%	25.705	303.728	9%	1.18	0.131
289	Collector	8	216	0.30%	25.705	316.27	8%	1.215	0.129
290	Collector	8	301	0.40%	4.705	333.829	1%	0.759	0.055
291	Collector	8	106	0.30%	30.41	314.01	10%	1.27	0.14
292	Collector	8	399	-0.10%	0		100%	0	0
293	Collector	8	159	0.70%	30.735	454.08	7%	1.652	0.117
295	Collector	8	401	0.20%	30.735	214.644	14%	0.972	0.17
296	Collector	8	398	0.20%	30.735	231.829	13%	1.027	0.164
297	Collector	8	326	0.40%	1.902	337.525	1%	0.581	0.036
298	Collector	8	275	0.40%	7.617	345.27	2%	0.899	0.068
299	Collector	8	380	0.10%	38.352	124.10	31%	0.698	0.254
300	Collector	8	34	0.60%	30.735	412.775	7%	1.545	0.123
301	Interceptor	10	375	0.10%	249.868	310.247	81%	1.41	0.567

MODEL SCENARIO 2A

SEWER SYSTEM MODEL OUTPUT

2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
302	Interceptor	10	391	0.10%	249.868	305.61	82%	1.392	0.573
303	Interceptor	10	573	0.10%	209.605	380.61	55%	1.592	0.441
304	Interceptor	10	315	0.30%	249.868	541.97	46%	2.169	0.397
305	Interceptor	10	241	0.00%	249.868	177.21	141%	1.021	0.833
306	Collector	8	300	1.00%	22.32	543.06	4%	1.704	0.092
307	Collector	8	194	0.90%	17.557	511.06	3%	1.52	0.085
308	Interceptor	15	519	0.30%	375.817	1,669.73	23%	2.447	0.403
309	Collector	8	592	0.30%	0	312.40	0%	0	0
310	Collector	8	320	0.30%	3.29	293.67	1%	0.623	0.05
311	Collector	8	295	0.40%	2.352	361.46	1%	0.65	0.038
312	Collector	8	336	0.30%	2.352	297.633	1%	0.568	0.042
313	Collector	8	327	0.40%	2.352	361.356	1%	0.65	0.038
314	Collector	8	250	0.50%	0	387.30	0%	0	0
315	Collector	8	302	0.40%	2.352	330.05	1%	0.61	0.04
316	Collector	8	316	0.60%	2.352	421.78	1%	0.724	0.036
317	Collector	8	297	0.20%	2.352	234.77	1%	0.481	0.047
318	Collector	8	341	0.30%	2.352	311.88	1%	0.587	0.041
320	Collector	8	348	0.50%	20.962	367.84	6%	1.272	0.108
321	Collector	8	226	0.40%	4.76	349.173	1%	0.786	0.054
322	Collector	8	173	0.40%	7.057	335.813	2%	0.862	0.067
323	Collector	8	137	0.30%	7.057	315.656	2%	0.825	0.069
324	Collector	8	265	0.50%	2.352	386.51	1%	0.681	0.037
325	Collector	8	601	0.30%	2.352	319.387	1%	0.597	0.041
327	Collector	8	504	0.30%	6.577	296.818	2%	0.774	0.069
328	Collector	8	305	0.30%	3.465	315.794	1%	0.666	0.049
331	Collector	8	337	0.50%	4.157	378.877	1%	0.799	0.049
332	Collector	8	234	0.30%	41.578	292.031	14%	1.321	0.17
333	Collector	8	52	0.80%	41.578	482.646	9%	1.886	0.132
334	Collector	8	159	0.40%	41.578	351.029	12%	1.505	0.155
335	Collector	8	271	0.20%	37.773	258.253	15%	1.177	0.172
336	Collector	8	105	0.40%	36.595	331.329	11%	1.392	0.15
337	Collector	8	293	0.40%	3.431	364.399	1%	0.733	0.046
338	Collector	8	355	0.30%	0.233	318.991	0%	0.294	0.014
339	Collector	8	496	0.30%	0	312.363	0%	0	0
340	Interceptor	15	304	0.20%	378.907	1341.543	28%	2.094	0.454
341	Interceptor	15	312	0.10%	379.845	1037.86	37%	1.738	0.523
342	Interceptor	15	335	0.10%	482.784	886.702	54%	1.644	0.658
343	Interceptor	15	302	0.30%	482.784	1542.364	31%	2.476	0.48
344	Collector	8	594	0.20%	34.393	212.457	16%	0.997	0.181
345	Collector	8	595	0.20%	48.688	255.154	19%	1.255	0.197
346	Collector	8	594	0.30%	17.997	320.165	6%	1.103	0.107
347	Collector	8	548	0.30%	4.762	312.41	2%	0.727	0.057
348	Collector	10	319	-0.10%	176.76		100%	0.722	0.833
349	Collector	12	595	0.20%	71.314	757.989	9%	1.351	0.207
350	Collector	12	327	0.10%	107.301	532.931	20%	1.183	0.304
351	Collector	12	268	0.70%	107.301	1373.928	8%	2.318	0.189

MODEL SCENARIO 2A

SEWER SYSTEM MODEL OUTPUT

2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
352	Collector	8	269	0.90%	0	512.067	0%	0	0
353	Collector	8	196	0.30%	0	300.69	0%	0	0
354	Collector	8	281	1.10%	0	572.91	0%	0	0
355	Collector	8	62	-0.80%	0		100%	0	0
356	Collector	8	146	1.80%	2.635	719.73	0%	1.086	0.029
357	Interceptor	10	180	0.30%	99.37	561.2	18%	1.729	0.237
358	Collector	8	103	0.10%	9.517	185.636	5%	0.622	0.103
359	Collector	8	307	0.80%	4.705	491.052	1%	0.993	0.046
360	Collector	8	235	0.40%	10.87	362.832	3%	1.036	0.079
361	Collector	8	262	0.20%	24.767	268.308	9%	1.07	0.137
362	Collector	8	247	0.40%	23.83	355.319	7%	1.289	0.117
363	Collector	8	217	0.30%	0	312.301	0%	0	0
364	Collector	8	326	0.30%	8.072	320.65	3%	0.869	0.073
365	Collector	8	217	0.40%	0	331.679	0%	0	0
366	Interceptor	10	290	0.50%	87.935	723.288	12%	2	0.196
367	Collector	8	361	0.40%	3.812	341.421	1%	0.724	0.05
368	Collector	8	87	0.00%	7.512		100%	0.048	0.667
369	Collector	8	315	1.50%	9.975	655.284	2%	1.525	0.057
370	Collector	8	248	0.30%	30.735	291.422	11%	1.208	0.146
371	Collector	8	151	-0.40%	30.735		100%	0.196	0.667
372	Interceptor	10	403	0.20%	249.868	415.62	60%	1.775	0.466
373	Interceptor	10	402	0.10%	249.868	343.895	73%	1.532	0.527
374	Collector	8	297	0.10%	2.752	182.894	2%	0.424	0.057
375	Collector	8	592	0.10%	17.997	192.832	9%	0.771	0.138
376	Collector	10	595	0.20%	221.223	482.674	46%	1.929	0.396
377	Collector	10	595	0.50%	108.014	689.043	16%	2.05	0.223
378	Collector	12	566	0.40%	2.91	1036.113	0%	0.641	0.039
379	Collector	12	338	0.10%	117.729	448.86	26%	1.073	0.35
380	Collector	8	350	0.70%	10.418	453.8	2%	1.196	0.07
381	Interceptor	10	629	0.50%	78.592	684.205	12%	1.861	0.191
382	Collector	12	617	0.30%	3.091	879.003	0%	0.582	0.043
383	Collector	8	205	0.30%	0	287.423	0%	0	0
384	Collector	8	480	0.30%	2.352	312.354	1%	0.587	0.041
385	Collector	8	589	0.60%	8.957	412.265	2%	1.068	0.068
386	Collector	8	367	0.20%	38.352	216.811	18%	1.043	0.19
387	Collector	8	110	0.40%	7.057	342.504	2%	0.873	0.066
388	Collector	8	123	0.60%	7.057	430.713	2%	1.025	0.059
389	Collector	8	126	0.20%	2.352	231.95	1%	0.477	0.047
390	Collector	8	176	0.40%	30.482	340.563	9%	1.345	0.135
391	Collector	8	215	0.50%	3.797	382.659	1%	0.782	0.047
392	Collector	8	225	0.40%	10.48	342.809	3%	0.984	0.08
393	Collector	8	87	-0.10%	41.578		100%	0.265	0.667
394	Collector	8	157	0.40%	3.431	328.605	1%	0.682	0.048
395	Collector	8	240	0.40%	43.969	324.547	14%	1.447	0.166
396	Collector	8	80	0.00%	0		0%	0	0
397	Collector	8	110	5.80%	0	1305.235	0%	0	0

MODEL SCENARIO 2A

SEWER SYSTEM MODEL OUTPUT

2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 2.5 (INTERCEPTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
398	Interceptor	8	94	0.40%	508.877	344.346	148%	3.248	0.667
399	Collector	10	279	0.30%	1.902	536.13	0%	0.513	0.036
400	Collector	10	299	0.30%	82.24	502.848	16%	1.515	0.228
401	Collector	8	160	2.00%	3.146	774.803	0%	1.207	0.031
402	Collector	8	158	0.10%	3.146	180.403	2%	0.437	0.061
403	Collector	8	298	0.40%	14.29	364.02	4%	1.127	0.09
404	Collector	8	116	0.40%	0	348.065	0%	0	0
405	Collector	8	151	0.30%	1.902	295.856	1%	0.53	0.038
406	Collector	8	246	0.30%	1.902	295.64	1%	0.53	0.038
407	Collector	8	405	0.30%	1.902	295.722	1%	0.53	0.038
408	Collector	8	181	0.30%	1.902	295.76	1%	0.53	0.038
409	Collector	8	177	0.30%	1.902	295.71	1%	0.53	0.038
410	Collector	8	257	0.30%	1.902	295.809	1%	0.53	0.038
411	Collector	8	199	0.30%	3.805	295.76	1%	0.654	0.053
412	Collector	8	716	0.30%	26.69	315.07	9%	1.225	0.131
413	Collector	8	284	0.30%	26.69	312.361	9%	1.217	0.132
414	Collector	8	174	0.30%	23.83	312.38	8%	1.178	0.125
417	Collector	8	206	0.30%	23.83	312.78	8%	1.179	0.124
420	Collector	8	80	1.10%	4.702	560.71	1%	1.089	0.043
421	Collector	8	105	0.30%	4.702	312.47	2%	0.725	0.057
423	Collector	8	375	0.30%	4.702	312.35	2%	0.725	0.057
424	Collector	8	79	2.40%	5.64	836.631	1%	1.521	0.039
425	Collector	8	16	1.00%	0	544.782	0%	0	0
426	Collector	8	9	0.30%	0	312.421	0%	0	0
428	Collector	8	185	0.30%	0	312.395	0%	0	0
430	Collector	8	201	0.30%	3.812	312.472	1%	0.68	0.052
431	Collector	8	297	0.30%	3.812	297.775	1%	0.658	0.053
433	Collector	8	54	0.30%	112.552	312.284	36%	1.831	0.277
443	Collector	8	1195	0.30%	30.735	312.392	10%	1.269	0.141
447	Interceptor	10	68	0.20%	249.868	484.75	52%	1.995	0.424
449	Interceptor	10	5	0.40%	249.868	623.59	40%	2.407	0.367
465	Collector	8	491	0.30%	0	312.398	0%	0	0
467	Collector	8	157	0.30%	0	312.418	0%	0	0
471	Collector	8	281	0.30%	0	312.36	0%	0	0
479	Collector	8	194	0.30%	0	312.43	0%	0	0
495	Collector	8	118	0.80%	2.635	483.212	1%	0.824	0.035
501	Well Connection	10	5	0.90%	375.817	935.39	40%	3.613	0.367
515	Interceptor	36	10	0.00%	508.877	949.207	54%	0.304	1.564
517	Interceptor	36	10	0.00%	249.868	949.207	26%	0.252	1.051
519	Collector	8	654	0.10%	8.059	207.93	4%	0.641	0.09
521	Collector	8	306	0.50%	3.146	368.686	1%	0.72	0.044

MODEL SCENARIO 2B

SEWER SYSTEM MODEL OUTPUT

2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
1	Interceptor	10	599.03	0.40%	41.16	610.42	7%	1.420	0.147
2	Collector	8	622.61	0.40%	34.15	344.04	10%	1.401	0.142
3	Collector	8	595.29	0.40%	22.91	334.25	7%	1.221	0.118
4	Collector	8	338.92	0.30%	0.00	312.33	0%	0.000	0.000
6	Collector	8	391.81	0.40%	3.04	331.04	1%	0.661	0.045
7	Collector	8	304.52	0.40%	12.20	331.85	4%	1.007	0.087
8	Collector	8	627.79	0.50%	150.47	390.36	39%	2.330	0.287
9	Collector	8	333.35	0.60%	10.68	413.46	3%	1.129	0.074
10	Collector	12	356.98	0.20%	188.36	718.56	26%	1.717	0.349
11	Collector	8	692.09	0.10%	1.44	135.23	1%	0.283	0.048
12	Collector	8	600.76	0.10%	31.14	202.98	15%	0.938	0.176
14	Collector	8	369.46	0.50%	6.71	401.50	2%	0.961	0.060
15	Collector	8	214.53	0.30%	0.00	312.40	0%	0.000	0.000
16	Collector	8	236.42	0.50%	21.32	395.57	5%	1.345	0.105
17	Collector	8	380.77	0.40%	36.84	347.29	11%	1.442	0.147
18	Collector	8	264.49	0.40%	3.04	355.61	1%	0.695	0.044
19	Collector	8	217.60	0.30%	0.00	318.19	0%	0.000	0.000
20	Collector	8	237.91	1.20%	2.80	593.00	1%	0.967	0.033
21	Collector	8	145.91	0.40%	0.00	361.84	0%	0.000	0.000
22	Collector	8	298.63	0.30%	1.75	281.99	1%	0.500	0.038
23	Collector	8	293.43	0.50%	6.10	365.98	2%	0.876	0.060
24	Collector	8	306.75	0.40%	0.00	358.21	0%	0.000	0.000
25	Collector	8	242.64	0.30%	0.00	312.45	0%	0.000	0.000
26	Collector	8	201.89	0.30%	0.00	312.34	0%	0.000	0.000
27	Collector	8	453.98	0.30%	0.00	312.38	0%	0.000	0.000
28	Collector	8	121.33	0.30%	0.00	312.24	0%	0.000	0.000
29	Collector	8	132.65	0.30%	0.00	312.48	0%	0.000	0.000
30	Collector	8	328.30	0.40%	6.10	351.80	2%	0.852	0.061
31	Collector	8	301.08	0.40%	172.46	338.13	51%	2.169	0.337
32	Collector	8	335.60	0.30%	10.57	312.32	3%	0.925	0.084
33	Collector	8	225.76	0.30%	0.00	312.39	0%	0.000	0.000
34	Collector	8	328.59	0.90%	4.58	522.71	1%	1.029	0.044
35	Collector	8	144.04	0.30%	3.76	312.28	1%	0.677	0.051
36	Collector	8	612.23	0.40%	40.23	364.53	11%	1.531	0.150
37	Collector	10	327.90	0.40%	163.20	650.44	25%	2.211	0.285
38	Collector	8	264.14	0.20%	7.62	264.73	3%	0.747	0.078
39	Collector	8	247.66	0.50%	3.76	398.51	1%	0.803	0.046
40	Collector	8	360.17	0.30%	11.29	277.52	4%	0.868	0.092
41	Collector	8	373.36	0.20%	1.80	241.61	1%	0.453	0.041
43	Collector	12	593.16	0.20%	84.04	678.74	12%	1.310	0.238
44	Collector	12	569.13	0.30%	0.00	921.01	0%	0.000	0.000
45	Collector	8	334.47	0.30%	0.00	312.43	0%	0.000	0.000
46	Collector	8	553.55	0.20%	32.02	269.35	12%	1.156	0.155

MODEL SCENARIO 2B
SEWER SYSTEM MODEL OUTPUT
2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
47	Collector	8	624.97	0.30%	0.00	312.36	0%	0.000	0.000
48	Collector	8	314.68	0.30%	36.59	272.47	13%	1.212	0.165
49	Collector	6	555.28	0.30%	6.23	141.63	4%	0.806	0.071
50	Collector	8	320.56	0.50%	6.10	378.75	2%	0.897	0.059
51	Collector	8	631.90	0.30%	0.00	312.37	0%	0.000	0.000
52	Interceptor	10	599.13	0.20%	25.91	465.60	6%	1.023	0.133
53	Collector	8	619.71	0.10%	10.19	129.79	8%	0.493	0.126
54	Collector	8	409.84	0.30%	0.00	312.34	0%	0.000	0.000
55	Collector	8	623.13	0.10%	13.20	192.52	7%	0.703	0.118
56	Collector	8	627.36	0.40%	3.04	361.02	1%	0.702	0.043
57	Collector	8	354.37	0.30%	3.76	312.34	1%	0.677	0.051
58	Collector	8	429.13	0.30%	0.00	312.38	0%	0.000	0.000
59	Interceptor	10	596.02	0.40%	78.47	589.70	13%	1.674	0.205
60	Interceptor	15	644.18	0.10%	606.25	1060.32	57%	1.989	0.677
61	Collector	8	348.74	0.40%	0.00	361.01	0%	0.000	0.000
62	Collector	8	270.74	0.40%	13.73	345.84	4%	1.074	0.091
64	Collector	8	156.91	0.40%	4.58	351.35	1%	0.780	0.053
65	Collector	8	401.11	0.40%	51.82	344.74	15%	1.583	0.175
66	Collector	8	168.86	0.60%	54.86	408.96	13%	1.818	0.165
67	Interceptor	10	40.97	-0.10%	280.51		100%	1.146	0.833
68	Interceptor	10	396.59	0.20%	272.97	424.17	64%	1.841	0.486
69	Collector	8	299.77	0.40%	23.49	342.34	7%	1.251	0.118
70	Collector	8	216.79	0.30%	0.00	312.30	0%	0.000	0.000
73	Collector	8	238.17	0.50%	3.76	392.86	1%	0.795	0.046
74	Collector	8	346.96	0.40%	30.48	355.76	9%	1.388	0.132
75	Collector	8	235.87	0.40%	9.15	363.69	3%	0.985	0.073
76	Collector	8	180.39	0.50%	7.62	373.94	2%	0.950	0.066
77	Collector	8	383.36	0.40%	12.20	348.23	4%	1.041	0.085
78	Collector	8	256.72	0.30%	3.04	285.58	1%	0.597	0.048
79	Interceptor	12	629.37	0.20%	84.04	715.39	12%	1.360	0.231
80	Collector	8	902.97	0.30%	7.53	300.21	3%	0.812	0.073
81	Collector	8	648.65	0.30%	41.13	303.62	14%	1.353	0.166
83	Collector	8	239.37	0.20%	49.18	241.99	20%	1.211	0.204
84	Collector	8	1390.60	0.30%	49.18	289.02	17%	1.376	0.186
85	Collector	8	399.71	0.30%	49.18	314.04	16%	1.460	0.178
86	Collector	8	326.71	0.40%	6.09	343.03	2%	0.836	0.062
87	Collector	8	222.66	0.40%	45.73	344.00	13%	1.525	0.164
88	Collector	8	172.62	0.70%	3.04	459.78	1%	0.831	0.039
89	Interceptor	10	400.41	0.00%	399.79	180.37	222%	1.633	0.833
90	Interceptor	10	740.52	0.20%	338.43	436.00	78%	1.968	0.552
91	Collector	8	373.31	0.70%	1.50	445.82	0%	0.656	0.028
92	Collector	8	239.96	0.40%	18.86	360.92	5%	1.216	0.104
93	Collector	8	340.04	0.30%	0.00	312.65	0%	0.000	0.000

MODEL SCENARIO 2B
SEWER SYSTEM MODEL OUTPUT
2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
94	Collector	8	217.09	0.50%	6.08	367.78	2%	0.877	0.060
95	Interceptor	10	397.74	0.20%	145.27	430.72	34%	1.588	0.334
96	Collector	8	262.24	0.20%	95.49	243.08	39%	1.458	0.290
97	Collector	8	361.43	0.40%	13.72	338.93	4%	1.059	0.092
98	Collector	8	417.07	0.30%	22.82	298.78	8%	1.127	0.125
99	Collector	8	389.89	0.20%	7.60	226.43	3%	0.669	0.084
100	Collector	8	449.30	0.40%	6.10	338.22	2%	0.829	0.062
101	Collector	8	399.01	1.90%	1.12	746.25	0%	0.857	0.019
102	Collector	8	353.45	0.50%	1.12	379.90	0%	0.536	0.026
103	Collector	8	234.66	2.80%	0.37	908.81	0%	0.702	0.011
104	Collector	8	588.44	2.00%	23.52	770.89	3%	2.212	0.080
105	Collector	8	300.50	0.00%	4.54		100%	0.029	0.667
106	Collector	8	432.13	0.20%	1.50	261.73	1%	0.453	0.036
107	Collector	8	871.72	0.40%	3.04	362.99	1%	0.705	0.043
108	Collector	8	407.47	0.30%	4.57	299.62	2%	0.698	0.057
109	Collector	8	236.21	0.70%	0.00	443.20	0%	0.000	0.000
110	Collector	8	491.49	0.30%	0.00	312.40	0%	0.000	0.000
111	Collector	8	298.60	0.00%	1.62	58.03	3%	0.162	0.077
112	Collector	8	581.30	0.30%	0.00	312.36	0%	0.000	0.000
113	Collector	8	295.38	0.60%	30.96	420.12	7%	1.568	0.122
114	Collector	8	157.24	0.30%	0.00	312.42	0%	0.000	0.000
115	Collector	8	507.62	0.30%	50.78	312.38	16%	1.467	0.182
116	Collector	8	390.31	0.40%	133.51	362.25	37%	2.137	0.280
117	Collector	8	269.15	0.40%	0.00	343.67	0%	0.000	0.000
118	Collector	8	89.34	0.60%	0.00	418.46	0%	0.000	0.000
119	Collector	8	156.90	0.50%	0.00	380.71	0%	0.000	0.000
121	Collector	8	239.87	0.40%	1.89	321.81	1%	0.561	0.037
122	Collector	8	723.73	0.30%	0.00	312.37	0%	0.000	0.000
123	Collector	8	476.50	0.20%	1.50	211.68	1%	0.391	0.040
124	Collector	8	287.48	0.50%	177.04	369.47	48%	2.333	0.325
125	Collector	10	624.05	0.10%	119.77	356.32	34%	1.312	0.333
126	Collector	8	302.87	0.40%	7.52	360.50	2%	0.923	0.067
127	Collector	8	177.29	0.50%	7.62	376.98	2%	0.956	0.066
128	Collector	8	289.20	0.30%	3.04	317.20	1%	0.642	0.046
129	Collector	8	269.55	0.30%	0.00	312.47	0%	0.000	0.000
130	Collector	8	914.53	0.20%	1.97	264.22	1%	0.495	0.041
131	Collector	8	60.75	0.30%	0.00	312.02	0%	0.000	0.000
132	Collector	8	194.19	0.30%	0.00	312.43	0%	0.000	0.000
133	Collector	12	566.19	0.20%	180.74	658.48	27%	1.593	0.358
134	Collector	12	338.77	0.30%	0.00	921.06	0%	0.000	0.000
135	Collector	12	466.70	0.30%	0.00	921.01	0%	0.000	0.000
137	Collector	8	282.96	1.30%	0.00	620.49	0%	0.000	0.000
138	Interceptor	10	322.28	0.30%	0.00	580.47	0%	0.000	0.000

MODEL SCENARIO 2B

SEWER SYSTEM MODEL OUTPUT

2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
139	Collector	8	300.17	0.20%	7.62	245.55	3%	0.708	0.081
140	Collector	8	185.45	1.30%	0.00	612.68	0%	0.000	0.000
141	Collector	8	280.29	0.40%	1.50	332.04	1%	0.534	0.032
142	Collector	8	297.23	0.60%	7.60	428.56	2%	1.045	0.062
143	Collector	8	277.01	0.70%	17.44	443.92	4%	1.374	0.090
144	Collector	8	335.33	4.50%	22.02	1156.83	2%	2.881	0.064
145	Collector	8	342.81	0.30%	23.52	285.82	8%	1.102	0.129
146	Collector	8	59.64	2.50%	28.09	864.17	3%	2.528	0.082
147	Collector	8	46.39	5.30%	28.09	1255.60	2%	3.283	0.069
148	Collector	8	111.89	2.20%	0.37	808.44	0%	0.647	0.011
149	Collector	8	122.84	1.90%	0.37	751.34	0%	0.615	0.012
150	Collector	8	292.70	0.00%	0.37	52.23	1%	0.097	0.040
151	Collector	8	224.64	0.40%	0.74	341.32	0%	0.440	0.023
152	Collector	8	235.12	0.50%	1.12	365.30	0%	0.522	0.027
153	Collector	8	319.03	0.40%	18.13	324.50	6%	1.116	0.107
154	Collector	8	185.90	0.20%	22.71	267.55	9%	1.041	0.131
155	Collector	8	336.42	0.20%	4.57	270.59	2%	0.650	0.060
156	Collector	8	261.95	0.30%	7.46	296.36	3%	0.803	0.073
157	Collector	8	237.50	1.30%	4.54	617.27	1%	1.153	0.041
158	Collector	8	513.61	0.30%	1.50	310.27	1%	0.510	0.033
159	Collector	8	418.83	0.20%	0.00	251.52	0%	0.000	0.000
160	Collector	8	401.81	0.50%	1.50	398.16	0%	0.606	0.030
161	Collector	8	365.06	0.60%	1.50	417.72	0%	0.627	0.029
162	Collector	8	297.32	0.00%	1.50			0.010	0.667
163	Collector	8	302.41	0.30%	1.50	314.58	1%	0.515	0.033
164	Collector	8	301.34	0.20%	1.50	270.03	1%	0.463	0.036
165	Collector	8	300.98	0.20%	40.29	254.27	16%	1.186	0.179
166	Collector	8	351.57	0.20%	47.88	225.77	21%	1.144	0.208
167	Collector	8	398.37	0.20%	52.45	212.10	25%	1.122	0.226
170	Collector	8	358.17	0.30%	16.41	277.10	6%	0.969	0.110
172	Collector	8	173.32	0.40%	3.04	360.34	1%	0.702	0.043
173	Collector	8	114.20	0.50%	1.50	392.86	0%	0.601	0.030
174	Collector	8	247.08	0.50%	4.54	384.93	1%	0.830	0.051
175	Collector	8	209.84	0.40%	10.64	359.88	3%	1.023	0.079
176	Collector	8	132.64	0.20%	15.91	270.83	6%	0.945	0.110
178	Collector	8	397.34	0.20%	66.53	257.80	26%	1.380	0.231
179	Collector	8	352.02	0.30%	74.15	291.28	26%	1.553	0.229
180	Collector	8	394.74	0.30%	81.77	278.18	29%	1.543	0.248
181	Collector	8	137.33	0.60%	119.82	414.02	29%	2.287	0.246
182	Collector	8	128.46	1.10%	2.62	576.35	1%	0.929	0.032
183	Collector	8	415.93	0.60%	2.62	423.62	1%	0.750	0.038
184	Interceptor	10	306.97	0.20%	122.43	425.24	29%	1.501	0.306
185	Collector	8	383.97	0.50%	1.12	397.73	0%	0.554	0.026

MODEL SCENARIO 2B
SEWER SYSTEM MODEL OUTPUT
2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
186	Collector	8	399.93	0.50%	1.12	399.09	0%	0.555	0.026
187	Collector	8	298.47	0.50%	6.10	372.30	2%	0.886	0.059
188	Interceptor	10	595.05	0.10%	30.48	323.11	9%	0.830	0.173
189	Collector	10	601.22	0.60%	18.42	775.37	2%	1.321	0.089
191	Collector	8	298.14	0.30%	24.40	319.01	8%	1.203	0.125
192	Collector	8	294.77	0.30%	18.30	294.24	6%	1.044	0.113
193	Collector	8	294.62	0.20%	18.30	262.02	7%	0.962	0.119
194	Collector	8	627.30	0.20%	51.91	240.21	22%	1.224	0.210
195	Collector	8	592.09	0.40%	41.24	348.30	12%	1.493	0.155
196	Collector	8	269.67	0.30%	26.54	281.96	9%	1.131	0.138
197	Collector	8	298.12	0.80%	0.00	471.48	0%	0.000	0.000
198	Collector	8	309.92	0.80%	16.78	487.04	3%	1.449	0.085
199	Collector	8	307.07	0.40%	1.62	345.43	1%	0.562	0.033
200	Collector	8	306.09	0.30%	38.58	316.37	12%	1.368	0.157
201	Collector	8	168.71	0.30%	0.00	312.46	0%	0.000	0.000
202	Collector	8	57.67	0.30%	0.00	312.13	0%	0.000	0.000
203	Collector	8	292.81	0.00%	0.25	52.22	1%	0.085	0.033
204	Collector	8	210.72	0.50%	22.01	368.20	6%	1.291	0.111
205	Collector	8	234.04	0.30%	77.97	295.70	26%	1.592	0.234
206	Collector	8	226.50	0.40%	0.00	363.86	0%	0.000	0.000
207	Collector	8	230.58	0.40%	88.63	325.67	27%	1.769	0.238
208	Collector	8	188.93	1.50%	28.11	656.92	4%	2.086	0.094
209	Collector	8	111.08	0.50%	124.36	373.85	33%	2.145	0.265
210	Collector	8	66.12	-3.60%	130.46		100%	0.833	0.667
211	Collector	8	134.27	0.40%	3.04	362.61	1%	0.705	0.043
212	Collector	8	45.89	0.10%	133.51	194.99	69%	1.340	0.405
213	Collector	8	319.88	0.40%	135.25	346.94	39%	2.077	0.289
214	Collector	8	309.65	0.40%	142.78	332.98	43%	2.044	0.305
215	Collector	8	290.66	0.40%	150.40	364.24	41%	2.214	0.299
216	Collector	8	292.79	0.30%	3.76	312.35	1%	0.677	0.051
217	Collector	8	352.34	0.50%	0.00	380.83	0%	0.000	0.000
218	Collector	8	37.39	-0.20%	0.00		100%	0.000	0.000
219	Interceptor	10	399.50	0.30%	125.48	522.29	24%	1.754	0.278
220	Interceptor	10	400.05	0.10%	126.98	357.52	36%	1.336	0.343
221	Interceptor	10	398.91	0.20%	126.98	439.33	29%	1.553	0.307
222	Interceptor	10	401.39	0.10%	130.02	285.27	46%	1.138	0.395
223	Collector	8	321.12	0.30%	0.00	283.86	0%	0.000	0.000
224	Interceptor	10	625.38	0.10%	35.06	323.93	11%	0.866	0.185
225	Interceptor	10	596.70	0.30%	53.36	580.45	9%	1.479	0.171
226	Collector	8	524.65	0.30%	0.00	312.36	0%	0.000	0.000
227	Collector	8	596.77	0.20%	32.57	240.27	14%	1.071	0.166
228	Collector	8	630.23	0.40%	28.49	362.92	8%	1.380	0.126
229	Collector	8	595.03	0.40%	20.81	342.18	6%	1.206	0.111

MODEL SCENARIO 2B
SEWER SYSTEM MODEL OUTPUT
2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
230	Collector	8	311.51	0.20%	54.86	240.64	23%	1.244	0.216
231	Collector	8	318.62	0.30%	47.24	289.66	16%	1.362	0.182
232	Collector	8	51.40	2.10%	45.74	788.28	6%	2.741	0.109
234	Collector	8	628.25	0.20%	15.83	260.26	6%	0.917	0.111
235	Collector	8	628.10	0.20%	77.65	235.20	33%	1.347	0.264
236	Collector	8	460.30	0.30%	0.00	312.39	0%	0.000	0.000
237	Collector	10	602.01	0.20%	106.88	459.59	23%	1.529	0.273
238	Collector	10	249.65	0.30%	123.99	533.17	23%	1.774	0.273
239	Collector	10	298.19	0.10%	127.04	361.58	35%	1.348	0.341
240	Collector	10	302.21	0.60%	130.09	768.51	17%	2.338	0.232
241	Collector	8	278.02	0.20%	3.04	219.51	1%	0.497	0.055
242	Collector	8	124.08	0.40%	7.62	336.82	2%	0.884	0.069
243	Collector	8	297.44	0.40%	172.46	349.27	49%	2.222	0.331
245	Collector	8	576.99	-0.80%	7.52		100%	0.048	0.667
246	Collector	8	327.10	0.30%	7.52	319.90	2%	0.849	0.071
247	Collector	8	286.59	0.50%	172.46	376.67	46%	2.351	0.317
250	Collector	8	70.41	0.90%	3.76	503.67	1%	0.944	0.041
251	Collector	8	111.07	0.40%	14.28	348.82	4%	1.093	0.092
252	Interceptor	10	399.14	0.20%	149.85	406.07	37%	1.533	0.350
253	Interceptor	10	163.27	0.10%	152.89	348.53	44%	1.377	0.386
256	Collector	10	594.56	0.40%	33.00	660.49	5%	1.406	0.127
257	Collector	10	59.02	0.90%	0.00	912.97	0%	0.000	0.000
258	Interceptor	12	625.45	0.20%	442.55	676.66	65%	2.046	0.590
259	Collector	8	206.62	0.20%	0.00	267.51	0%	0.000	0.000
260	Collector	8	182.89	0.40%	3.76	348.47	1%	0.731	0.049
261	Collector	10	277.94	0.50%	287.64	695.52	41%	2.707	0.373
262	Collector	8	629.32	0.10%	55.61	204.39	27%	1.110	0.238
263	Collector	8	280.18	0.40%	4.46	334.80	1%	0.749	0.054
266	Collector	10	298.85	0.40%	139.21	594.10	23%	1.981	0.274
267	Collector	10	302.49	0.30%	140.71	509.59	28%	1.779	0.299
268	Collector	10	297.23	0.30%	160.16	544.96	29%	1.935	0.309
269	Interceptor	8	84.59	0.40%	814.20	344.26	237%	5.197	0.667
270	Collector	8	270.19	0.30%	4.57	294.98	2%	0.690	0.058
272	Collector	8	162.39	0.50%	4.58	398.72	1%	0.852	0.050
273	Collector	8	101.42	0.50%	15.23	381.05	4%	1.186	0.091
274	Collector	8	218.11	0.50%	64.02	369.13	17%	1.766	0.188
275	Collector	8	271.96	0.40%	19.82	358.20	6%	1.228	0.106
276	Collector	8	389.96	0.50%	18.86	379.58	5%	1.260	0.101
277	Collector	8	171.31	0.80%	21.90	495.97	4%	1.590	0.095
278	Interceptor	10	238.02	0.20%	152.89	453.71	34%	1.672	0.333
279	Interceptor	10	398.53	0.10%	183.94	275.88	67%	1.207	0.498
280	Interceptor	10	363.03	0.20%	274.47	433.58	63%	1.874	0.481
281	Collector	8	201.13	0.50%	25.01	379.21	7%	1.369	0.116

MODEL SCENARIO 2B

SEWER SYSTEM MODEL OUTPUT

2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
282	Interceptor	10	36.87	0.00%	183.94	170.30	108%	0.751	0.833
283	Collector	8	286.29	0.50%	4.54	383.12	1%	0.827	0.051
284	Collector	8	196.27	-0.40%	1.50		100%	0.010	0.667
285	Collector	8	180.71	0.40%	1.50	357.95	0%	0.563	0.031
286	Collector	8	140.86	0.40%	18.91	350.15	5%	1.192	0.105
288	Collector	8	517.38	0.30%	41.13	303.73	14%	1.354	0.166
289	Collector	8	216.12	0.30%	41.13	316.27	13%	1.393	0.162
290	Collector	8	301.18	0.40%	7.53	333.83	2%	0.875	0.069
291	Collector	8	105.57	0.30%	48.66	314.01	16%	1.455	0.177
292	Collector	8	399.19	-0.10%	0.00		100%	0.000	0.000
293	Collector	8	158.91	0.70%	49.18	454.08	11%	1.897	0.148
295	Collector	8	401.16	0.20%	49.18	214.64	23%	1.111	0.217
296	Collector	8	398.36	0.20%	49.18	231.83	21%	1.175	0.208
297	Collector	8	325.51	0.40%	3.04	337.53	1%	0.670	0.045
298	Collector	8	275.35	0.40%	12.19	345.27	4%	1.035	0.086
299	Collector	8	380.20	0.10%	61.36	124.10	49%	0.790	0.331
300	Collector	8	34.37	0.60%	49.18	412.78	12%	1.773	0.155
301	Interceptor	10	374.71	0.10%	399.79	310.25	129%	1.633	0.833
302	Interceptor	10	391.37	0.10%	399.79	305.61	131%	1.633	0.833
303	Interceptor	10	573.11	0.10%	335.37	380.61	88%	1.755	0.607
304	Interceptor	10	315.08	0.30%	399.79	541.97	74%	2.422	0.532
305	Interceptor	10	241.48	0.00%	399.79	177.21	226%	1.633	0.833
306	Collector	8	300.12	1.00%	35.71	543.06	7%	1.959	0.116
307	Collector	8	193.95	0.90%	28.09	511.06	6%	1.748	0.106
308	Interceptor	15	519.24	0.30%	601.30	1669.73	36%	2.784	0.519
309	Collector	8	591.78	0.30%	0.00	312.40	0%	0.000	0.000
310	Collector	8	320.26	0.30%	5.26	293.67	2%	0.718	0.062
311	Collector	8	294.92	0.40%	3.76	361.46	1%	0.750	0.048
312	Collector	8	336.16	0.30%	3.76	297.63	1%	0.655	0.053
313	Collector	8	327.47	0.40%	3.76	361.36	1%	0.750	0.048
314	Collector	8	249.58	0.50%	0.00	387.30	0%	0.000	0.000
315	Collector	8	301.61	0.40%	3.76	330.05	1%	0.704	0.050
316	Collector	8	316.50	0.60%	3.76	421.78	1%	0.835	0.045
317	Collector	8	296.69	0.20%	3.76	234.77	2%	0.555	0.059
318	Collector	8	341.12	0.30%	3.76	311.88	1%	0.677	0.051
320	Collector	8	347.72	0.50%	33.54	367.84	9%	1.461	0.136
321	Collector	8	225.81	0.40%	7.62	349.17	2%	0.906	0.068
322	Collector	8	172.55	0.40%	11.29	335.81	3%	0.992	0.084
323	Collector	8	137.41	0.30%	11.29	315.66	4%	0.950	0.086
324	Collector	8	265.46	0.50%	3.76	386.51	1%	0.786	0.046
325	Collector	8	600.96	0.30%	3.76	319.39	1%	0.688	0.051
327	Collector	8	503.82	0.30%	10.52	296.82	4%	0.891	0.086
328	Collector	8	304.84	0.30%	5.54	315.79	2%	0.767	0.061

MODEL SCENARIO 2B
SEWER SYSTEM MODEL OUTPUT
2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
331	Collector	8	337.23	0.50%	6.65	378.88	2%	0.921	0.061
332	Collector	8	234.41	0.30%	66.53	292.03	23%	1.510	0.216
333	Collector	8	52.05	0.80%	66.53	482.65	14%	2.162	0.167
334	Collector	8	159.11	0.40%	66.53	351.03	19%	1.723	0.197
335	Collector	8	270.91	0.20%	60.44	258.25	23%	1.345	0.219
336	Collector	8	104.79	0.40%	58.55	331.33	18%	1.594	0.190
337	Collector	8	293.08	0.40%	5.49	364.40	2%	0.845	0.057
338	Collector	8	354.55	0.30%	0.37	318.99	0%	0.339	0.017
339	Collector	8	496.45	0.30%	0.00	312.36	0%	0.000	0.000
340	Interceptor	15	304.28	0.20%	606.25	1341.54	45%	2.374	0.589
341	Interceptor	15	312.25	0.10%	607.75	1037.86	59%	1.958	0.687
342	Interceptor	15	335.35	0.10%	772.45	886.70	87%	1.814	0.903
343	Interceptor	15	301.60	0.30%	772.45	1542.36	50%	2.801	0.626
344	Collector	8	594.21	0.20%	55.02	212.46	26%	1.138	0.231
345	Collector	8	595.49	0.20%	77.89	255.15	31%	1.430	0.253
346	Collector	8	594.29	0.30%	28.81	320.17	9%	1.267	0.135
347	Collector	8	547.50	0.30%	7.62	312.41	2%	0.838	0.072
348	Collector	10	319.46	-0.10%	281.54		100%	1.150	0.833
349	Collector	12	595.07	0.20%	115.37	757.99	15%	1.553	0.264
350	Collector	12	326.74	0.10%	171.68	532.93	32%	1.347	0.390
351	Collector	12	267.73	0.70%	171.68	1373.93	13%	2.659	0.239
352	Collector	8	268.75	0.90%	0.00	512.07	0%	0.000	0.000
353	Collector	8	195.92	0.30%	0.00	300.69	0%	0.000	0.000
354	Collector	8	280.56	1.10%	0.00	572.91	0%	0.000	0.000
355	Collector	8	62.10	-0.80%	0.00		100%	0.000	0.000
356	Collector	8	145.86	1.80%	4.22	719.73	1%	1.254	0.037
357	Interceptor	10	180.27	0.30%	158.99	561.20	28%	1.973	0.303
358	Collector	8	102.98	0.10%	15.23	185.64	8%	0.715	0.129
359	Collector	8	306.96	0.80%	7.53	491.05	2%	1.145	0.058
360	Collector	8	235.41	0.40%	17.39	362.83	5%	1.192	0.099
361	Collector	8	262.08	0.20%	39.63	268.31	15%	1.226	0.173
362	Collector	8	247.11	0.40%	38.13	355.32	11%	1.480	0.147
363	Collector	8	217.40	0.30%	0.00	312.30	0%	0.000	0.000
364	Collector	8	326.16	0.30%	12.92	320.65	4%	1.000	0.091
365	Collector	8	216.66	0.40%	0.00	331.68	0%	0.000	0.000
366	Interceptor	10	290.27	0.50%	140.70	723.29	20%	2.289	0.249
367	Collector	8	361.00	0.40%	6.10	341.42	2%	0.834	0.062
368	Collector	8	86.95	0.00%	12.03		100%	0.077	0.667
369	Collector	8	314.73	1.50%	15.96	655.28	2%	1.757	0.072
370	Collector	8	247.57	0.30%	49.18	291.42	17%	1.384	0.185
371	Collector	8	151.21	-0.40%	49.18		100%	0.314	0.667
372	Interceptor	10	402.96	0.20%	399.79	415.62	96%	1.934	0.656
373	Interceptor	10	401.97	0.10%	399.79	343.90	116%	1.633	0.833

MODEL SCENARIO 2B

SEWER SYSTEM MODEL OUTPUT

2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
374	Collector	8	297.04	0.10%	4.42	182.89	2%	0.489	0.071
375	Collector	8	592.49	0.10%	28.81	192.83	15%	0.884	0.174
376	Collector	10	595.46	0.20%	352.41	482.67	73%	2.152	0.529
377	Collector	10	595.24	0.50%	172.82	689.04	25%	2.342	0.284
378	Collector	12	566.32	0.40%	4.66	1036.11	0%	0.740	0.048
379	Collector	12	338.12	0.10%	188.36	448.86	42%	1.218	0.452
380	Collector	8	350.38	0.70%	16.66	453.80	4%	1.377	0.087
381	Interceptor	10	629.02	0.50%	125.75	684.21	18%	2.131	0.242
382	Collector	12	616.84	0.30%	4.95	879.00	1%	0.673	0.054
383	Collector	8	205.11	0.30%	0.00	287.42	0%	0.000	0.000
384	Collector	8	479.50	0.30%	3.76	312.35	1%	0.677	0.051
385	Collector	8	588.61	0.60%	14.33	412.27	4%	1.230	0.085
386	Collector	8	367.39	0.20%	61.36	216.81	28%	1.190	0.243
387	Collector	8	110.16	0.40%	11.29	342.50	3%	1.006	0.083
388	Collector	8	123.22	0.60%	11.29	430.71	3%	1.181	0.074
389	Collector	8	125.87	0.20%	3.76	231.95	2%	0.550	0.059
390	Collector	8	176.18	0.40%	48.77	340.56	14%	1.543	0.170
391	Collector	8	215.49	0.50%	6.08	382.66	2%	0.902	0.059
392	Collector	8	224.71	0.40%	16.77	342.81	5%	1.133	0.100
393	Collector	8	86.72	-0.10%	66.53		100%	0.425	0.667
394	Collector	8	156.92	0.40%	5.49	328.61	2%	0.787	0.060
395	Collector	8	240.04	0.40%	70.35	324.55	22%	1.655	0.211
396	Collector	8	79.99	0.00%	0.00		0%	0.000	0.000
397	Collector	8	110.48	5.80%	0.00	1305.24	0%	0.000	0.000
398	Interceptor	8	93.77	0.40%	814.20	344.35	236%	5.197	0.667
399	Collector	10	279.37	0.30%	3.04	536.13	1%	0.592	0.045
400	Collector	10	298.73	0.30%	131.59	502.85	26%	1.729	0.291
401	Collector	8	159.95	2.00%	5.03	774.80	1%	1.393	0.038
402	Collector	8	158.10	0.10%	5.03	180.40	3%	0.504	0.077
403	Collector	8	297.93	0.40%	22.86	364.02	6%	1.296	0.113
404	Collector	8	116.19	0.40%	0.00	348.07	0%	0.000	0.000
405	Collector	8	150.68	0.30%	3.04	295.86	1%	0.612	0.048
406	Collector	8	246.31	0.30%	3.04	295.64	1%	0.611	0.048
407	Collector	8	404.77	0.30%	3.04	295.72	1%	0.611	0.048
408	Collector	8	181.21	0.30%	3.04	295.76	1%	0.611	0.048
409	Collector	8	176.87	0.30%	3.04	295.71	1%	0.611	0.048
410	Collector	8	257.18	0.30%	3.04	295.81	1%	0.611	0.048
411	Collector	8	198.79	0.30%	6.09	295.76	2%	0.754	0.066
412	Collector	8	716.15	0.30%	42.70	315.07	14%	1.405	0.166
413	Collector	8	283.99	0.30%	42.70	312.36	14%	1.396	0.167
414	Collector	8	173.95	0.30%	38.13	312.38	12%	1.351	0.157
417	Collector	8	206.45	0.30%	38.13	312.78	12%	1.352	0.157
420	Collector	8	80.14	1.10%	7.52	560.71	1%	1.256	0.054

MODEL SCENARIO 2B

SEWER SYSTEM MODEL OUTPUT

2038 DESIGN FLOW WITH THE EXISTING SYSTEM - PEAKING FACTOR OF 4.0 (COLLECTOR)

Pipe #	Collector/ Interceptor	Diameter (in)	Length (ft)	Slope	Flow (gpm)	Full Flow (gpm)	% of Capacity	Velocity (ft/s)	Water Depth (ft)
421	Collector	8	105.40	0.30%	7.52	312.47	2%	0.835	0.071
423	Collector	8	375.25	0.30%	7.52	312.35	2%	0.835	0.071
424	Collector	8	78.92	2.40%	9.02	836.63	1%	1.754	0.049
425	Collector	8	16.04	1.00%	0.00	544.78	0%	0.000	0.000
426	Collector	8	9.39	0.30%	0.00	312.42	0%	0.000	0.000
428	Collector	8	184.84	0.30%	0.00	312.40	0%	0.000	0.000
430	Collector	8	200.50	0.30%	6.10	312.47	2%	0.784	0.065
431	Collector	8	296.82	0.30%	6.10	297.78	2%	0.758	0.066
433	Collector	8	54.28	0.30%	180.08	312.28	58%	2.064	0.363
443	Collector	8	1195.13	0.30%	49.18	312.39	16%	1.454	0.179
447	Interceptor	10	68.26	0.20%	399.79	484.75	83%	2.212	0.577
449	Interceptor	10	5.00	0.40%	399.79	623.59	64%	2.704	0.485
465	Collector	8	491.49	0.30%	0.00	312.40	0%	0.000	0.000
467	Collector	8	157.24	0.30%	0.00	312.42	0%	0.000	0.000
471	Collector	8	280.67	0.30%	0.00	312.36	0%	0.000	0.000
479	Collector	8	194.19	0.30%	0.00	312.43	0%	0.000	0.000
495	Collector	8	117.78	0.80%	4.22	483.21	1%	0.950	0.044
501	Well Connection	10	5.00	0.90%	601.30	935.39	64%	4.058	0.486
515	Interceptor	36	10.00	0.00%	814.20	949.21	86%	0.336	2.140
517	Interceptor	36	10.00	0.00%	399.79	949.21	42%	0.286	1.358
519	Collector	8	653.89	0.10%	12.90	207.93	6%	0.737	0.113
521	Collector	8	306.32	0.50%	5.03	368.69	1%	0.830	0.054

APPENDIX C:

Engineer's Opinion of Probable Cost

SUNRISE ENGINEERING, INC.
CONSULTING ENGINEERS AND SURVEYORS

Opinion of Probable Costs

Project: Delta WW Masterplan OPC

By: JR
Date: Mar-19

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	MOBILIZATION (5%)	1	LS	$ 810,000.00	$ 810,000
	NEW GRAVITY MAIN - STATION A TO STATION F				
2	10" (ASTM 3034) PVC Sewer Pipe & Fittings (Station A to Station F)	1,670	Ln. Ft.	$ 43.00	$ 71,810
3	Import Pipe Bedding	1,670	Ln. Ft.	$ 1.00	$ 1,670
4	Service Connections	15	EA	$ 800.00	$ 12,000
5	Replace Laterals to Property Line - 4" Sewer Pipe	750	Ln. Ft.	$ 32.00	$ 24,000
6	Cleanout	15	EA	$ 300.00	$ 4,500
7	New Manholes	5	EA	$ 4,500.00	$ 22,500
8	Pavement Sawcut/Rotomill Exist Pavement	900	Ln. Ft.	$ 2.00	$ 1,800
9	Import UBC	200	CY	$ 35.00	$ 7,000
10	3" HMA Surfacing	1,000	SY	$ 30.00	$ 30,000
11	Decommission & Demo Station A	1	LS	$ 40,000.00	$ 40,000
	Subtotal - New Gravity Main from Station A to Station F				$ 215,280
	LIFT STATION F UPGRADES				
12	Replace Primary Wet Well	1	LS	$ 25,000.00	$ 25,000
13	Install Backup Wet Well	1	Ln. Ft.	$ 15,000.00	$ 15,000
14	Install Duplex Primary Pumps & Controls (Assume 20 HP Pumps)	1	LS	$ 100,000.00	$ 100,000
15	Install Backup Simplex Pump & Controls (Asusme 20 HP Pump)	1	LS	$ 50,000.00	$ 50,000
16	Instrumentation & Controls	1	LS	$ 20,000.00	$ 20,000
17	Lift Station Piping & Valves	1	LS	$ 25,000.00	$ 25,000
18	New Backup Generator w/Enclosure	1	LS	$ 50,000.00	$ 50,000
19	Demo Station A	1	LS	$ 20,000.00	$ 20,000
	Subtotal - Lift Station F Upgrades				$ 305,000
	NEW FORCE MAIN FROM STATION F TO STATION B				
20	12" AWWA C900 PVC Force Main	5,000	Ln. Ft.	$ 36.00	$ 180,000
21	Pipe Bedding	5,000	Ln. Ft.	$ 1.00	$ 5,000
22	2" Combination Air Valve Assembies	4	EA	$ 4,500.00	$ 18,000
23	12" Plug Valves	4	EA	$ 5,000.00	$ 20,000
	Subtotal - New Force Main, Station F to Station B				$ 223,000
	SEWER REPLACEMENT - ZONE A				
24	8" (ASTM 3034) PVC Sewer Pipe & Fittings	29,690	Ln. Ft.	$ 36.00	$ 1,068,840
25	10" (ASTM 3034) PVC Sewer Pipe & Fittings	8,457	Ln. Ft.	$ 43.00	$ 363,651
26	12" (ASTM 3034) PVC Sewer Pipe & Fittings	5,015	Ln. Ft.	$ 50.00	$ 250,750
27	Import Pipe Bedding	43,162	Ln. Ft.	$ 1.00	$ 43,162
28	Service Connections	531	EA	$ 800.00	$ 424,800
29	Replace Laterals to Property Line - 4" Sewer Pipe	26,550	Ln. Ft.	$ 32.00	$ 849,600
30	Cleanout	531	EA	$ 300.00	$ 159,300
31	New Manholes	102	EA	$ 4,500.00	$ 459,000
32	Pavement Sawcut/Rotomill Exist Pavement	43,162	Ln. Ft.	$ 2.00	$ 86,324
33	Import UBC	9,500	CY	$ 35.00	$ 332,500
34	3" HMA Surfacing	50,000	SY	$ 30.00	$ 1,500,000
35	Import Granular Borrow (UDOT)	7,000	CY	$ 25.00	$ 175,000
36	8" HMA Surfacing (UDOT)	4,000	SY	$ 50.00	$ 200,000
37	Flowable Fill (UDOT Crossings & Services)	1,500	CY	$ 110.00	$ 165,000
38	2" Mill & Overlay	9,000	SY	$ 25.00	$ 225,000
	Subtotal 2 - Sewer Replacement for Zone A				$ 6,302,927
	NEW FORCE MAIN FROM STATION B TO LAGOONS				
39	12" AWWA C900 PVC Force Main	8,300	Ln. Ft.	$ 36.00	$ 298,800
40	Pipe Bedding	8,300	Ln. Ft.	$ 1.00	$ 8,300
41	2" Combination Air Valve Assembies	4	EA	$ 4,500.00	$ 18,000
42	12" Plug Valves	4	EA	$ 5,000.00	$ 20,000
	Subtotal - New Force Main for Station B to Lagoons				$ 345,100
	LIFT STATION C UPGRADES				
43	Replace Primary Wet Well	1	LS	$ 20,000.00	$ 20,000

44	Install Backup Wet Well	1	Ln. Ft.	$ 15,000.00	$ 15,000
45	Install Duplex Primary Pumps & Controls (Assume 7.5 HP Pumps)	1	LS	$ 50,000.00	$ 50,000
46	Install Backup Simplex Pump & Controls (Asusme 7.5 HP Pump)	1	LS	$ 25,000.00	$ 25,000
47	Instrumentation & Controls	1	LS	$ 15,000.00	$ 15,000
48	Lift Station Piping & Valves	1	LS	$ 15,000.00	$ 15,000
49	New Backup Generator w/Enclosure	1	LS	$ 35,000.00	$ 35,000
50	Direction Drill New Force Main Under Hwy 6	1	LS	$ 20,000.00	$ 20,000
	Subtotal - Lift Station C Upgrades				$ 195,000
	SEWER REPLACEMENT - ZONE B & C				
51	8" (ASTM 3034) PVC Sewer Pipe & Fittings	13,085	Ln. Ft.	$ 36.00	$ 471,060
52	10" (ASTM 3034) PVC Sewer Pipe & Fittings	2,375	Ln. Ft.	$ 43.00	$ 102,125
53	15" (ASTM 3034) PVC Sewer Pipe & Fittings	2,400	Ln. Ft.	$ 60.00	$ 144,000
54	Import Pipe Bedding	17,860	Ln. Ft.	$ 1.00	$ 17,860
55	Service Connections	184	EA	$ 800.00	$ 147,200
56	Replace Laterals to Property Line - 4" Sewer Pipe	9,200	Ln. Ft.	$ 32.00	$ 294,400
57	Cleanout	184	EA	$ 300.00	$ 55,200
58	New Manholes	60	EA	$ 4,500.00	$ 270,000
59	Pavement Sawcut/Rotomill Exist Pavement	17,860	Ln. Ft.	$ 2.00	$ 35,720
60	Import UBC	3,500	CY	$ 35.00	$ 122,500
61	3" HMA Surfacing	20,000	SY	$ 30.00	$ 600,000
62	Import Granular Borrow (UDOT)	1,500	CY	$ 25.00	$ 37,500
63	8" HMA Surfacing (UDOT)	800	SY	$ 50.00	$ 40,000
64	Flowable Fill (UDOT Crossings & Services)	50	CY	$ 110.00	$ 5,500
65	2" Mill & Overlay	1,600	SY	$ 25.00	$ 40,000
	Subtotal - Sewer Replacement for Zones B & C				$ 2,383,065
	SEWER REPLACEMENT - ZONE D & E- CITY STREETS				
66	8" (ASTM 3034) PVC Sewer Pipe & Fittings	16,725	Ln. Ft.	$ 36.00	$ 602,100
67	Import Pipe Bedding	16,725	Ln. Ft.	$ 1.00	$ 16,725
68	Service Connections	209	EA	$ 800.00	$ 167,200
69	Replace Laterals to Property Line - 4" Sewer Pipe	10,450	Ln. Ft.	$ 32.00	$ 334,400
70	Cleanout	209	EA	$ 300.00	$ 62,700
71	New Manholes	83	EA	$ 4,500.00	$ 373,500
72	Pavement Sawcut/Rotomill Exist Pavement	16,725	Ln. Ft.	$ 2.00	$ 33,450
73	Import UBC	3,200	CY	$ 35.00	$ 112,000
74	3" HMA Surfacing	20,000	SY	$ 30.00	$ 600,000
	Subtotal - Sewer Replacement for Zones D & E				$ 2,302,075
	GENERAL PROJECT ITEMS				
75	Subsurface Investigation	240	Hr	$ 200.00	$ 48,000
76	Materials Testing	1	Est	$ 160,000.00	$ 160,000
77	Bypass Pumping	1	Est	$ 80,000.00	$ 80,000
78	Utiility Conflicts & Repairs	1	Est	$ 90,000.00	$ 90,000
79	Traffic Control	1	Est	$ 50,000.00	$ 50,000
	Subtotal - General Project Items				$ 428,000
	Construction Subtotal				$ 13,509,447
80	CONTINGENCY		20%		$ 2,701,889.40
	Total Construction				$ 16,211,336
	INCIDENTALS & PROFESSIONAL SERVICES				
81	Funding & Administration	1	Est.	$ 40,000.00	$ 40,000
82	Environmental Assessment/Study	1	Est.	$ 35,000.00	$ 35,000
83	USDA-RD PER	1	Est.	$ 35,000.00	$ 35,000
83	Site Survey Design	1	LS	$ 35,000.00	$ 35,000
84	Easement Preparation	0	Est.	$ 10,000.00	$ -
85	Engineering Design		5.2%	(of total project)	$ 973,000
86	UDOT Coordination	1	LS	$ 15,000.00	$ 15,000
87	Bid Phase Services	1	LS	$ 16,000.00	$ 16,000
88	Construction Phase Services	1	Hourly	$ 1,300,000.00	$ 1,300,000
89	Legal	1	Est.	$ 30,000.00	$ 30,000
90	Post Construction Mapping Updates	1	Est.	$ 15,000.00	$ 15,000
91	Construction Staking	1	Est.	$ 50,000.00	$ 50,000
92	Incidentals & Professional Services Contingency		5%		$ 127,000
	Incidentals & Professional Services Total				$ 2,671,000
	TOTAL PROJECT COST				$ 18,882,336

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.

APPENDIX D:
Sample Financing Plans

Delta City Proposed WW Improvements

Recommended System Improvements

March-19

Total Project Cost		**$**	**18,882,336.00**
Proposed Funding:	% of Project		
Self Participation	0%		-
DWQ Loan	0%		-
DWQ Grant	0%		-
CIB Loan	0%		-
CIB Grant	0%		-
USDA RD Loan	55%		10,385,284.80
USDA RD Grant	45%		8,497,051.20
	100%		
Total Project Funding		**$**	**18,882,336.00**

Annual Expenses: (Projected)

2017 Expenses Less Depreciation (See Attached Expense Sheet)			272,827.00
Total Operation and Maintenance			272,827.00
Existing Debt Service:			
None Known			-
Total Existing Debt Service			-
New Debt Service:			
DDW Loan			
CIB Loan	-		$0.00
USDA RD Loan	(2.75% for 40 Yrs; Loan Amount: 10,385,284.80		$431,316.59
10% Debt Reserve			$43,131.66
Total Estimated New Debt Service			$474,448.25
Total Annual Income Required			**$747,275.25**

Annual Income:

Total Number of Active ERC's Billed		1,206
Total Annual Income Required		747,275.25
Total Annual Income Required w/ 1.25% debt service coverage		865,887.31
Average Monthly Sewer User Rate	**$**	**59.83**
Average Monthly Overages		
Average Monthly Total Sewer User Rate	**$**	**59.83**
Median Adjusted Gross Income (2017 MAGI)		43,944.00
1.40% of MAGI Per Month	**$**	**51.27**
% of MAGI Per Month Projected		1.63%

Delta City Proposed WW Improvements

Recommended System Improvements

March-19

Total Project Cost		**$**	**18,882,336.00**
Proposed Funding:	% of Project		
Self Participation	0%		-
DWQ Loan	10%		1,888,233.60
DWQ Grant	20%		3,776,467.20
CIB Loan	0%		-
CIB Grant	0%		-
USDA RD Loan	39%		7,269,699.36
USDA RD Grant	32%		5,947,935.84
USACE Grant	0%		-
	100%		
Total Project Funding		**$**	**18,882,336.00**

Annual Expenses: (Projected)

2017 Expenses Less Depreciation (See Attached Expense Sheet)			272,827.00
Total Operation and Maintenance			272,827.00
Existing Debt Service:			
None Known			-
Total Existing Debt Service			-
New Debt Service:			
DWQ Loan	1,888,233.60		$73,165.46
CIB Loan	-		$0.00
USDA RD Loan (2.75% for 40 Yrs; Loan Amount:	7,269,699.36		$301,921.61
10% Debt Reserve			$37,508.71
Total Estimated New Debt Service			$412,595.78
Total Annual Income Required			**$685,422.78**

Annual Income:

Total Number of Active ERC's Billed			1,206
Total Annual Income Required			685,422.78
Total Annual Income Required w/ 1.25% debt service coverage			788,571.72
Average Monthly Sewer User Rate		**$**	**54.49**
Average Monthly Overages			
Average Monthly Total Sewer User Rate		**$**	**54.49**
Median Adjusted Gross Income (2017 MAGI)			43,944.00
1.40% of MAGI Per Month		**$**	**51.27**
% of MAGI Per Month Projected			1.49%