FINAL REPORT

2019 SANITARY SEWER MASTER PLAN UPDATE

Master Plan

B&V PROJECT NO. 400609

PREPARED FOR

City of Norfolk, Nebraska

23 MARCH 2020

BLACK & VEATCH

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Abbreviations and Acronyms

The following abbreviations and acronyms are used in this report.

2008 Sewer Plan	2008 Sanitary Sewer Master Plan
2017 Comp Plan	Norfolk Comprehensive Plan 2017 Update
2019 Sewer Plan	2019 Sanitary Sewer Master Plan Update
ADDF	average daily dry weather flow
BSF	base sewage flow
CCFRPM	centrifugally cast fiberglass reinforced polymer mortar
CCTV	closed-circuit television
CIP	capital improvements plan
CIPP	cured in place pipelining
City	City of Norfolk, Nebraska
CP	concrete pipe
DWF	dry weather flows
EPS	extended period simulation
gpm	gallons per minute
gpcd	gallons per capita per day
HDPE	high density polyethylene
I&I	infiltration and inflow
mgd	gallons per day
Norfolk WPC Plant	Norfolk Water Pollution Control Plant
PVC	polyvinyl chloride pipe
Qc	flow at pipe capacity
Qp	peak flow
Qp/Qc	pipe utilization (expressed as a percent)
SP	steel pipe
SSO	sanitary sewer overflow
UV	ultraviolet
VCP	vitrified clay pipe
WWF	wet weather flows

1.0 Introduction

This project will update the City of Norfolk, Nebraska's (City's) 2008 Sanitary Sewer Master Plan (2008 Sewer Plan) as part of their ongoing sanitary sewer maintenance program to support future growth within the City.

1.1 PURPOSE OF THE STUDY

Since 2008 the City has seen growth and has completed several projects to enhance the performance of their sanitary sewer system and to provide adequate sewer capacity for their growing population. The purpose of the 2019 Sanitary Sewer Master Plan Update (2019 Sewer Plan) is to make the following updates to the 2008 Sewer Plan:

- Collect and analyze available data to update existing wastewater flows and project future wastewater flows. Existing flows reflect 2018 data and future flow projections are for year 2040.
- Update City's 2008 collection system hydraulic model to include existing and future sewer flows and facility updates.
- Validate existing collection system hydraulic model to mimic flow conditions at the Norfolk Water Pollution Control Plant (Norfolk WPC Plant) for wet weather and dry weather conditions.
- Evaluate collection system hydraulic model for existing and future peak design conditions.
- Identify capacity improvements to alleviate hydraulic deficiencies.
- Prepare recommendations and a Capital Improvements Plan (CIP) to guide the City in addressing their sanitary sewer collection system needs through 2040.

1.2 SYSTEM BACKGROUND AND DESCRIPTION

The wastewater collection system is owned, operated, and maintained by the City. The City's collection system is primarily a local service system of smaller diameter pipes serving the neighborhoods and developments within the City boundaries. Slightly less than 10 percent of the collection system is 15-inch-diameter and greater with the largest interceptor sewers within the City being 54 inches in diameter. The City operates and maintains 12 lift stations. Overall, the lift stations are in good operating condition with routine maintenance. All the flow collected and conveyed through this system is discharged to the Norfolk WPC Plant, which has a peak treatment capacity of 5.74 million gallons per day (mgd). The Norfolk WPC Plant is in the southeastern corner of the City and discharges treated effluent to the Elkhorn River.

2.0 Population Analysis and Service Area Growth Projections

This chapter describes the existing service area, as well as historical and projected population for the City.

2.1 HISTORICAL AND PROJECTED POPULATION

This section provides historical analysis of population trends in the City and population projections for year 2040.

2.1.1 Historical Population

Although the United States Census Bureau only performs a census of the United States and its territories every ten years, they also provide estimated population on a yearly basis. Based on the most recent Census data available (2018) the City's current population is approximately 24,700. This represents a growth of about 1,200 people or an average annual growth rate of 0.5% over the last 10 years. Figure 2-1 shows the estimated population by year from 2008 to 2018.

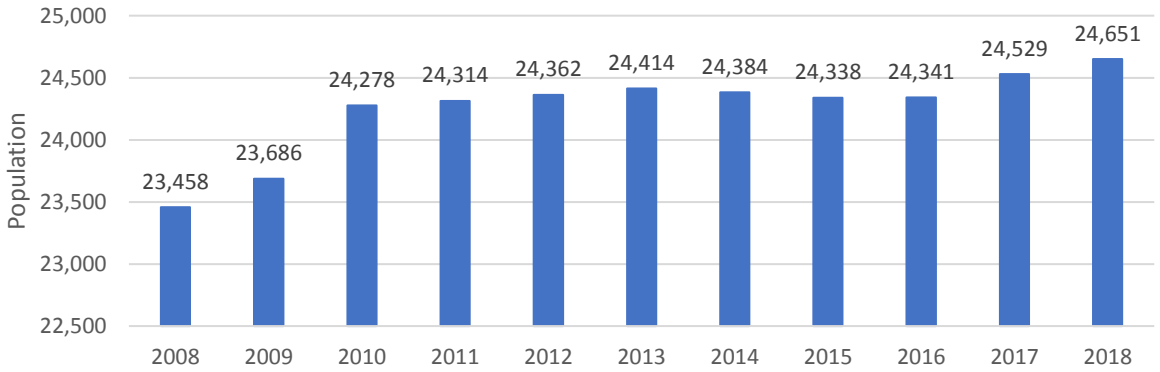


Figure 2-1 Historical Population – Census Data

2.1.2 Projected Population

To be consistent with other local planning, population projections for the 2019 Sewer Plan were taken from the Norfolk Comprehensive Plan 2017 Update (2017 Comp Plan). Various methods were used in the 2017 Comp Plan to project population growth by year 2040. Linear population projection was the method chosen, projecting a population of 28,193 by year 2040, which is an increase of approximately 3,500 people. This projection predicts a growth rate of 13%, which is higher than the historical rate of 5% (2008-2018).

2.2 EXISTING SERVICE AREA

The City wastewater collection system provides service for users over an area of about 11,500 acres. This includes the communities of Woodland Park, Suburban Acres, and Eastern Heights, which are outside of the City limits but are connected to the sanitary sewer collection system as shown in Figure 2-2.

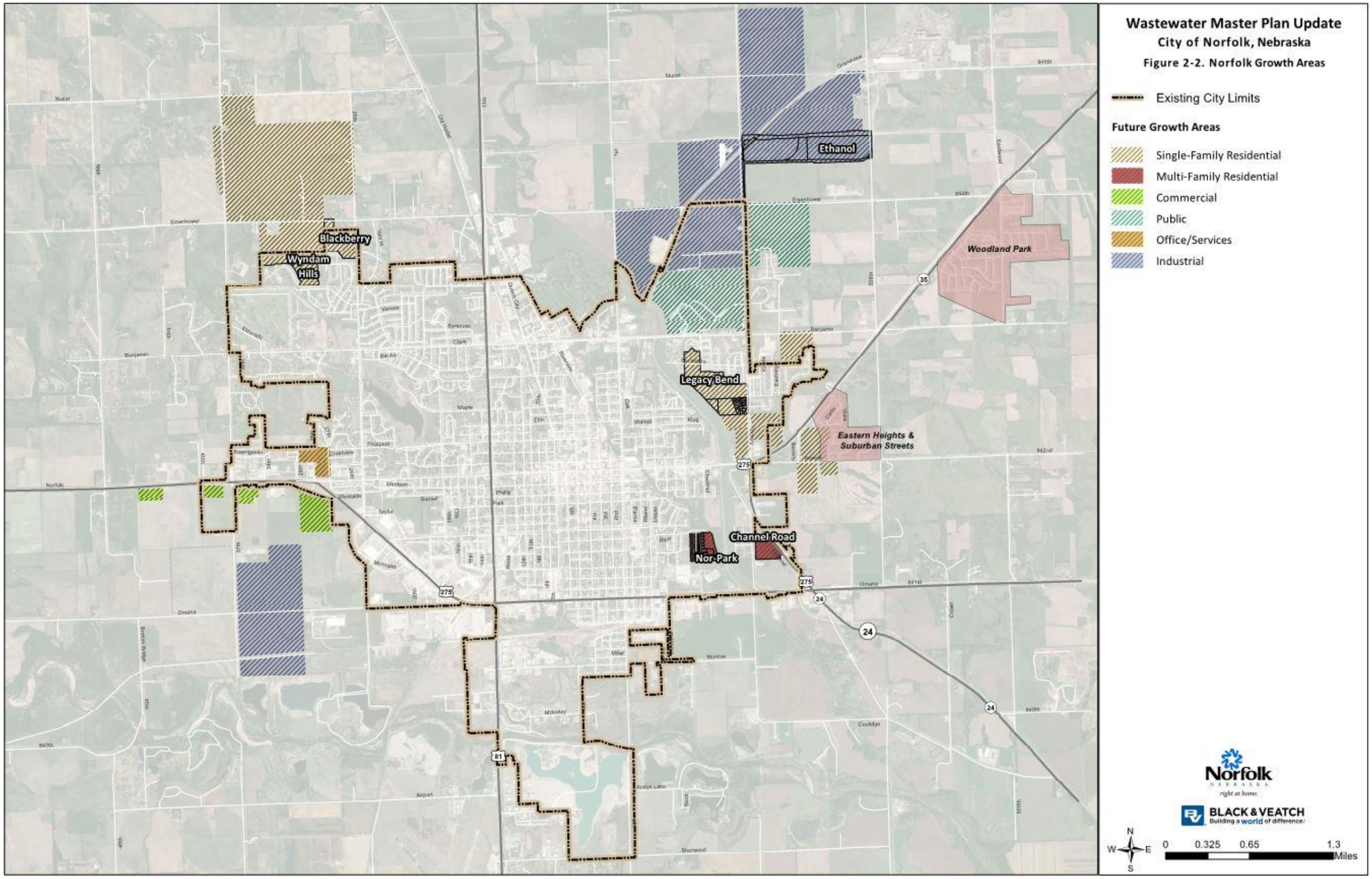


Figure 2-2 **Existing Sewer Service Area**

2.3 SERVICE AREA GROWTH PROJECTIONS

The City identified approximately 2,200 acres of available land within and adjacent to its current planning area that is likely for future development. Of this identified area, the 2017 Comp Plan estimated that development of 1,100 acres is expected to occur by 2040, leaving an additional 1,100 acres of development beyond 2040. The 2040 development growth includes an increase across all land uses and densification near the City core.

The City is currently in discussions with developers for several areas including Blackberry, Wyndham Hills, Legacy Bend, Channel Road, and Nor-Park, which are shown on Figure 2-2, as well as, areas that were identified as likely areas for growth with no specific developer at this time. There is existing development on the land assigned to Legacy Bend, Channel Road, and Nor-Park, but they are being redeveloped to remove or eliminate blight and substandard conditions within the City. Additional information on projected development areas are included in Table 2-1.

Table 2-1 Norfolk Growth Areas

LAND USE	IDENTIFIED LAND (ACRES)	2040 PLANNED DEVELOPMENT (ACRES)
Single-Family Residential	**1,000**	**393**
Blackberry and other residential property in this drainage basin	640	33
Wyndham Hills	44	44
Legacy Bend	92	92
Undefined	224	224
Multi-Family Residential	**42**	**42**
Channel Road	19	19
Nor-Park	23	23
Commercial	**462**	**288**
Industrial	**1,303**	**377**
Total Growth Area	**2,807**	**1,100**

3.0 Wastewater Collection System

Information about the existing sewer collection system was obtained from the City's AutoCAD and GIS electronic files, and available construction drawings for projects completed since the 2008 Sewer Plan.

3.1 NORFOLK WPC PLANT

All flow collected within the City's wastewater collection system is treated at the Norfolk WPC Plant. Evaluation of the capacity and treatment facilities at the Norfolk WPC Plant was not included in the scope of the 2019 Sewer Plan, but Table 3-1 summarizes the permitted flows and recent historical extreme flow conditions. The City has been working on inflow and infiltration reduction improvements and has seen peak wet weather flows at the Norfolk WPC Plant drop from about 12 mgd to 7.5 mgd over the last 10 years.

Table 3-1 Norfolk WPC Plant Summary

DESCRIPTION	FLOW (MGD)
Permitted Flow	
Maximum Month Design Flow	7.1
4-Hour Peak Design Flow	9.6
Peak Hourly Design Flow	14.9
Historical Flows	
10-Year Average Flow	3.0
10-Year Maximum Month Flow	3.6
10-Year Maximum Flow	13.92
10-Year Minimum Month Flow	2.8

Note: Flow average based on years 2008 – 2018

3.2 GRAVITY SEWERS

The City operates and maintains approximately 138 miles of gravity sewers in the wastewater collection system with pipe diameters ranging from 8-inches to 54-inches in diameter. As shown in Figure 3-1, approximately 93 percent of the collection system, by length, consists of pipes with diameters less than or equal to 18 inches, and 76 percent of the collection system is made up of 10-inch-diameter or smaller pipes. The hydraulic model was built to include all pipes greater than or equal to 12 inches in diameter, as well as smaller pipes that were hydraulically significant.

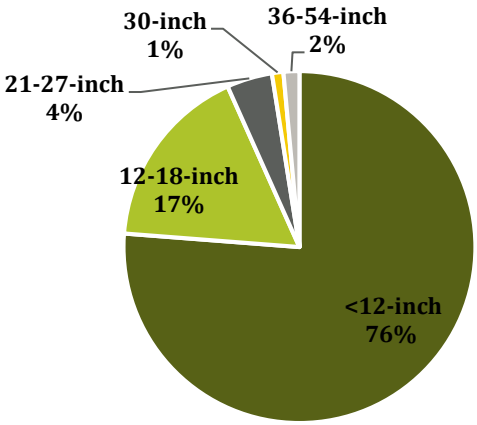


Figure 3-1 Gravity Sewer Diameters

Four interceptors convey the majority of flow to the Norfolk WPC Plant: a 21-inch to 27-inch interceptor from the western area of the system, a 21-inch to 36-inch interceptor from the northwestern area of the system, a 21-inch to 27-inch from the north central portion of the service area, and a 30-inch to 54-inch interceptor that conveys flow from the north eastern region of the collection system. A force main from Andy's Lift Station conveys the small amount of current flow that is located south of the Elkhorn River.

Figure 3-2 shows the existing sewer collection system: the modeled wastewater collection system (generally 12-inch and larger) and smaller than 12-inch existing pipes as maintained in the City's GIS database. This figure also shows existing lift stations and the Norfolk WPC Plant.

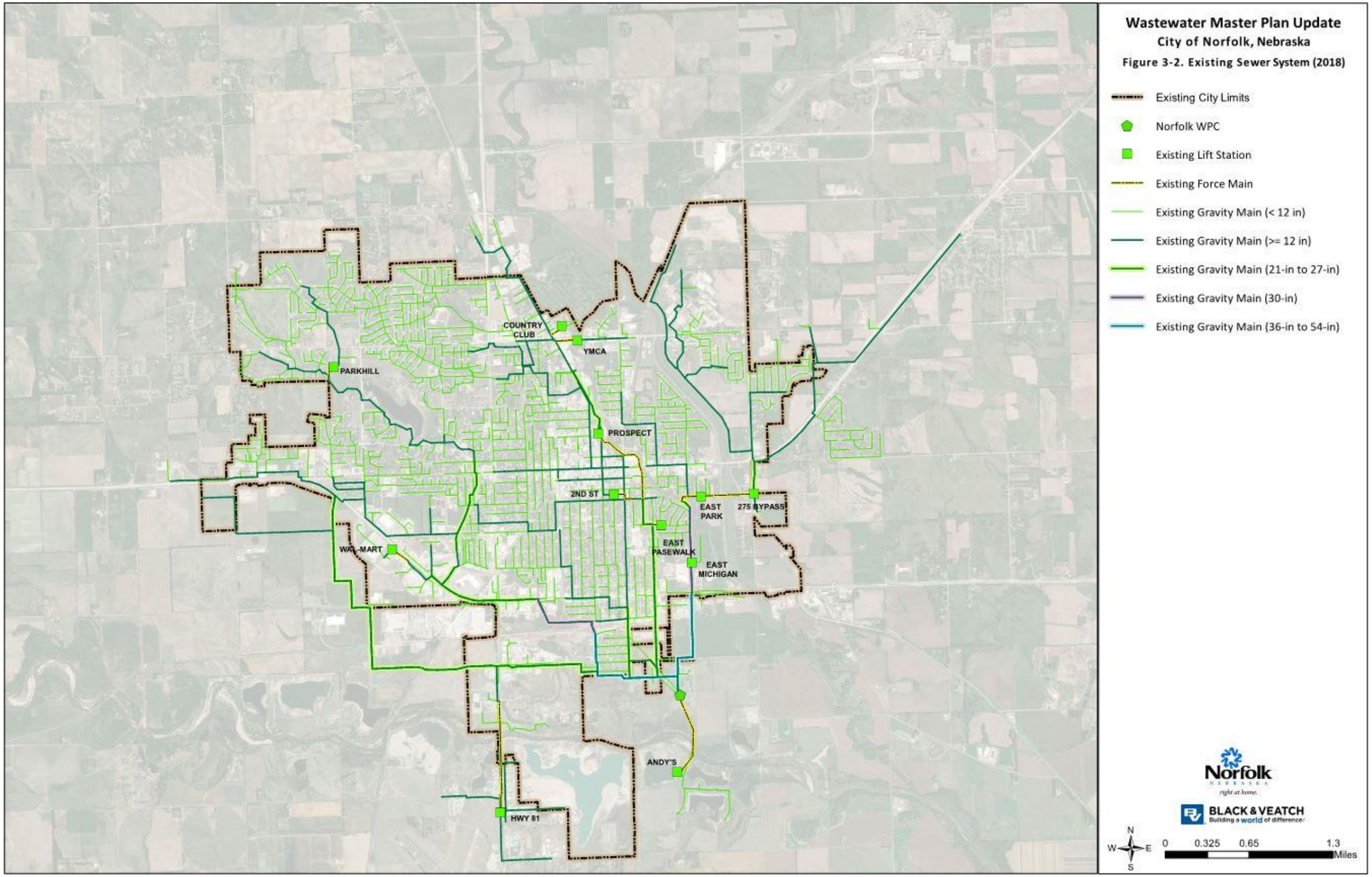


Figure 3-2 **Norfolk Existing Sewer System**

3.3 LIFT STATIONS, WETWELLS, AND FORCE MAINS

There are currently 12 lift stations in use by the City. Table 3-2 summarizes available data on the various lift stations. Table 3-3 includes information about the associated wet wells and force mains for the lift stations. Most of the lift stations are relatively small; they collect local flows and discharge them into the gravity system.

Table 3-2 Lift Station Summary

NAME	LOCATION	LIFT STATION CAPACITY (1)	
		FIRM CAPACITY (GPM)	TOTAL DYNAMIC HEAD (TDH)
2nd Street	309 South 2nd Street	600	30
275 Bypass (3)	309 South Victory Road	1,225	47
Andy's Lake	1st Street and Andy's Lake Road	225	32
Country Club	701 Country Club	120	17
East Michigan	700 East Michigan Avenue	100	10
East Park	716 East Park Avenue	350	25
East Pasewalk (2)	405 Pasewalk Circle	150	25
Hwy 81	Hwy 81 at the north end of the airport property.	325	88
Parkhill	2557 Parkhill Drive	200	20
Prospect (2)(3)	300 Prospect Avenue	2,000	41
Wal-Mart	2206 Pasewalk Avenue	100	13
YMCA	413 Benjamin Avenue	150	35

(1) Two pumps of the same size per lift station unless otherwise noted.
(2) These lift stations have variable frequency drives to reduce pump cycling.
(3) There are three pumps at the Prospect Lift Station, each 1,000 gallons per minute (gpm).

Table 3-3 Wet Well and Force Main Summary

NAME	WET WELL DIMENSIONS		PUMP OEPRATION		FORCE MAIN	
	DIAMETER (FT)	DEPTH (FT)	PUMP ON LEVEL (FT)	PUMP OFF LEVEL (FT)	DIAMETER (IN)	LENGTH (FT)
2nd Street	4	18.5	6	4	4	618
275 Bypass	8	23	5	4.5	10	3,000
Andy's Lake	5	16.7	4	2.7	6	1,900
Country Club	4	14	4	2.5	10	556
East Michigan	4	17	Not Available		10	21
East Park	7	16	6.3	2.8	6	900
East Pasewalk	5	18.5	5.3	2.3	4	300
Hwy 81	8	6.5	5.5	1.5	6	4,600
Parkhill	7	20.5	4	2.5	6	500
Prospect	16.5 by 4	18	4.7	3.8	12	3,700
Wal-Mart	4	15	4.8	2.7	6	700
YMCA	4	16	3.4	2.3	6	900

Note: Pump on/off level measured from the bottom of the wet well.
** For East Michigan Lift Station, the pump controls are an assumption, the City does not have this information*

4.0 Wastewater Collection System Flows

Wastewater flow is made up of the average daily dry weather flow (ADDF), wet weather infiltration, and inflow. The daily wastewater production flow rate can be approximated using either direct measurement of ADDF during dry weather/low groundwater conditions or derived from winter month water consumption data. The ADDF is the combination of the base sewage flow (BSF), water used to convey waste from buildings to the collection system, and dry weather infiltration due to sewer line defects in areas of high groundwater. Flow varies throughout the day in a diurnal pattern that reflects the changing water use at different times of day.

Wet weather infiltration is defined as water entering the wastewater collection system through defective pipes, pipe joints, and manhole structures directly following a significant rainfall event. The rate of infiltration depends on the depth of groundwater above the defects, the size of the defects, and the portion of the collection system submerged. The duration of wet weather infiltration depends on the drainage properties of soils and other factors, such as sump pump connections, but can last several hours or even days.

Inflow is rainfall-related water which enters the collection system from sources such as private sewer laterals, downspouts, foundation drains, yard and area drains, manholes, defective piping, and cross-connections with storm drains. Inflow is directly influenced by the intensity and duration of a storm event. The wet weather infiltration and inflow components are quantified together as the total infiltration and inflow (I&I) by subtracting the ADDF component from the total observed flow. Typically, the I&I contribution can be quantified by analyzing flow-monitoring data and system-specific factors estimated.

4.1 NORFOLK WPC PLANT FLOW

They City provided historical wastewater flow data from the Norfolk WPC Plant. The flow data included average, maximum and minimum daily plant flow from year 2008 to 2018. Using this data, annual average, maximum and minimum flows were generated and are shown in the graph in Figure 4-1. Average Norfolk WPC Plant flow has been steady at around 3.0 mgd while the maximum plant flows have decreased through the years and have been below 7.5 mgd the last 4 years. As noted earlier, this reduction is due to City efforts to reduce I&I.

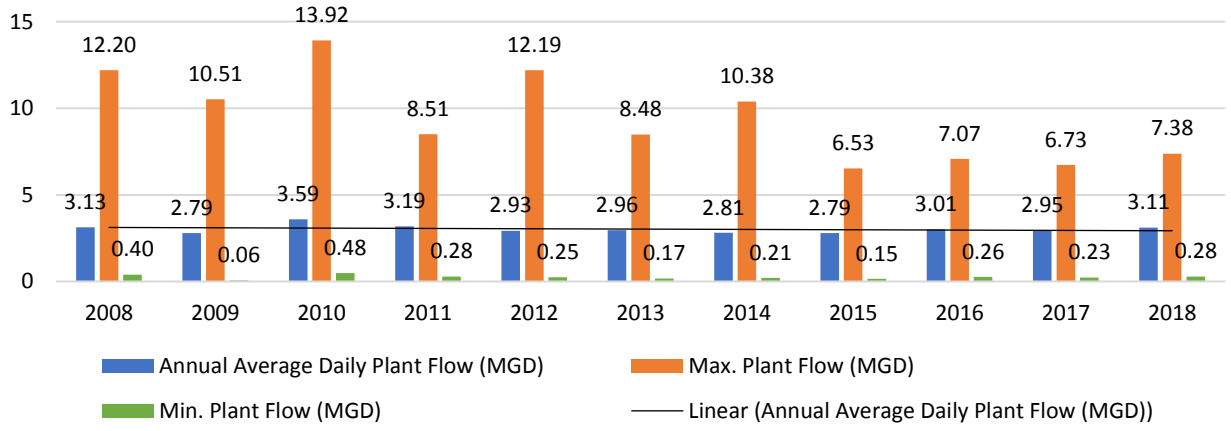


Figure 4-1 Historical Norfolk WPC Plant Flows (2008 -2018)

To understand the current average daily wastewater flows into the Norfolk WPC Plant, monthly flows for 2017 and 2018 were generated and shown in the two graphs in Figure 4-2 and Figure 4-3. In November 2017, the average plant flows were around 3 mgd, similar to the historic average daily flows for the 2008-2018 time period. In addition, the maximum daily flows in the month of November 2017 were in the lower range, approximately 6.14 mgd, for the 2017 to 2018 time period indicating that this was a low dry weather infiltration period. Hourly Norfolk WPC Plant data was requested for November 13 – 20, 2017, after confirming there were no rainfall events during this week. This data was used to estimate the existing ADDF into the plant.

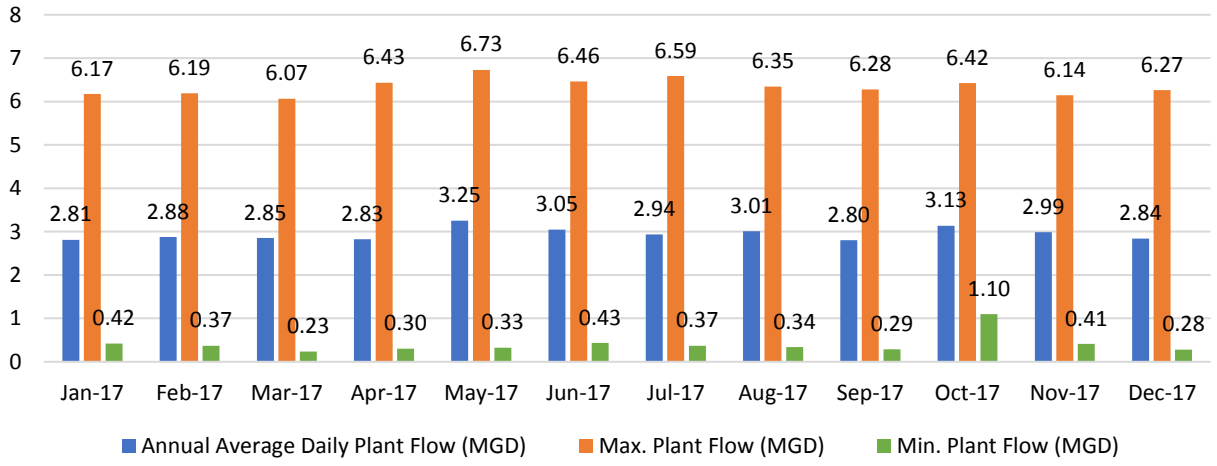


Figure 4-2 2017 Norfolk WPC Plant Flows

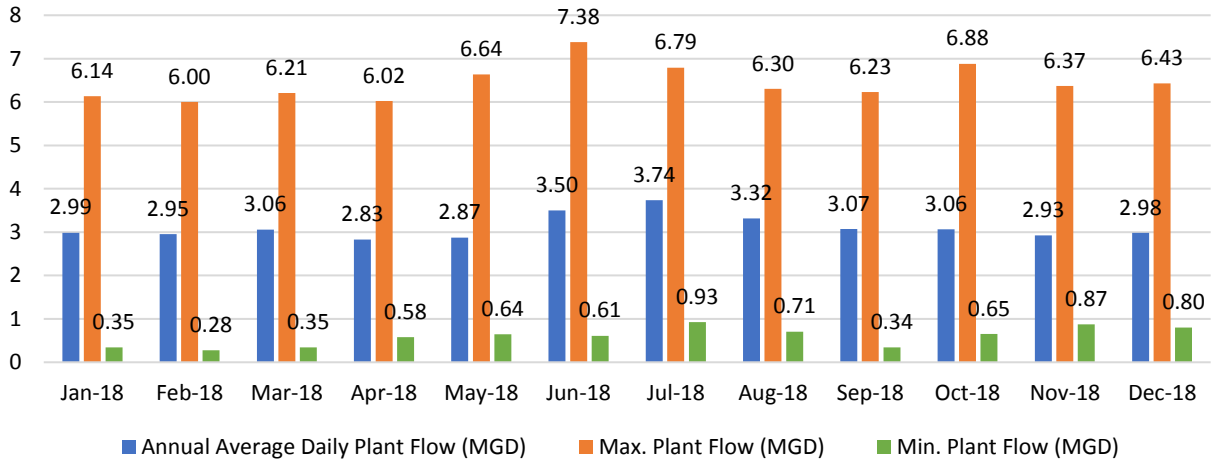


Figure 4-3 2018 Norfolk WPC Plant Flows

To understand plant flows during wet weather conditions, maximum daily flows were reviewed for 2017 and 2018. The Norfolk WPC Plant experienced the maximum flow of 7.38 mgd, on June 20, 2018. In reviewing rainfall data, a significant storm occurred the week of June 19 (a total of 3.37 inches on June 19 and 20), so hourly Norfolk WPC data was obtained for June 19 - 25, 2018 to estimate the average hourly wet weather flows into the plant.

Figure 4-4 shows the hourly flows into the plant for the November 2017 period. November 15th was selected as a representative day for hourly dry weather flows (DWF) entering the plant.

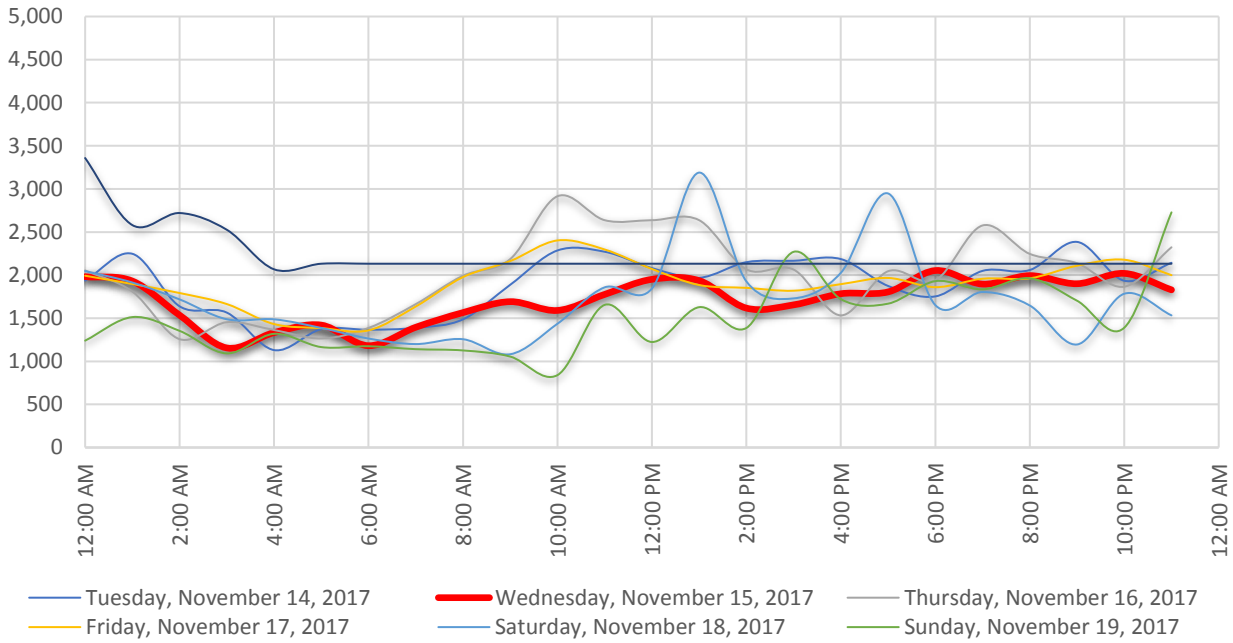


Figure 4-4 Dry Weather Flow (November 15, 2017)

Figure 4-5 shows the hourly flows into the plant for the June 2018 period. Flows on June 20th showed the rainfall response and were selected as representative of wet weather flows (WWF) entering the plant.

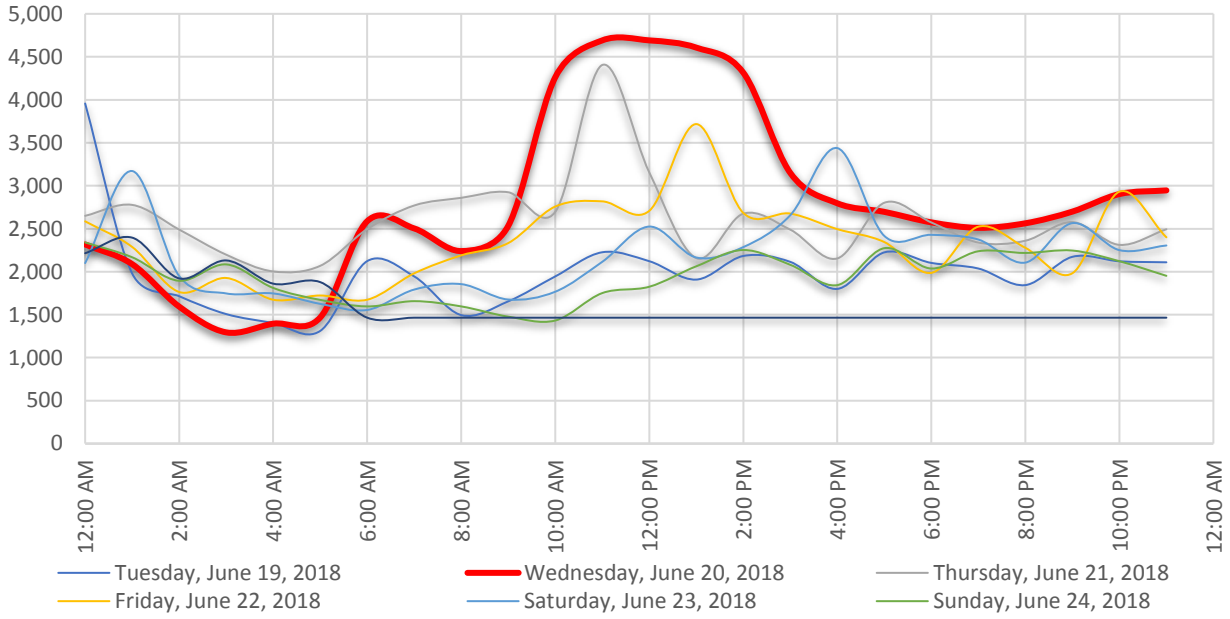


Figure 4-5 Wet Weather Flow (June 20, 2018)

4.2 EXISTING AVERAGE DAILY DRY WEATHER FLOW

Winter month water consumption data was used to estimate the BSF within the City, because irrigation is minimal during the winter and most of the distributed water is returned in the wastewater collection system.

The City provided monthly billing summaries for 2018. The winter water consumption within the City is summarized in Table 4-1. The residential users include single and multifamily units. The residential, commercial and industrial water consumption during the winter months totaled to 2.43 mgd in 2018 for the City. In addition, the Norfolk WPC Plant accepts flows of approximately 0.11 mgd from the SID/Woodland Park area. Currently the City does not have any collection system flow monitoring data other than information from the Norfolk WPC Plant, which limits the information available to estimate I&I during either dry weather or wet weather periods. For the 2019 Sewer Plan, the dry weather I&I was estimated using the 2018 winter month water consumption data and Norfolk WPC Plant daily flows. Using the winter month water consumption, it was estimated that about 2.54 mgd of BSF is generated within the City daily. Subtracting the 2.54 mgd from the average 2018 flow of 3.11 mgd, results in a dry weather infiltration of 0.57 mgd.

Table 4-1 2018 Norfolk Average Daily Sewer Flow (mgd)

LAND USE	JAN-APRIL
Residential	1.07
SID/Woodland Park	0.11
Commercial	0.86
Industrial	0.50
Dry Weather Infiltration	0.57
2018 Annual Average Plant Flow (mgd)	3.11

Note: Flow by land use estimated from January – April water billing records.

4.3 UNIT FLOW

Using the historical Norfolk WPC Plant flows and the Census population data, a system wide per capita flow was estimated for each year. The flow per capita in the last few years have been around 120 to 126 gallons per capita per day (gpcd) and the historical average flow per capita is 124 gpcd. A summary of unit flow data is shown in Table 4-2. Unit flows vary considerably between communities based on system condition and typical depth to groundwater. For comparison, Grand Island, Nebraska sees between 45 and 400 gpcd for individual basins, based on flow monitoring data, and uses 128 gpcd for future development.

Table 4-2 2008-2018 Average Wastewater Flow per Capita

YEAR	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	AVG
Average Flow (mgd)	3.13	2.79	3.59	3.19	2.95	2.93	2.81	2.79	3.01	2.95	3.11	3.02
Population	23,458	23,686	24,278	24,314	24,362	24,414	24,384	24,338	24,341	24,529	24,651	24,250
Flow/ Capita (gpcd)	133	117	148	131	121	120	115	114	123	120	126	124

4.4 FUTURE AVERAGE DAILY DRY WEATHER FLOW

As discussed earlier in the report, at this time a total of 1,100 acres of development is expected to occur by 2040 and based on a system-wide per capita flow of 124 gpd, and a future population of 28,193, the future flow to the Norfolk WPC Plant is estimated to be 3.5 mgd, an addition of 0.4 mgd

Table 4-3 shows the future developments grouped into residential, commercial and industrial uses. The residential users include single family and multifamily developments as well as mixed use developments. The commercial users include commercial, office, institutional, services, and public spaces.

Table 4-3 Future Development Acres and Wastewater Flow

LAND USE	2040 PLANNED ACRES	2040 ADDITIONAL FLOW (MGD)
SF Residential	394	0.2
MF Residential	39	
Mixed Use	4	
Commercial	82	0.1
Office/Services	31	
Public	175	
Industrial	367	0.1
Dry Weather Infiltration	Not Applicable	0.00
Total	**1,100**	**0.4**

For the 2019 Sewer Plan, it was assumed that the City's efforts to reduce I&I will continue and will offset I&I from future development, resulting in the dry weather infiltration remaining at 0.57 mgd in the future. In addition, it was assumed that SID/Woodland Park flow would remain the same. So, the additional 0.4 mgd was split based on maintaining a similar percent contribution by land use with residential being approximately equal to the commercial and industrial contributions. Table 4-3 shows an additional 0.2 mgd of residential flow, 0.1 mgd of commercial flow, 0.1 mgd of industrial flow by 2040, equating to a total of 0.4 mgd of additional flow in the future. Figure 4-6 shows the exiting sewer flows and future sewer flows by land use within the City.

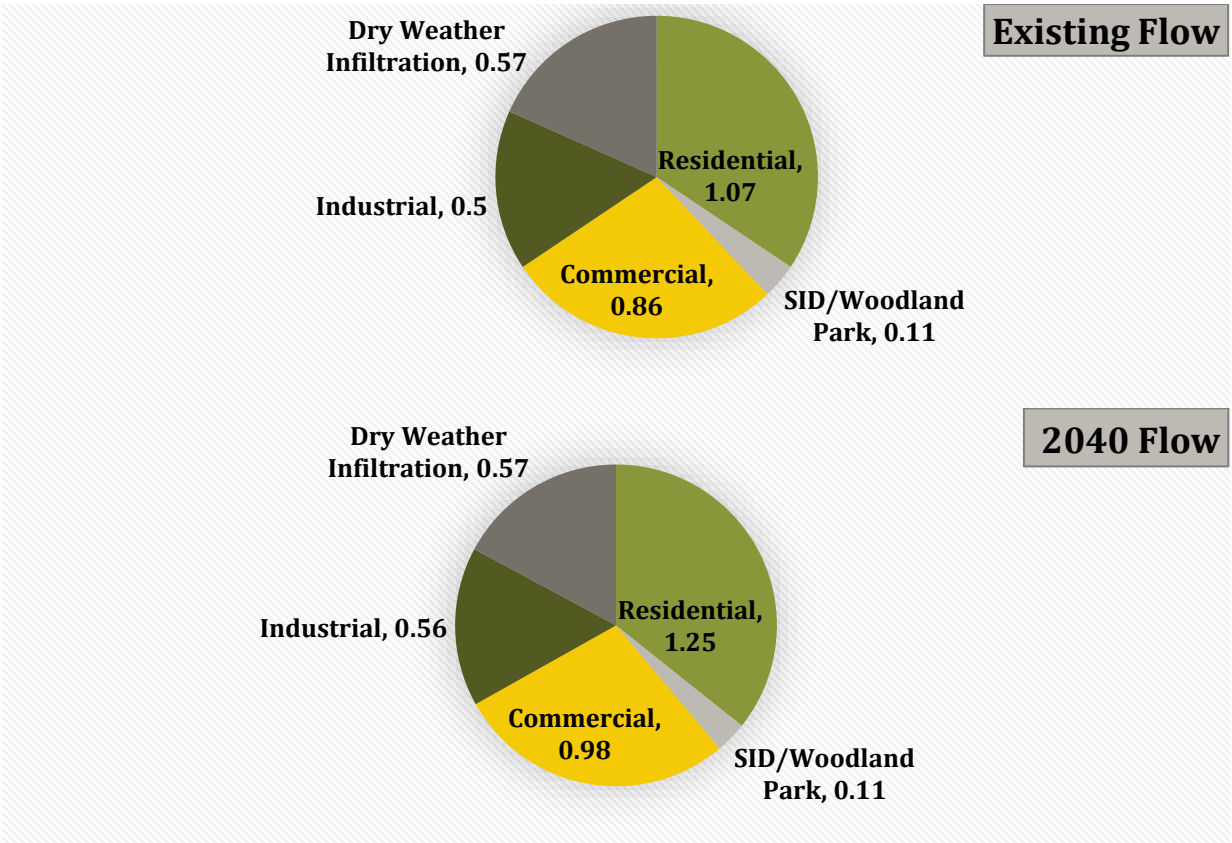


Figure 4-6 **Existing and Estimated Future Wastewater Flow, by use type, mgd**

The additional flow is shown per land use contribution in Table 4-4. At this time, it is assumed that 0.2 mgd will be contributed from residential development, and 0.1 from commercial and industrial developments.

Table 4-4 Year 2040 Flow Contribution

LAND USE	2040 PLANNED DEVELOPMENT (ACRES)	FLOW (MGD)
Single-Family Residential	**393**	**0.17**
Blackberry	33	0.01
Wyndham Hills	44	0.02
Legacy Bend	92	0.04
Unnamed	224	0.10
Multi-Family Residential	**42**	**0.03**
Channel Road	19	0.01
Nor-Park	23	0.02
Commercial	**288**	**0.10**
Industrial	**377**	**0.10**
Total Growth Area	**1,100**	**0.40**

5.0 Sanitary Sewer Collection System Evaluation

This section documents the updates made to the model and presents the hydraulic evaluation of the City's sewer collection system to handle existing and future peak flow conditions. The hydraulic model can simulate the performance of the sewer collection system over time in an extended period simulation (EPS) run by tracking the movement of wastewater flowing through the network over an extended period of time under varying wastewater loading and operating conditions. Sewer collection system performance is calculated as the ratio of peak flow versus pipe capacity (Qp/Qc), also referred to as pipe utilization (expressed as a percentage). Various model simulations were run to assess system performance for DWF, WWF, and future growth scenarios. All scenarios were run as an EPS so that the impact of lift station operation on the sewer collection system and the impact of contributions from various parts of the system could be observed. Appendices A, B, C, and D include details of the modeled network and scenario results.

5.1 HYDRAULIC MODEL UPDATE

Prior to performing a hydraulic evaluation of the sewer collections system, various updates were made to the existing hydraulic model. The 2008 hydraulic model used H2OMap Sewer Pro Version 7.0 (by Innovyze). Since then, this modeling software has been phased out by Innovyze and the current software is the InfoSewer/Pro for ArcGIS 10.x Suite version 7. The 2008 hydraulic model was imported into the InfoSewer modeling software. Wastewater collection system facilities, including manholes, wet wells, outfalls, interceptors, force mains, and lift station pumps, were updated to represent the City's current collection system.

Since the 2008 Sewer Plan, system improvements were made by the City, which are documented in in Section 5.2.3.1. Hydraulic inventory data from these updates was provided by the City in the form of AutoCAD maps, drawings, and GIS data. Facility information extracted from these data sets included: manhole coordinates, rim elevations, pipe diameter, length, invert elevations, pump curves, wet well dimensions, pump on/off settings, and other special structures information. The model was updated to include all sewer improvements 12 inches in diameter or larger and the addition or removal of lift station pumps. Smaller sewer lines were included if they were considered important or needed for continuity.

5.1.1 Wastewater Flow Allocation

The second key component of a sewer collection system model is allocating wastewater flow and assigning appropriate flow parameters. The wastewater flow allocation method used in this update included the use of water meters to locate the entrance of sewer flow into the wastewater collection system. As mentioned earlier in the report, average water consumption from winter months were used as BSF. Water meters were assigned to the closest sewer line, these flows were then brought to the nearest modeled manhole. Appendix A, Figure A-1 shows how the sewer lines were assigned to manholes in the model. Dry weather infiltration was allocated in the model based on the percentage of flow entering each manhole. The combination of the BSF and the dry weather infiltration results in the ADDF. The hydraulic model includes simulations over a 72-hour period for DWF and WWF conditions.

5.1.2 Model Validation

Model validation is the process of checking the model simulated results versus field observations. A 72-hour EPS model run was performed with two different patterns: DWF diurnal flow pattern, and WWF diurnal pattern as shown in Figure 5-1. These patterns were applied to the ADDF estimated in Chapter 4, simulating DWF and WWF conditions.

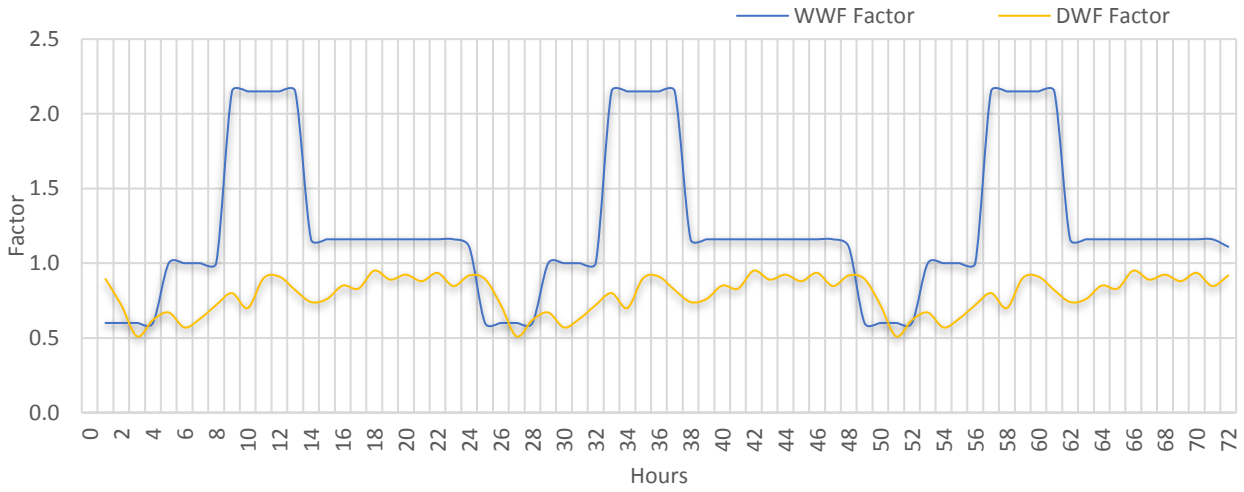


Figure 5-1 DWF and WWF Diurnal Patterns

The simulated flows under each condition were then compared to the flows observed at the Norfolk WPC Plant on November 15, 2017 and June 20, 2018, respectively. Figure 5-2 and Figure 5-3 show that the simulated flows under each condition were similar to the actual flows observed at the plant and matched minimum and maximum flows, indicating that the model can mimic flows in the system and that it is validated.

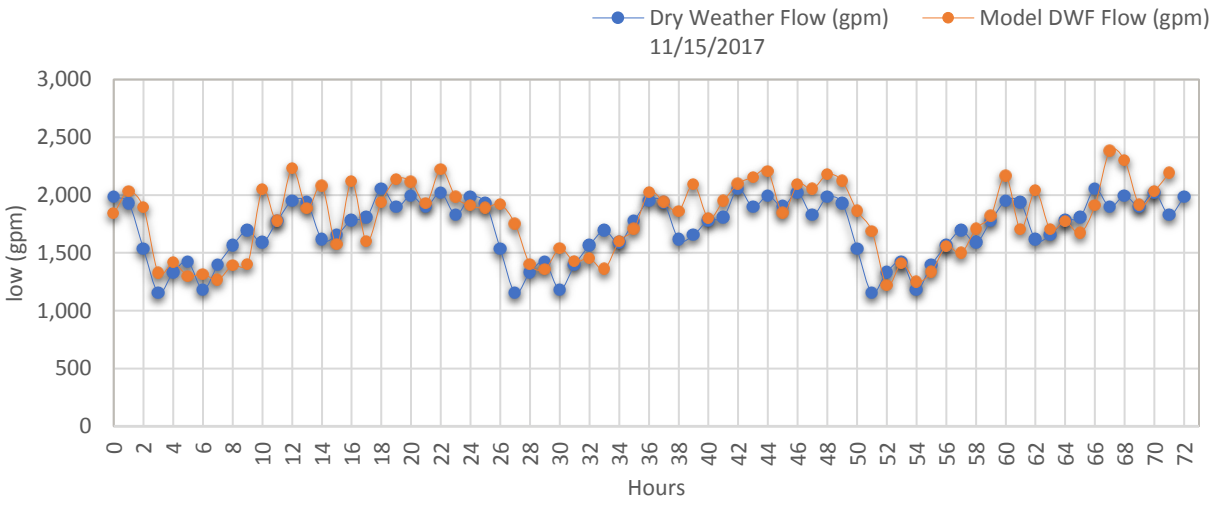


Figure 5-2 2017 Hourly Plant Flow: Actual Dry Weather Plant Flow vs. Modeled Dry Weather Plant Flow

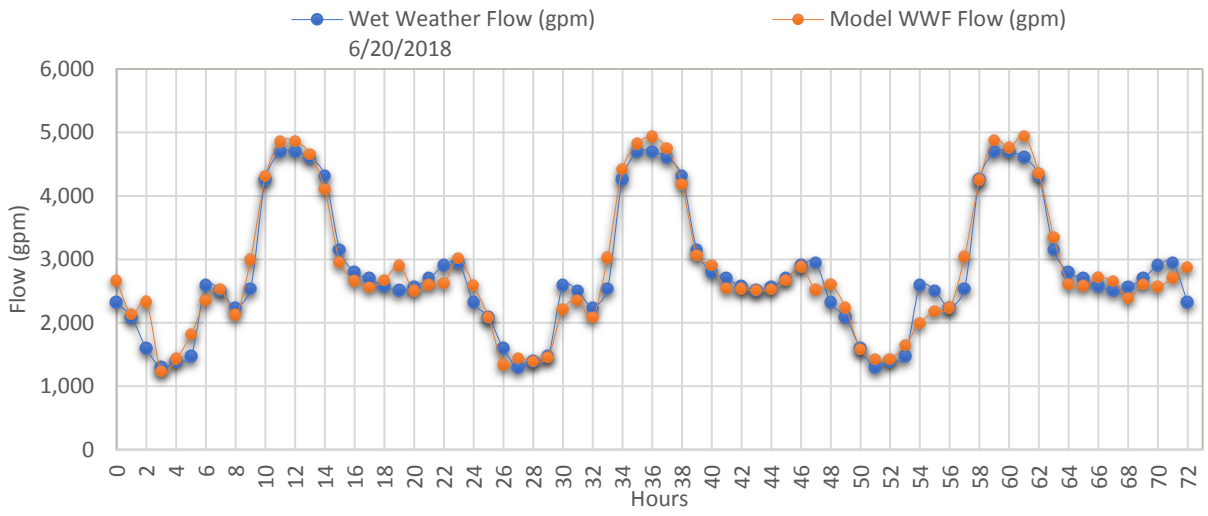


Figure 5-3 2017 Hourly Plant Flow: Actual Wet Weather Plant Flow vs. Modeled Wet Weather Plant Flow

5.2 COLLECTION SYSTEM EVALUATION

The objective of the collection system evaluation is to identify and alleviate system deficiencies capable of causing a sanitary sewer overflow (SSO) or a basement back up. This section provides the results of the system evaluation under existing and future conditions and the criteria used to evaluate the collection system. Based on the results of the evaluation, recommendations were made for facility improvements. Existing and Year 2040 model scenarios were performed using the peaking patterns developed during model verification. The results of these scenarios were used to evaluate system capacity, recommend improvements, and confirm that the improvements will adequately address the capacity issues.

5.2.1 Evaluation Criteria

To identify collection system deficiencies, the percent utilization was calculated for every pipe in the system for its peak flow during the wet weather simulation. Table 5-1 summarizes the criteria used for evaluating the ability of existing facilities to handle peak flows for both existing and future conditions. In addition to the evaluation criteria, consideration is also given to the extent of capacity problems. For example, if a single pipe segment is shown at 150 percent of capacity this may be less of a concern than a mile of pipeline that is at 130 percent of capacity.

Table 5-1 Evaluation Criteria

ROUGHNESS COEFFICIENTS		
Coefficient	**Pipe Type**	**Value**
Manning's	Gravity	0.013
Hazen William's	Force main	100

GRAVITY LINES		
Percent Utilization	**Recommendation**	**Comments**
< 80 percent	None	
80 – 125 percent	Watch list	Evaluate cleaning and inspection schedule. Limit additional development tributary to this area without increase in capacity.
> 125 percent	Improvement	Prior to implementation of the recommendation, a survey should be completed to confirm the findings of the hydraulic model. No additional tributary development until capacity issues have been addressed.

FORCE MAINS	
Velocity, fps	**Recommendation**
< 12	None
> 12	Improvement

LIFT STATIONS		
Pump Start/Stop	**Recommendation**	**Comments**
< 1 per day	Configuration change	Extended storage of wastewater in the wet well will tend to create hydrogen sulfide problems, which can reduce the design life of downstream facilities.
1 per day – 4 per hour	None	--
> 4 per hour	Expansion	Frequent start/stop can reduce the pump life and may indicate the wet well is too small.

WET WELLS		
Level, feet (1)	**Recommendation**	**Comments**
< 2	None	Lift station should be able to maintain the level in the wet well with its firm capacity (one pump out of service).
> 2	Add additional pump capacity	

(1) Wet well level above the "Pump On" level.

5.2.2 Existing System Evaluation

The existing system was evaluated with the lift station parameters provided by the City and found in the tables in Chapter 3. Lift stations operating on variable frequency drives were simulated in the model by pumping an equal amount of flow as the influent into a lift station, thus maintaining a constant water level in the wet well based on typical operating levels provided by the City.

The percent capacity utilization results for the existing system are summarized in Table 5-2 and shown on Figure 5-4. Detailed information on the pipe capacity results for each pipe segment are included in Appendix B and the wet well results are included in Appendix D. As shown in Table 5-2, over 99% percent of the existing system shows little to no surcharge with peak design flows during existing conditions. Less than 1 percent of the modeled collection system is slightly higher than the 80% utilization. This section of pipe is 21-inches in diameter and is located south of the Prospect force main along Blaine Street, between Park Avenue and East Pasewalk Avenue.

Table 5-2 Existing Collection System Capacity Evaluation

CAPACITY UTILIZATION %	LENGTH (FT)	PERCENT OF WASTEWATER COLLECTION SYSTEM
< 50	219,713	95.1%
50 to 80	10,845	4.7%
80 to 125	530	0.2%
> 125	0	0%
Total	231,087	100%

Note: Pipe lengths only reflect the pipes that are included in the hydraulic model.

The equations used in InfoSewer tend to provide results that are slightly conservative because the pipe capacity calculation depends solely upon Manning's equation. Determining the true capacity of a pipe segment involves the conservation of momentum, as well as Manning's equation. In addition, no flow monitoring was done in conjunction with the 2019 Sewer Plan, so diurnal curves based on observed flow patterns during peak flow in 2018 were used to estimate peak flow during wet weather conditions. The diurnal curves included a peaking factor of 2.6 and resulted in a peaking factor of 1.8 at the Norfolk WPC Plant. For these reasons, the pipe segments in the capacity utilization category of 80 to 125 percent are added to a watch list for closer observation and investigation. Under existing conditions, there are no pipes with capacity utilization greater than 125 percent of capacity.

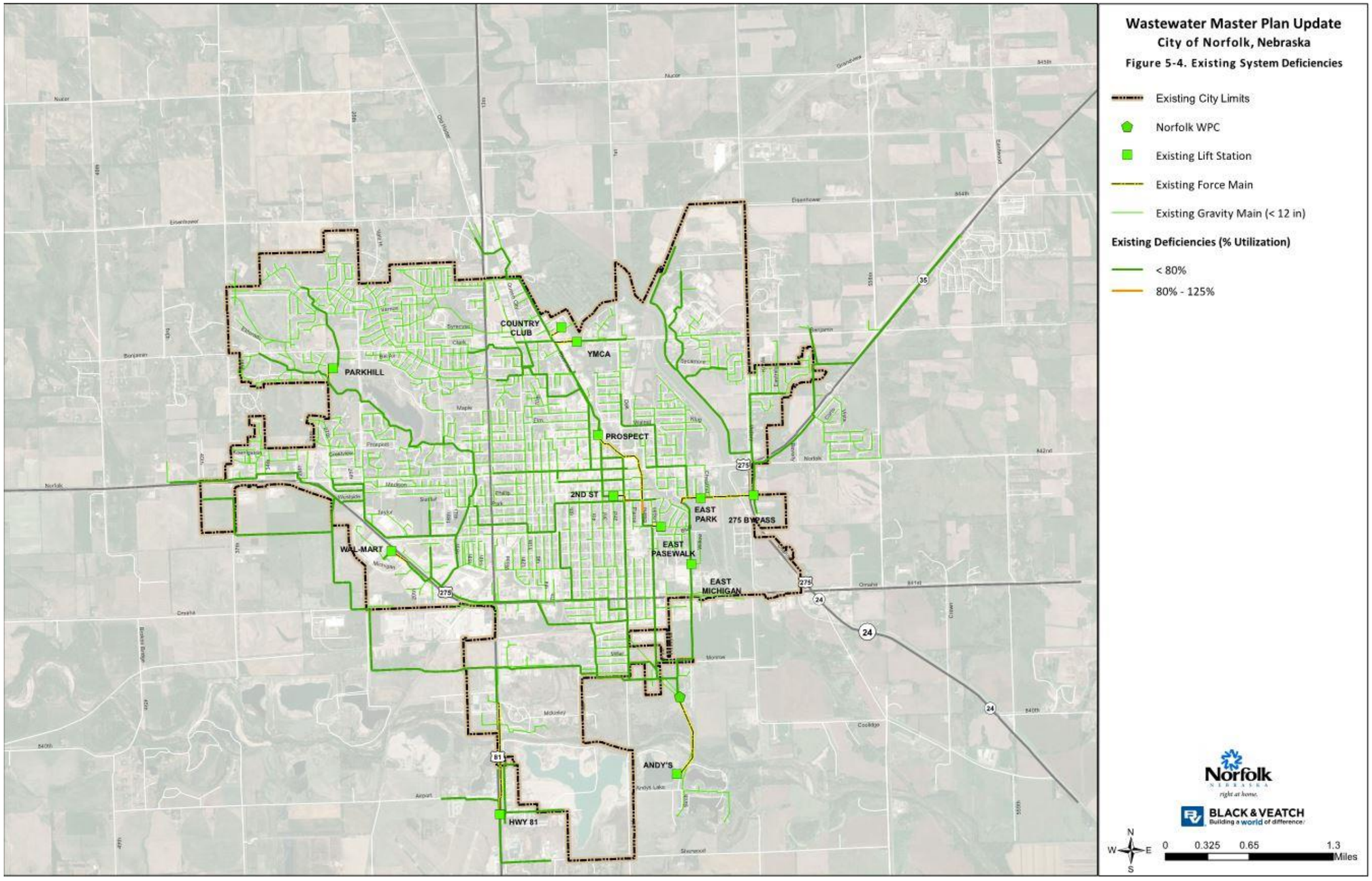


Figure 5-4 **Norfolk Existing Sewer System Deficiencies**

5.2.3 Future System Evaluation

The same methodology used to perform existing system analyses was followed for the future system evaluation. Additional flow attributed to future growth and outlined in Chapter 4 was applied to the model manholes. The collection system was modeled for the projected future wet weather flow as discussed in Chapter 4. Detailed results by pipe segment are included in Appendix C and the wet well operation is shown in Appendix D.

5.2.3.1 Updated Facilities Since The 2008 Sewer Plan

Since the 2008 Sewer Plan, the City has completed projects to improve sewer service within its service area. The improvement projects include the abandonment of the following lift stations and force mains: Goodyear and Monroe. Also, the following gravity sewer main installations and replacements were completed since the 2008 Sewer Plan, prior to June 2018, and are shown in Figure 5-5 and included in the existing system evaluation.

- South Highway 81 (Gravity Lines, Force Main, Lift Station), 2016
- Norfolk Southwest Sanitary Sewer Interceptor, Phase 1, 2014
- Norfolk Southwest Sanitary Sewer Interceptor, Phase 2, 2017
- Norfolk Southwest Sanitary Sewer Interceptor, Phase 3, 2017
- Northwest Industrial Sanitary Sewer Extension, Phase 1, 2017
- Fountain Point Addition Madison Avenue Sanitary Sewer, 2017
- West Highway 275 Sewer Extension, 2017
- Sewer Reconstruction of West of Norfolk WPC, 2014

5.2.3.2 Recent Projects

After June 2018, but before the end of 2019, the following projects were completed by the City. They are included as existing projects in the future modeling runs and shown as recent projects in Figure 5-6.

- Blackberry Interceptor Sewer (Raasch Reservoir), 2018
- Northeast Industrial Sanitary Sewer Extension, Phase 2, 2018
- Victory Road Sanitary Sewer Extensions (Channel Road), 2019

5.2.3.3 Future Facilities

The City is planning for service expansions to the sewer collection system as development occurs. Planned facilities were divided into near-term and long-term projects. Near-term expansions are planned for the next five years and the long-term projects will be designed and implemented when they are needed. The future improvements include the installation of three future lift stations and force mains to serve the future southwest region of the collection system: Omaha, 1st, and Victory. In addition, various gravity sewer extensions are also planned. These facility updates are shown on Figure 5-6.

The following list of proposed construction plans were used to update the hydraulic model for future planning conditions:

- Abandon 275 Bypass Lift Station and Force Main
- Omaha Ave Lift Station, Force Main, and Gravity Sewer Improvements
- 1st Street Lift Station, Force Main, and Gravity Sewer Improvements
- Victory Road Lift Station, Force Main, and Gravity Sewer Improvements
- Industrial 1 Sewer Extensions
- Industrial 2 Sewer Extensions

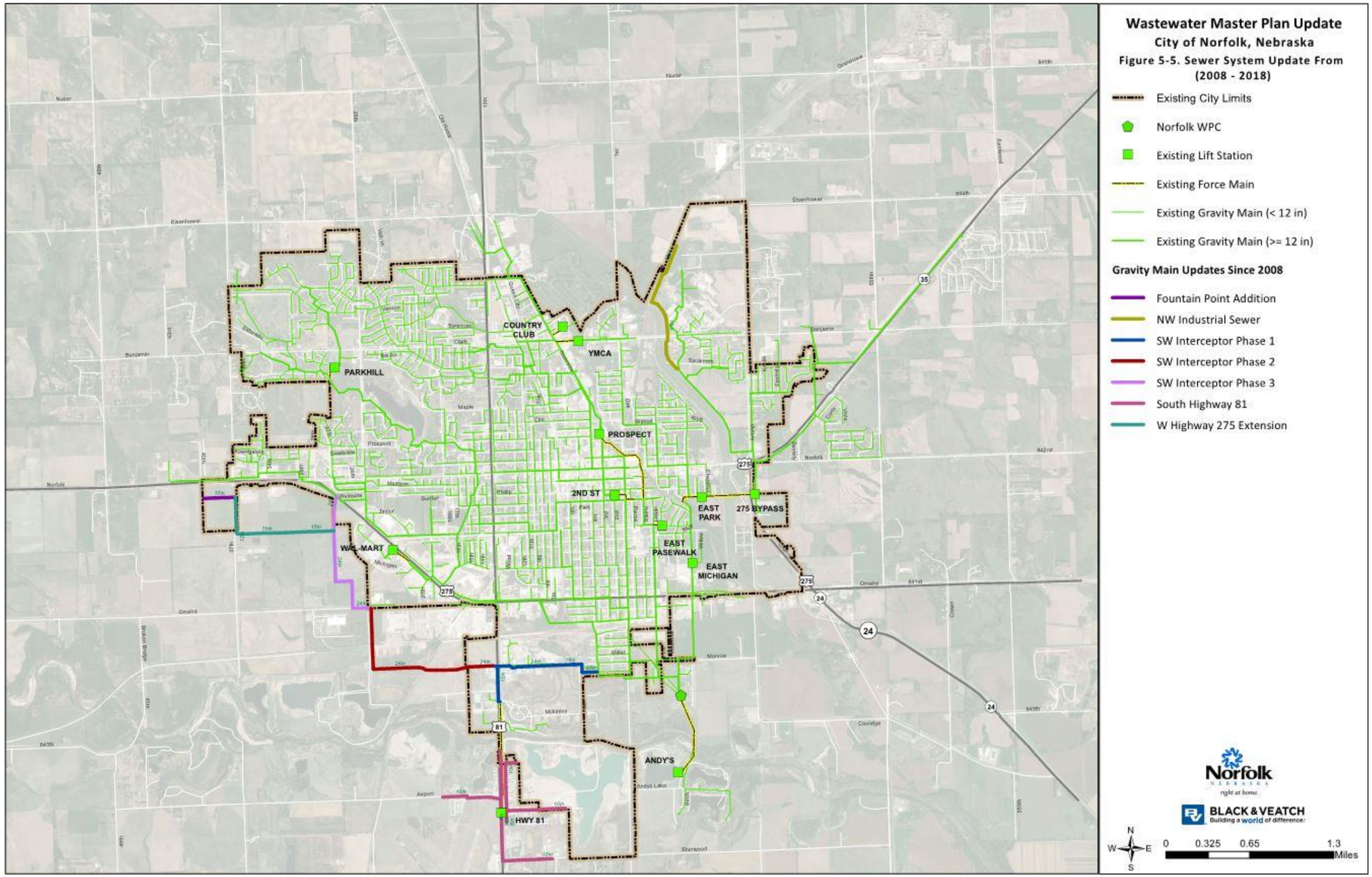


Figure 5-5 **Norfolk Sewer System Updated Since 2008**

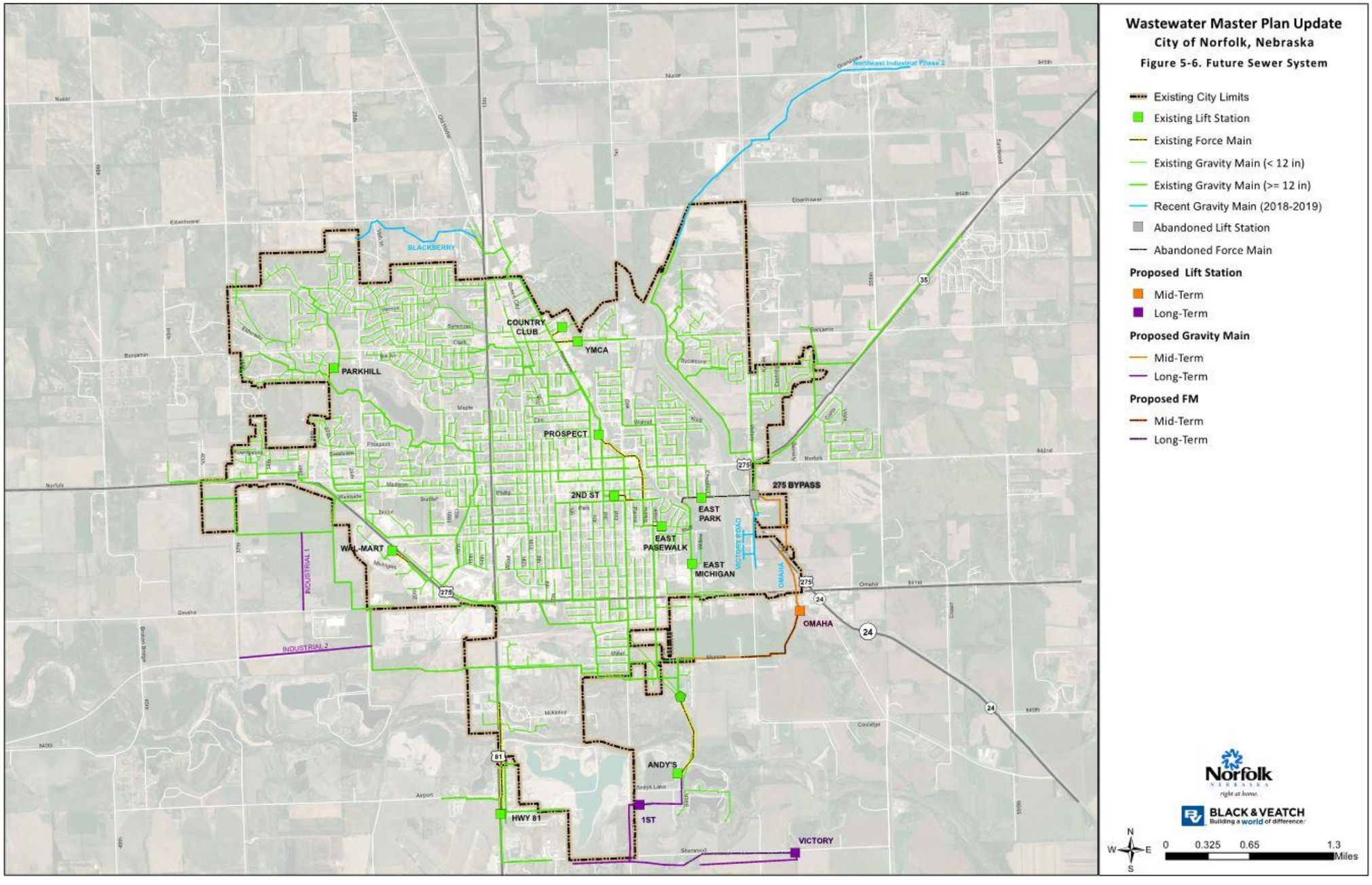


Figure 5-6 **Norfolk Future Sewer System**

Table 5-3 shows the length of pipe within each capacity utilization category for the future peak wet weather flow. The location of these pipes is shown on Figure 5-7. Similar to the existing system evaluation, over 99% percent of the collection system shows little to no surcharge with peak design flows during existing conditions. The segment identified in the existing system evaluation with higher utilization continues to see a slight increase in utilization, just under 90% utilization. That pipe is 21-inches in diameter and is located south of the Prospect force main along Blaine Street, between Park Avenue and East Pasewalk Avenue. In addition, the 21-inch pipeline south of this segment and downstream of the East Pasewalk Lift Station also increases in capacity, reaching slightly higher than 80% in utilization.

Table 5-3 Year 2040 Collection System Capacity Utilization

CAPACITY UTILIZATION %	LENGTH (FT)	PERCENT OF WASTEWATER COLLECTION SYSTEM
< 50	272,087	95.4%
50 to 80	12,119	4.2%
80 to 125	998	0.3%
> 125	0	0%
Total	285,204	100%

The City asked for an additional evaluation to understand the impact of growth from the Blackberry development beyond what is currently anticipated in the 2040 planning horizon. The future collection system evaluation assumes 0.1 mgd flow is contributed from the 33 acres of planned development from Blackberry and 0.3 mgd flow is contributed from 74 acres of land adjacent to Blackberry, a total of 0.4 mgd of sewer flow from 107 acres of land via the proposed 8-inch pipe downstream of the Blackberry development. If additional 513 acres of residential land is developed in the future, the total flow will increase to 0.25 mgd. This flow will increase the utilization in the 21-inch pipeline downstream of the Prospect Lift Station, heading south from East Park Avenue down to East Michigan Avenue as shown in Figure 5-8. The utilization in this pipe segment will increase above 80% but will remain below 90%. The utilization is not reaching 125% or greater, therefore if the City builds the 620 acres by 2040 under the conditions discussed in this report, the downstream pipes from the Blackberry development will not see major issues but should be monitored since the utilization will be above the 80% threshold.

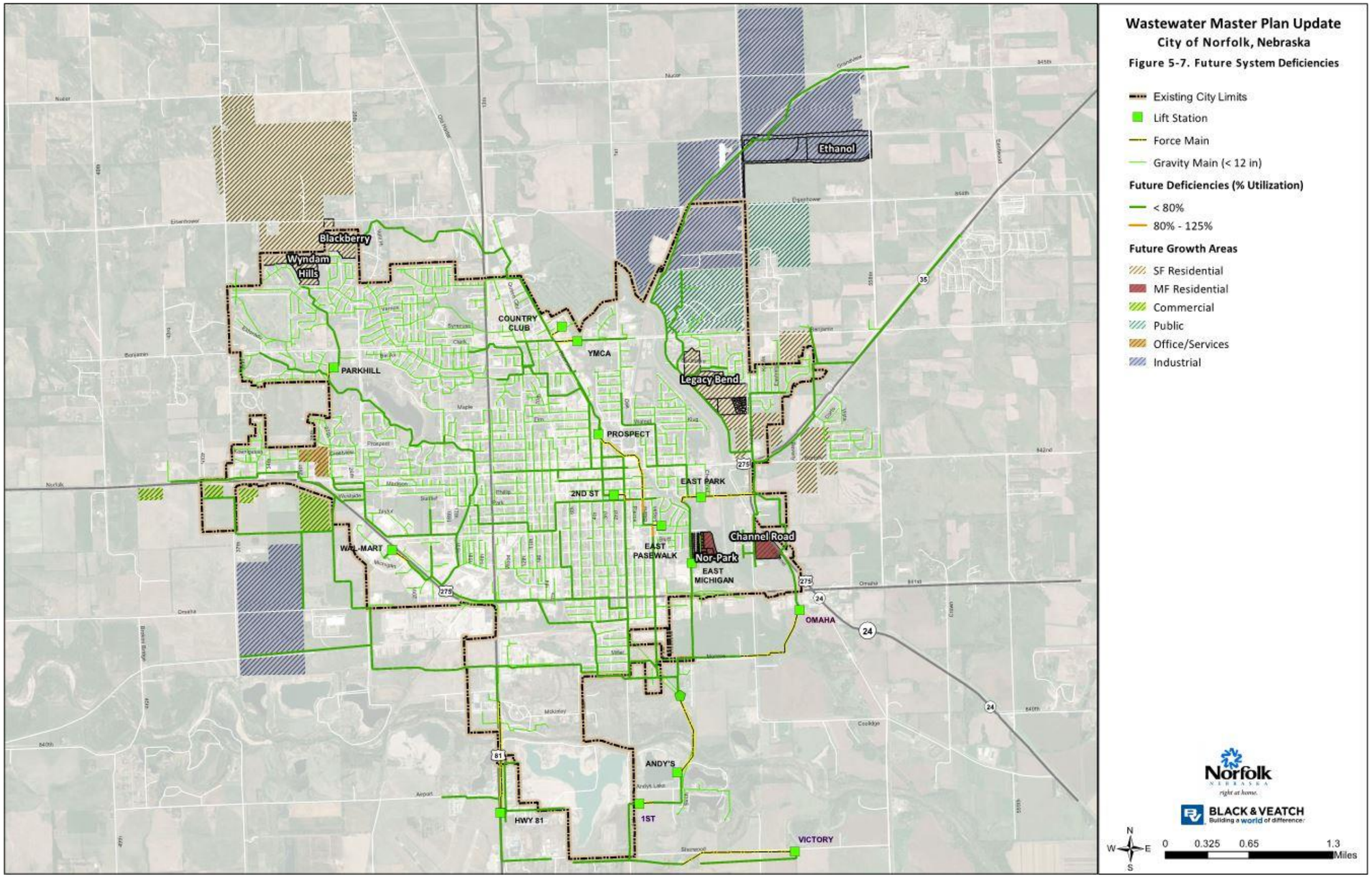


Figure 5-7 **Norfolk Future Sewer System Deficiencies**

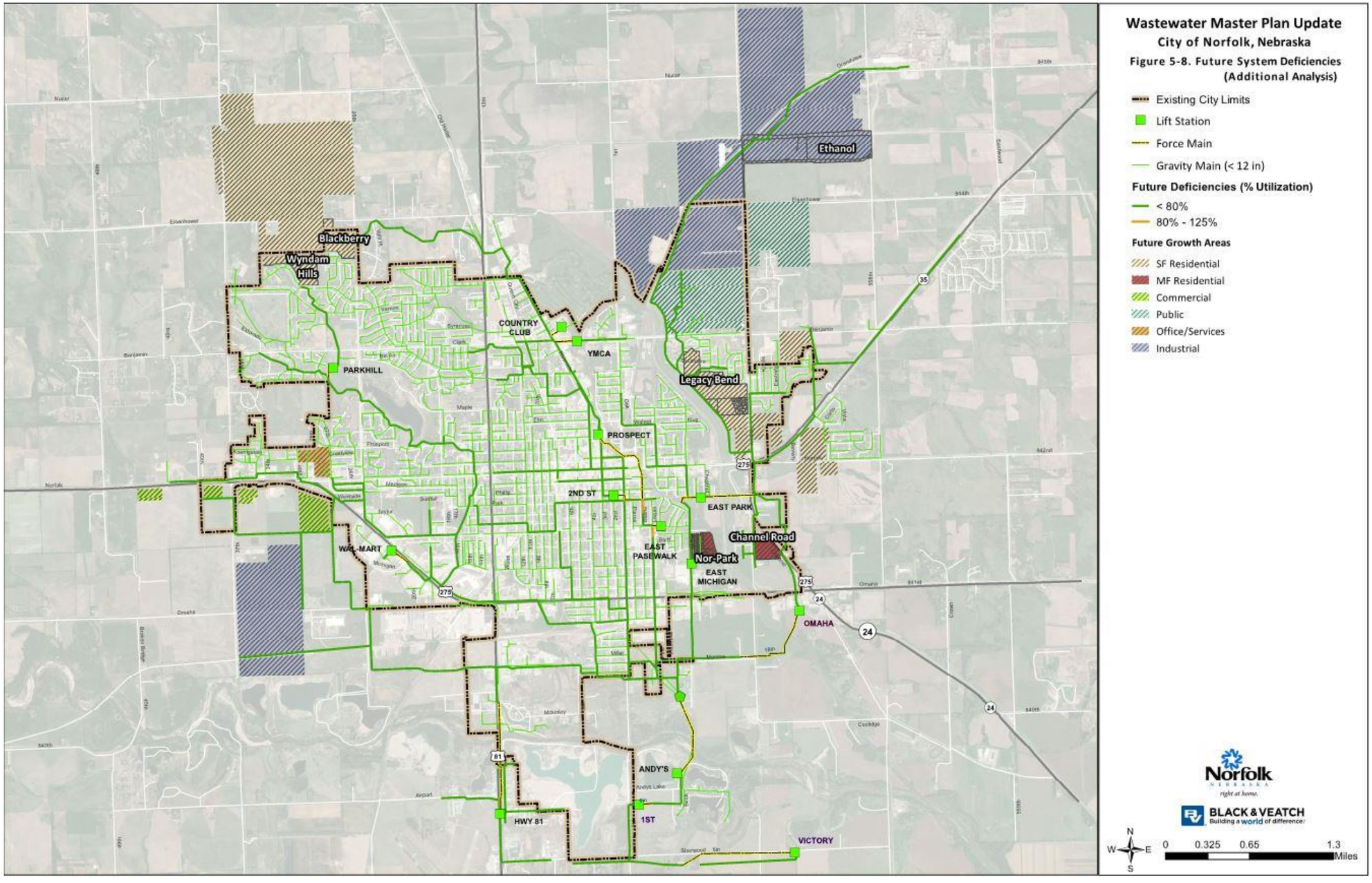


Figure 5-8 **Norfolk Future Sewer System Deficiencies – Additional Analysis**

5.3 CAPACITY IMPROVEMENT RECOMMENDATIONS

Recommended improvements were developed with a three-step process. Results from the existing and future analysis were used to identify all pipe segments and lift stations that had capacity concerns based on the criteria given in Table 5-1. Pipe segments of concern (existing utilization of over 80 percent) were then reviewed and placed into a watch list. Finally, recommended improvements and extensions were prioritized, and triggers developed based on the comparison of existing and future model results as well as incorporating comments from the City.

5.3.1 Watch List

Table 5-4 identifies pipe segments, which are of concern from an existing or future capacity standpoint but do not justify a recommended improvement. It is difficult to tell in these areas when, or if, relief will be needed. The City should survey and/or monitor these areas to confirm modeled facility slopes and flows and determine appropriate action. Because these two areas are downstream of a lift station, additional development will probably not change the maximum flows in this area, however, the City should be cautious of changes to the 2nd Street, Prospect, or East Pasewalk lift stations. These watch list areas are shown on Figure 5-4, Figure 5-7, Figure 5-8.

WL-1 is a 21-inch pipeline located south of the Prospect Lift Station force main along Blaine Street, between Park Avenue and East Pasewalk Avenue. WL-2 is also a 21-inch pipeline, south of WL-1 and downstream of the East Pasewalk Lift Station and reaches slightly higher than 80% in utilization during the 2040 modeling.

Table 5-4 Watch List

NAME	LOCATION	LENGTH (FT)	EXISTING MAXIMUM PERCENT UTILIZATION	YEAR 2040MAXIMUM PERCENT UTILIZATION
WL-1	21-in pipe along Blaine Street, between Park Avenue and East Pasewalk Avenue	530	84%	85%
WL-2	21-in pipe downstream of the East Pasewalk Lift Station, from Pasewalk Avenue to Northwestern Avenue	468	< 80%	82%

5.3.2 Gravity Sewer Improvements and Extensions

The collection sewer system evaluation results showed no gravity sewer capacity issues for this system under existing or future conditions. However, the City will continue to extend the collection system gravity mains to serve the future developments as needed.

Table 5-5 lists the proposed gravity sewer extensions and Figure 5-6 and the Figure in Appendix E displays the location of these pipes (which are also shown in Figure 5-6). Some of these were added in 2018 and 2019 including: Channel Road, Blackberry and Northeast Industrial. The Omaha project is designed and will be constructed when required to serve development. Long-term projects including: 1st Street, Industrial 1, Industrial 2, and Victory projects will be constructed when required by development.

Table 5-5 Proposed Gravity Sewer Extensions

NAME	PIPE SIZE (INCHES)	LENGTH (FT)
Omaha	24	3,614
	27	1,911
	30	2,639
1st Street	8	4,518
	10	5,167
Victory	8	4,264
Industrial 1	12	3,126
Industrial 2	12	5,402

5.3.3 Lift Station and Force Main Recommendations

No capacity issues resulted for the lift stations or force mains under existing or future conditions. In the future, the City will add the following lift stations and the force mains shown in Table 5-6, Figure 5-6, and the Figure in Appendix E. The Omaha Lift Station is a near-term project and the 1st Street and Victory lift stations are planned for the long-term.

Table 5-6 Proposed Lift Station and Force Mains

NAME	FIRM CAPACITY (MGD)	FORCE MAIN PIPE SIZE (INCHES)	LENGTH (FT)
Omaha LS	2.9	18	3,663
1st Street LS	0.25	6	1,065
Victory LS	0.13	6	4,217

5.4 GRAVITY SEWER PIPE REHABILITATION

The City has identified areas of the sanitary sewer system during CCTV (performed by City staff) that, through visual inspection CCTV review, show that the interior pipe wall condition has deteriorated structurally. As a result of the review of the CCTV records, it is recommended that the City begin considering options for/planning for replacement or rehabilitation of CCTV inspected pipelines and appurtenances found to have deteriorated conditions. Potential rehabilitation methods are provided in Table 5-7, including pipe size range, application and limitations of the method, method type and material. Black & Veatch is not recommending a specific rehabilitation method be applied by the City as part of the 2019 Sewer Plan.

Table 5-7 Gravity Sewer Pipeline Rehabilitation Methods

REHABILITATION METHOD	PIPE SIZE RANGE (IN)	APPLICATION	LIMITATIONS	METHOD TYPE/MATERIALS
Pipe Bursting	2 – 48	On size and upsizing of host pipe. Upsizing limited by 2 to 4 sizes from host pipe size (dependent upon existing pipeline size and depth, and ground conditions)	Host pipe material and condition dependent and soil type restrictions. Cleaning of host pipe invert required. Potential for ground heave and disturbance of adjacent infrastructure due to vibrations (varies by method).	Static, pneumatic, hydraulic, combination (multiple different heads for pipe type and soil conditions)/ Fused HDPE or Fusible PVC installed
Pipe Jacking	48 – 140	New installation. Alternative to open cut and for pipe sizes exceeding pipe bursting technology	Soil information required for design	Thrust force to vertical face/ CCFRPM, CP, SP, VCP installed
CIPP	4 – 124	In-situ/on size of host pipe	Partially to fully deteriorated design dependent upon strength of host structure. Cleaning of host pipe required pre-installation to remove debris and loose material	Inversion and pull-in; water, steam or UV cure/felt with resin, glass fiber reinforced felt with resin (resin/type designed for application)
Sliplining (Traditional)	4 – 110	Downsizing of host pipe; spacers and/or grout on annular space	Access pits for installation annular space requirements for installation	Pull-in of new pipe/ HDPE, PVC, CCFRPM
Sliplining (Close Fit/Compression Fit)	16 – 78	On size and downsizing	Access pits for installation	Reduction die and pull-in of deformed pipe/ fused HDPE only
SWP	6 – 217	Downsizing of host pipe; grouting may be required	Access for installation; mechanical process	Machine wound installation with continuous helical liner/HDPE and PVC strip feed

Abbreviations
CCFRPM – centrifugally cast fiberglass reinforced polymer mortar
CIPP – cured in place pipelining
CP – concrete pipe
HDPE - high density polyethylene
PVC - polyvinyl chloride
SP – steel pipe
SWP – spiral wound pipe
UV - ultraviolet
VCP – vitrified clay pipe

6.0 Capital Improvements Plan

This section provides cost opinions for the recommendations from the previous section. Due to the growth the City is expecting by 2040, the projects listed in

are needed to support the additional development in the future. Appendix E includes the capital cost projection calculations and a map of the proposed projects, which are also shown in Figure 5-6 and the Figure in Appendix E.

When needed to support development, the City will construct the Omaha Avenue Lift Station, Force Main and gravity sewers and abandon the existing 275 Bypass Lift Station and Force Main. This will divert flow from the northeast region of the service area, including the area served by the recently installed Northeast Industrial Sewer Phase II, to the east out of the East Park and East Michigan lift stations.

A few other projects are planned for the west side of the service area. The Blackberry development and development to the northwest of Blackberry, which will be served by the recently constructed Blackberry Extension, will contribute flow to the Prospect Lift Station. The flow from Wyndham Hills will contribute to the Parkhill Lift Station via the 12-inch gravity main south of the Wyndham Hills development. The commercial and Office/Services developments located on the west side of the service area do not trigger any need for additional gravity sewers or improvements. The Industrial 1 and Industrial 2 developments will contribute flows to the existing 15-inch sewer, recently constructed and referred to as the West Highway 275 Extension. It is anticipated that the 1st Street and Victory Lift Stations and Force Main and gravity improvements will take place further in the future when required to support growth or address septic system problems.

Capital cost opinions for the linear projects (Industrial 1 and Industrial 2) in this report are based on Black & Veatch experience on prior projects and reflect a January 2020 dollar base when the Engineering News Record (ENR) Construction Cost Index (CCI) was 11,392. Capital cost opinions for the 1st Street and Victory Rd projects are based on costs from the 2008 Sewer Plan and escalated by 3 percent per year. Capital cost opinions for the Omaha Ave project are based on the 2017 estimate from the Olsson Design. These cost opinions are intended to provide guidance for project evaluation and budgeting and are based on the information available at the time of estimation. The final costs of the project and resulting feasibility will depend on a variety of factors, including, but not limited to, actual labor and material costs, competitive market conditions, actual site conditions, final project scope, and implementation schedule. Therefore, the final project costs will vary from the cost opinions provided in Table 6-1. A total project cost is included for the projects listed, which includes:

- Implementation Factor (35%)
  - Engineering – Design and construction management
  - Legal
  - Planning and Permitting
- Contingency (30%)

Table 6-1 Collection System Capital Improvement Plan

PROJECT	PRIORITY YEAR	OPINION OF CAPITAL COST (1)
Omaha Ave Lift Station, Force Main, and Gravity Sewer Improvements (2)	Mid-Term	$5,359,000
1st Street Lift Station, Force Main, and Gravity Sewer Improvements	Long-Term	$2,208,500
Industrial 1 Gravity Sewer Improvement	Long-Term	$622,000
Industrial 2 Gravity Sewer Improvement	Long-Term	$1,084,000
Victory Road Lift Station, Force Main, and Gravity Sewer Improvements	Long-Term	$1,191,900

(1) Costs are in January 2020 dollars, ENR CCI 11,392.
(2) This includes abandoning the 275 Bypass Lift Station and Force Main. Based on cost opinions by Olsson Associates during design of this facility in 2017 and updated to January 2020 dollars.

Appendix A. Flow Allocation and System Node Map

Wastewater Master Plan Update

City of Norfolk, Nebraska

Figure A-1.

Flow Allocation and System Node Map

- Existing City Limits
- Model Manhole
- Model Lift Station
- Model Force Main
- Model Gravity Main (>=12 in)
- Streets
- State HWY
- US HWY

Note: Pipes < 12 inch diameter are colored to show the drainage areas to the manhole where flow was assigned.

COUNTRY CLUB

YMCA

PARKHILL

PROSPECT

2ND ST

EAST PARK

EAST PASEWALK

EAST MICHIGAN

WAL-MART

ANDY'S

HWY 81

WWTP

Norfolk
NEBRASKA
right at home.

BLACK & VEATCH
Building a world of difference.

N
W E
S

0 0.15 0.3 0.6 Miles

Appendix B. Existing System Pipe Capacity Evaluation

Existing Wet Weather Flow - Pipe Capacity Results

ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
07-200_07-210	07-200	07-210	1700.85	34:00 hr	2.09	1.23	0.42	0.70	-316.10	1.23	0.70	2.09	0.84	0.71	530
275BYPASSWW_PIPE2	275BYPASSWW_JDM	275BYPASSWW	759.47	58:31 hr	3.01	0.67	0.80	0.67	-195.33	0.67	0.67	3.01	0.80	0.55	116
02-310_02-300	02-310	02-300	156.08	09:50 hr	0.89	0.56	0.26	0.67	-40.80	0.56	0.67	0.89	0.79	0.26	477
02-320_02-310	02-320	02-310	153.54	09:48 hr	0.89	0.55	0.26	0.66	-43.08	0.56	0.67	0.81	0.78	0.25	201
07-145_13-100	07-145	13-100	1530.86	82:07 hr	2.06	1.14	0.42	0.65	-486.10	1.14	0.65	2.02	0.76	0.67	468
07-210_07-220	07-210	07-220	1515.99	10:23 hr	2.05	1.13	0.42	0.65	-500.97	1.13	0.65	2.05	0.75	0.67	533
08-250_08-240	08-250	2ND_ST	144.40	09:36 hr	0.39	0.80	0.09	0.64	-50.62	0.80	0.64	0.39	0.74	0.22	1555
07-431_07-430	07-431	07-430	332.83	10:15 hr	0.90	0.79	0.22	0.63	-122.72	0.79	0.63	0.90	0.73	0.34	526
08-020_07-480	08-020	07-431	330.32	10:15 hr	0.90	0.79	0.22	0.63	-125.23	0.95	0.76	0.90	0.73	0.34	532
13-100_13-090	13-100	13-090	1495.89	82:11 hr	2.10	1.10	0.43	0.63	-589.45	1.10	0.63	2.06	0.72	0.66	468
05-095_08-250	05-095	08-250	144.50	09:13 hr	0.62	0.62	0.17	0.62	-57.95	0.78	0.78	0.41	0.71	0.23	439
07-220_07-145	07-220	07-145	1428.39	10:27 hr	2.03	1.09	0.42	0.62	-588.57	1.09	0.62	2.01	0.71	0.65	374
13-090_13-080	13-090	13-080	1464.26	82:14 hr	2.10	1.08	0.43	0.61	-636.29	1.08	0.61	2.06	0.70	0.66	334
13-080_13-070	13-080	13-070	1439.21	82:17 hr	2.10	1.06	0.43	0.61	-660.79	1.06	0.61	2.07	0.69	0.65	334
13-070_13-060	13-070	13-060	1422.45	82:21 hr	2.08	1.06	0.43	0.60	-671.11	1.06	0.60	2.06	0.68	0.65	429
13-060_13-050	13-060	13-050	1410.72	82:25 hr	2.09	1.05	0.43	0.60	-692.90	1.05	0.60	2.06	0.67	0.64	448
14-130_14-120	14-130	14-120	1486.59	60:08 hr	2.21	1.04	0.46	0.60	-742.59	1.04	0.60	2.20	0.67	0.66	420
13-040_14-130	13-040	14-130	1409.02	60:04 hr	2.12	1.03	0.44	0.59	-740.24	1.03	0.59	2.11	0.66	0.64	440
13-050_13-040	13-050	13-040	1401.23	82:29 hr	2.14	1.02	0.45	0.58	-778.07	1.02	0.58	2.14	0.64	0.64	428
05-360_05-350	05-360	05-350	97.67	09:06 hr	0.49	0.55	0.14	0.55	-69.98	0.71	0.71	0.40	0.58	0.19	183
SW-P-1	MH_EXIST	SW-MH-1	383.57	09:50 hr	1.24	0.68	0.30	0.55	-277.18	0.69	0.55	1.25	0.58	0.36	73
GM-1	08-020	07-260	411.91	10:10 hr	0.96	0.80	0.23	0.53	-331.26	1.13	0.75	0.96	0.55	0.36	346
01-570_01-130	01-570	01-130	71.21	09:17 hr	0.84	0.35	0.30	0.53	-57.51	0.35	0.53	0.84	0.55	0.18	54
21-050_21-040	21-050	21-040	796.49	59:23 hr	1.37	0.93	0.30	0.53	-649.70	0.93	0.53	1.37	0.55	0.48	122
34-050_34-030	34-050	34-030	2638.03	60:01 hr	1.56	1.57	0.26	0.52	-2226.98	1.57	0.52	1.56	0.54	0.76	228
21-070_21-060	21-070	21-060	795.82	35:46 hr	1.39	0.92	0.30	0.52	-672.64	0.92	0.52	1.38	0.54	0.48	401
07-260_07-200	07-260	07-200	401.54	10:13 hr	0.96	0.78	0.23	0.52	-345.89	1.24	0.83	0.96	0.54	0.35	402
21-060_21-050	21-060	21-050	798.91	59:21 hr	1.42	0.91	0.31	0.52	-709.59	0.91	0.52	1.09	0.53	0.48	514
07-290_08-020	07-290	08-020	364.78	09:44 hr	1.33	0.62	0.35	0.50	-370.23	1.00	0.80	0.66	0.50	0.35	438
05-350_05-095	05-350	05-095	97.66	09:10 hr	0.56	0.50	0.17	0.50	-100.20	0.74	0.74	0.28	0.49	0.19	460
21-080_21-070	21-080	21-070	801.45	35:42 hr	1.50	0.87	0.33	0.50	-823.78	0.88	0.50	1.31	0.49	0.48	462
05-370_05-360	05-370	05-360	97.64	09:02 hr	0.56	0.50	0.17	0.50	-100.62	0.69	0.69	0.28	0.49	0.19	196
05-380_05-370	05-380	05-370	97.71	09:03 hr	0.56	0.49	0.17	0.49	-101.38	0.65	0.65	0.45	0.49	0.19	389
01-130_01-120	01-130	01-120	71.20	09:20 hr	0.92	0.33	0.33	0.49	-73.88	0.33	0.49	0.92	0.49	0.18	309
SW-P-2	SW-MH-1	SW-MH-2	480.03	09:55 hr	1.79	0.61	0.47	0.49	-511.17	0.61	0.49	1.73	0.48	0.41	407
01-270_01-260	01-270	01-260	195.73	09:03 hr	2.59	0.32	0.94	0.49	-214.84	0.32	0.49	2.59	0.48	0.31	195
SW-P-4	SW-MH-3	SW-MH-4	439.34	10:03 hr	1.65	0.61	0.44	0.49	-483.31	0.61	0.49	1.64	0.48	0.39	514
SW-P-3	SW-MH-2	SW-MH-3	451.52	09:58 hr	1.72	0.60	0.46	0.48	-513.54	0.60	0.48	1.71	0.47	0.39	341
01-580_01-570	01-580	01-570	68.66	09:19 hr	0.93	0.32	0.34	0.48	-78.97	0.34	0.50	0.44	0.47	0.18	461
14-100_14-090	14-100	14-090	1479.49	60:18 hr	2.22	0.96	0.47	0.48	-1709.90	0.96	0.48	2.21	0.46	0.63	418
01-120_05-310	01-120	02-320	148.54	09:44 hr	2.01	0.32	0.74	0.48	-173.18	0.44	0.65	0.95	0.46	0.27	3206
14-120_14-110	14-120	14-110	1482.63	60:12 hr	2.23	0.95	0.47	0.48	-1728.66	0.95	0.48	2.23	0.46	0.64	462
SW-P-5	SW-MH-4	SW-MH-5	436.39	10:04 hr	1.71	0.59	0.46	0.47	-531.99	0.59	0.48	1.70	0.45	0.39	156
07-430_12-400	07-430	12-400	343.36	10:06 hr	0.96	0.69	0.24	0.46	-443.80	0.69	0.46	0.96	0.44	0.33	541
14-110_14-100	14-110	14-100	1481.47	60:14 hr	2.33	0.92	0.50	0.46	-1915.65	0.92	0.46	2.29	0.44	0.64	234
21-110_21-100	21-110	21-100	660.87	58:19 hr	1.85	0.69	0.46	0.46	-857.48	0.69	0.46	1.84	0.44	0.46	194
14-090_14-080	14-090	14-080	1477.37	60:24 hr	2.34	0.92	0.51	0.46	-1948.81	0.92	0.46	2.33	0.43	0.63	671
15-180_15-110	15-180	15-110	633.13	10:33 hr	1.31	0.80	0.30	0.46	-839.20	0.80	0.46	1.31	0.43	0.43	469
14-080_34-040	14-080	34-140	1476.56	60:27 hr	2.38	0.90	0.52	0.45	-2037.42	0.90	0.45	2.37	0.42	0.63	311
12-380_12-040	12-380	12-040	354.28	10:23 hr	1.03	0.67	0.26	0.45	-502.04	0.67	0.45	1.03	0.41	0.33	427
34-160_WWTP-002	34-160	1R	5325.07	60:15 hr	1.73	2.01	0.25	0.45	-7656.90	2.01	0.45	1.70	0.41	0.97	604
15-200_15-190	15-200	15-190	223.39	09:37 hr	1.47	0.45	0.45	0.45	-322.07	0.45	0.45	1.47	0.41	0.29	397
12-210_15-200	12-210	15-200	218.13	09:34 hr	1.44	0.45	0.44	0.45	-314.92	0.45	0.45	1.43	0.41	0.29	452
196	34-140	34-040	1487.67	60:30 hr	2.45	0.89	0.54	0.45	-2153.84	1.01	0.51	2.20	0.41	0.64	352
02-250_02-370	02-250	02-370	650.81	59:26 hr	1.93	0.66	0.49	0.44	-965.44	0.66	0.44	1.88	0.40	0.45	325
12-390_12-380	12-390	12-380	351.09	10:14 hr	1.04	0.66	0.26	0.44	-521.62	0.66	0.44	0.90	0.40	0.33	645
01-180_01-150	01-180	01-150	213.56	09:06 hr	3.22	0.29	1.23	0.44	-320.32	0.29	0.44	3.22	0.40	0.32	171
21-120_21-110	21-120	21-110	586.37	58:18 hr	1.76	0.65	0.45	0.44	-900.62	0.67	0.44	0.73	0.39	0.43	455
21-130_21-120	21-130	21-120	587.45	58:14 hr	1.79	0.65	0.46	0.43	-926.30	0.65	0.43	1.78	0.39	0.43	215
12-020_12-010	12-020	12-010	398.40	10:27 hr	1.22	0.65	0.31	0.43	-633.41	0.65	0.43	1.21	0.39	0.35	483
07-340_07-290	07-340	07-290	343.21	09:40 hr	1.53	0.53	0.43	0.43	-560.83	0.71	0.57	0.62	0.38	0.34	434
04-110_04-080	04-110	04-080	179.41	09:05 hr	1.81	0.35	0.63	0.42	-298.73	0.35	0.42	1.81	0.38	0.28	327
12-040_12-020	12-040	12-020	395.06	10:21 hr	1.24	0.64	0.32	0.42	-661.46	0.64	0.42	1.07	0.37	0.35	460
34-090_34-080	34-090	34-080	2644.95	59:57 hr	2.07	1.27	0.38	0.42	-4445.15	1.32	0.44	1.90	0.37	0.76	717
07-350_07-340	07-350	07-340	329.34	09:37 hr	1.49	0.53	0.42	0.42	-556.17	0.53	0.42	1.36	0.37	0.34	453
12-400_12-390	12-400	12-390	346.15	10:09 hr	1.10	0.63	0.29	0.42	-600.83	0.64	0.43	0.68	0.37	0.33	399

Existing Wet Weather Flow - Pipe Capacity Results															
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
16-330_16-320	16-330	16-320	206.45	58:08 hr	1.48	0.42	0.47	0.42	-360.32	0.42	0.42	1.48	0.36	0.28	400
01-200_01-180	01-200	01-180	213.37	09:04 hr	3.47	0.28	1.36	0.41	-379.38	0.28	0.43	1.36	0.36	0.32	162
11-070_11-060	11-070	11-060	874.75	59:39 hr	2.07	0.72	0.50	0.41	-1562.16	0.72	0.41	2.06	0.36	0.50	360
02-290_02-270	02-290	02-270	708.94	82:26 hr	2.29	0.62	0.60	0.41	-1266.98	0.62	0.41	2.15	0.36	0.47	349
11-080_11-070	11-080	11-070	870.10	59:36 hr	2.06	0.72	0.50	0.41	-1557.16	0.72	0.41	2.06	0.36	0.50	371
11-050_11-040	11-050	11-040	875.32	59:45 hr	2.08	0.72	0.51	0.41	-1576.22	0.72	0.41	2.07	0.36	0.50	305
11-060_11-050	11-060	11-050	875.25	59:42 hr	2.09	0.72	0.51	0.41	-1589.25	0.72	0.41	2.08	0.36	0.50	360
198	34-030	34-160	4113.41	60:37 hr	2.47	1.43	0.43	0.41	-7580.53	1.70	0.49	0.90	0.35	0.91	795
11-090_11-080	11-090	11-080	865.19	59:33 hr	2.09	0.71	0.51	0.41	-1614.97	0.71	0.41	1.98	0.35	0.50	190
12-010_15-180	12-010	15-180	399.15	10:30 hr	1.32	0.61	0.35	0.41	-750.93	0.70	0.47	0.50	0.35	0.35	389
15-100_15-095	15-100	15-095	642.33	10:40 hr	1.58	0.70	0.39	0.40	-1246.03	0.70	0.40	1.58	0.34	0.43	285
02-270_02-260	02-270	02-260	666.67	82:29 hr	2.24	0.60	0.60	0.40	-1300.35	0.70	0.46	0.73	0.34	0.46	370
21-020_21-010	21-020	21-010	831.02	59:31 hr	2.05	0.70	0.51	0.40	-1622.26	0.70	0.40	2.05	0.34	0.49	152
21-010_11-090	21-010	11-090	830.29	59:32 hr	2.06	0.70	0.51	0.40	-1630.39	0.70	0.40	0.76	0.34	0.49	101
33-150_33-140	33-150	33-140	103.17	09:30 hr	1.76	0.27	0.70	0.40	-202.93	0.37	0.56	1.72	0.34	0.22	167
16-250_16-240	16-250	16-240	204.73	58:16 hr	1.56	0.40	0.51	0.40	-404.01	0.40	0.40	1.55	0.34	0.28	284
02-260_02-250	02-260	02-250	655.39	59:22 hr	2.22	0.60	0.59	0.40	-1301.75	1.11	0.74	0.74	0.33	0.45	350
16-320_16-290	16-320	16-290	204.76	58:11 hr	1.56	0.40	0.51	0.40	-407.30	0.40	0.40	1.54	0.33	0.28	316
16-290_16-250	16-290	16-250	204.19	58:14 hr	1.56	0.40	0.51	0.40	-407.33	0.40	0.40	1.56	0.33	0.28	357
33-030_33-040	33-030	33-040	100.69	09:42 hr	1.75	0.26	0.70	0.39	-205.31	0.26	0.39	1.73	0.33	0.22	287
21-030_21-020	21-030	21-020	796.04	59:30 hr	2.02	0.69	0.50	0.39	-1647.20	0.69	0.40	1.68	0.33	0.48	605
12-310_12-300	12-310	12-300	139.87	09:16 hr	1.09	0.39	0.36	0.39	-290.05	0.39	0.39	1.09	0.33	0.23	250
15-110_15-100	15-110	15-100	642.26	10:33 hr	1.64	0.69	0.41	0.39	-1339.70	0.69	0.40	0.59	0.32	0.43	414
11	1R	WWTP-002	5320.82	60:18 hr	2.07	1.75	0.32	0.39	-11235.81	1.75	0.39	2.04	0.32	0.97	400
12-320_12-310	12-320	12-310	139.88	09:14 hr	1.11	0.39	0.37	0.39	-298.51	0.39	0.39	1.06	0.32	0.23	201
12-200_12-210	12-200	12-210	200.03	09:31 hr	1.59	0.39	0.53	0.39	-429.16	0.41	0.41	0.57	0.32	0.28	584
21-040_21-030	21-040	21-030	795.85	59:24 hr	2.06	0.68	0.52	0.39	-1711.99	0.68	0.39	2.06	0.32	0.48	162
12-330_12-320	12-330	12-320	137.66	09:15 hr	1.10	0.39	0.36	0.39	-298.79	0.39	0.39	1.05	0.32	0.23	445
33-140_33-130	33-140	33-130	95.53	09:33 hr	1.72	0.26	0.70	0.38	-209.85	0.26	0.38	1.69	0.31	0.21	241
SW-P-6	SW-MH-5	SW-MH-6	748.53	83:43 hr	1.50	0.77	0.35	0.38	-1652.30	0.77	0.38	1.49	0.31	0.45	189
49-150_02-290	49-150	02-290	603.58	09:24 hr	2.16	0.57	0.59	0.38	-1337.08	0.57	0.38	2.05	0.31	0.43	65
01-150_01-140	01-150	01-140	215.84	09:06 hr	3.98	0.25	1.63	0.38	-494.58	0.26	0.38	1.37	0.30	0.32	18
12-340_12-330	12-340	12-330	133.24	09:08 hr	1.09	0.38	0.37	0.38	-305.31	0.38	0.38	0.99	0.30	0.22	428
16-360_16-350	16-360	16-350	212.67	58:00 hr	1.75	0.38	0.59	0.38	-490.52	0.38	0.38	1.74	0.30	0.29	270
33-130_33-120	33-130	33-120	92.20	09:36 hr	1.71	0.25	0.70	0.38	-213.97	0.25	0.38	1.69	0.30	0.21	363
01-260_01-200	01-260	01-200	196.03	09:05 hr	3.64	0.25	1.50	0.38	-455.75	0.26	0.39	1.25	0.30	0.31	237
33-120_33-030	33-120	33-030	91.84	09:40 hr	1.71	0.25	0.70	0.38	-214.12	0.25	0.38	1.70	0.30	0.21	344
SW-P-8	SW-MH-7	SW-MH-8	733.80	83:47 hr	1.52	0.75	0.36	0.38	-1714.65	0.75	0.38	1.46	0.30	0.44	169
26-110_26-100	26-110	26-100	237.62	09:30 hr	1.97	0.37	0.66	0.37	-557.68	1.00	1.00	0.67	0.30	0.30	443
SW-P-7	SW-MH-6	SW-MH-7	739.40	83:46 hr	1.53	0.75	0.37	0.37	-1736.38	0.75	0.37	1.49	0.30	0.44	305
24-020_24-010	24-020	24-010	311.84	11:45 hr	1.66	0.47	0.50	0.37	-733.25	0.47	0.37	1.58	0.30	0.33	232
16-430_16-420	16-430	16-420	209.74	57:55 hr	1.74	0.37	0.59	0.37	-493.21	0.37	0.37	1.73	0.30	0.28	265
26-100_26-090	26-100	26-090	237.60	09:32 hr	1.97	0.37	0.66	0.37	-558.75	1.00	1.00	0.67	0.30	0.30	292
SW-P-10	SW-MH-9	SW-MH-10	720.41	83:52 hr	1.51	0.74	0.36	0.37	-1723.55	0.74	0.37	1.45	0.29	0.44	495
21-100_21-090	21-100	21-090	659.82	58:23 hr	1.81	0.65	0.46	0.37	-1580.85	0.65	0.37	1.80	0.29	0.44	446
51-090_51-080	51-090	51-080	743.48	10:25 hr	2.05	0.65	0.53	0.37	-1806.22	1.75	1.00	0.69	0.29	0.46	501
SW-P-11	SW-MH-10	SW-MH-11	713.02	83:57 hr	1.50	0.74	0.36	0.37	-1733.70	0.74	0.37	1.50	0.29	0.44	507
SW-P-9	SW-MH-8	SW-MH-9	729.11	83:48 hr	1.54	0.74	0.37	0.37	-1774.12	0.74	0.37	1.48	0.29	0.44	162
34-080_34-050	34-080	34-050	2644.03	59:58 hr	2.49	1.11	0.49	0.37	-6459.40	1.48	0.49	0.83	0.29	0.76	217
51-080_51-070	51-080	51-070	743.43	10:25 hr	2.07	0.64	0.53	0.37	-1836.37	1.75	1.00	0.69	0.29	0.46	313
21-090_21-080	21-090	21-080	659.32	58:27 hr	1.83	0.64	0.47	0.37	-1630.28	0.75	0.43	0.60	0.29	0.43	407
11-590_12-340	11-590	12-340	125.99	09:04 hr	1.07	0.37	0.37	0.37	-312.28	0.37	0.37	0.36	0.29	0.22	428
16-350_16-340	16-350	16-340	210.38	58:02 hr	1.80	0.37	0.61	0.37	-523.53	0.37	0.37	1.78	0.29	0.28	243
SW-P-13	SW-MH-12	SW-MH-13	699.48	84:04 hr	1.50	0.73	0.36	0.37	-1743.82	0.73	0.37	1.43	0.29	0.43	326
SW-P-14	SW-MH-13	SW-MH-14	694.02	84:08 hr	1.49	0.73	0.36	0.37	-1734.08	0.73	0.37	1.48	0.29	0.43	475
SW-P-12	SW-MH-11	SW-MH-12	704.89	84:01 hr	1.51	0.73	0.36	0.37	-1761.81	0.73	0.37	1.49	0.29	0.43	499
SW-P-16	SW-MH-15	SW-MH-16	687.07	84:11 hr	1.48	0.73	0.36	0.36	-1745.11	0.73	0.36	1.47	0.28	0.43	276
SW-P-18	SW-MH-17	SW-MH-18	676.88	84:20 hr	1.47	0.72	0.36	0.36	-1738.87	0.77	0.38	0.41	0.28	0.42	614
SW-P-17	SW-MH-16	SW-MH-17	682.51	84:14 hr	1.49	0.72	0.36	0.36	-1777.57	0.72	0.36	1.48	0.28	0.43	334
48-030_48-020	48-030	48-020	2017.73	60:17 hr	1.97	1.07	0.39	0.36	-5325.04	1.07	0.36	1.97	0.27	0.66	351
48-040_48-030	48-040	48-030	2021.78	60:14 hr	1.98	1.07	0.39	0.36	-5341.71	1.07	0.36	1.97	0.27	0.66	631
48-020_48-010	48-020	48-010	2015.84	60:18 hr	1.98	1.07	0.39	0.36	-5349.86	1.07	0.36	1.96	0.27	0.66	166
16-440_16-430	16-440	16-430	207.38	57:53 hr	1.17	0.45	0.36	0.36	-551.77	0.45	0.36	1.17	0.27	0.26	44
24-400_24-010	24-400	24-010	313.11	09:27 hr	1.80	0.44	0.56	0.35	-854.01	0.44	0.35	1.80	0.27	0.33	372
24-300_24-290	24-300	24-290	311.06	09:22 hr	1.79	0.44	0.56	0.35	-853.60	0.44	0.35	1.79	0.27	0.33	380
05-020_05-010	05-020	05-010	283.04	09:31 hr	1.64	0.44	0.51	0.35	-784.04	0.44	0.35	1.64	0.27	0.31	482
01-280_01-270	01-280	01-270	194.96	09:01 hr	3.96	0.23	1.69	0.35	-540.10	0.28	0.42	1.24	0.27	0.31	469

Existing Wet Weather Flow - Pipe Capacity Results															
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
24-290_24-400	24-290	24-400	312.36	09:24 hr	1.81	0.44	0.56	0.35	-867.36	0.44	0.35	1.70	0.26	0.33	370
12-240_12-200	12-240	12-200	167.27	09:27 hr	1.52	0.35	0.53	0.35	-468.63	0.37	0.37	0.47	0.26	0.25	509
07-460_27-140	07-460	27-140	1468.19	81:50 hr	3.34	0.70	0.82	0.35	-4123.00	0.70	0.35	3.31	0.26	0.63	252
07-360_07-460	07-360	07-460	1471.64	06:59 hr	3.36	0.70	0.83	0.35	-4166.13	0.76	0.38	3.33	0.26	0.63	163
27-080_27-090	27-080	27-090	240.59	10:03 hr	1.41	0.44	0.44	0.35	-683.89	0.44	0.35	1.41	0.26	0.29	59
05-010_07-350	05-010	07-350	288.42	09:33 hr	1.69	0.43	0.53	0.35	-822.83	0.48	0.38	0.52	0.26	0.31	445
33-160_WAL-MARTLS	33-160	WAL-MARTWW	47.02	09:02 hr	0.98	0.23	0.42	0.35	-135.80	0.23	0.35	0.98	0.26	0.15	469
27-090_EASTPARKLS	27-090	EASTPARKWW	240.57	10:02 hr	1.43	0.43	0.45	0.34	-702.59	0.43	0.34	1.43	0.26	0.29	19
16-410_16-360	16-410	16-360	211.51	57:58 hr	1.97	0.34	0.70	0.34	-622.33	0.35	0.35	1.97	0.25	0.28	203
SW-P-15-2	SW-MH-14	SW-MH-15	345.12	84:09 hr	1.45	0.51	0.42	0.34	-1042.35	0.67	0.45	0.43	0.25	0.33	87
SW-P-15-1	SW-MH-14	SW-MH-15	345.95	84:09 hr	1.46	0.51	0.42	0.34	-1044.87	0.67	0.45	0.43	0.25	0.33	87
16-340_16-330	16-340	16-330	208.66	58:04 hr	1.99	0.34	0.71	0.34	-636.66	0.36	0.36	1.80	0.25	0.28	187
05-030_05-020	05-030	05-020	277.41	09:25 hr	1.71	0.42	0.55	0.34	-866.40	0.43	0.34	0.50	0.24	0.31	394
15-190_15-180	15-190	15-180	230.97	09:41 hr	2.24	0.33	0.80	0.33	-731.00	0.57	0.57	0.65	0.24	0.30	353
26-130_26-120	26-130	26-120	189.17	09:24 hr	1.84	0.33	0.66	0.33	-598.69	1.00	1.00	0.54	0.24	0.27	319
16-240_03-140	16-240	03-140	204.40	58:19 hr	1.99	0.33	0.71	0.33	-650.85	0.33	0.33	1.97	0.24	0.28	320
SW-P-19	SW-MH-18	SW-MH-19	675.99	84:20 hr	1.66	0.66	0.42	0.33	-2173.27	0.91	0.46	0.41	0.24	0.42	58
04-080_04-010	04-080	04-010	195.34	09:09 hr	1.92	0.33	0.69	0.33	-629.97	0.36	0.36	0.55	0.24	0.27	325
26-120_26-110	26-120	26-110	189.17	09:28 hr	1.86	0.33	0.67	0.33	-612.95	1.00	1.00	0.54	0.24	0.27	420
48-090_48_040-1	SW-MH-19	48-040	2026.96	60:08 hr	2.27	0.97	0.48	0.32	-6874.51	1.00	0.33	0.60	0.23	0.66	159
01-530_01-540	01-530	01-540	215.94	09:09 hr	2.21	0.32	0.80	0.32	-748.42	0.32	0.32	2.20	0.22	0.29	166
01-540_01-550	01-540	01-550	216.60	09:14 hr	2.22	0.32	0.81	0.32	-752.76	0.32	0.32	2.21	0.22	0.29	353
12-300_12-240	12-300	12-240	141.38	09:20 hr	1.46	0.32	0.53	0.32	-497.17	0.33	0.33	0.40	0.22	0.23	410
27-100_27-080	27-100	27-080	240.58	10:02 hr	1.59	0.40	0.52	0.32	-847.76	0.42	0.33	0.46	0.22	0.29	78
36-050_36-040	36-050	36-040	1507.19	10:10 hr	2.49	0.80	0.58	0.32	-5346.98	2.50	1.00	2.37	0.22	0.60	247
01-560_24-300	01-560	24-300	220.21	09:19 hr	2.31	0.32	0.85	0.32	-801.01	0.32	0.32	2.31	0.22	0.29	365
38-110_38-100	38-110	38-100	1355.77	59:54 hr	2.29	0.79	0.53	0.31	-4967.39	0.79	0.31	2.28	0.21	0.57	222
32-080_32-070	32-080	32-070	242.94	57:31 hr	1.64	0.39	0.54	0.31	-894.66	0.39	0.31	1.64	0.21	0.29	620
15-410_15-280	15-410	15-280	1356.12	60:03 hr	2.30	0.78	0.54	0.31	-5019.70	0.78	0.31	2.30	0.21	0.57	495
38-120_38-110	38-120	38-110	1355.98	59:53 hr	2.30	0.78	0.54	0.31	-5025.97	0.78	0.31	2.03	0.21	0.57	293
01-550_01-560	01-550	01-560	216.70	09:15 hr	2.30	0.31	0.85	0.31	-803.94	0.31	0.31	2.19	0.21	0.29	323
32-090_32-080	32-090	32-080	258.26	57:24 hr	1.75	0.39	0.58	0.31	-958.34	0.45	0.36	1.75	0.21	0.30	194
P-NEW50	38-100	15-420	1355.70	59:58 hr	2.30	0.78	0.54	0.31	-5040.65	0.78	0.31	2.30	0.21	0.57	533
15-420_15-410	15-420	15-410	1355.73	59:59 hr	2.31	0.78	0.54	0.31	-5058.39	0.78	0.31	2.18	0.21	0.57	232
32-070_32-060	32-070	32-060	239.26	57:32 hr	1.64	0.39	0.54	0.31	-898.38	0.39	0.31	1.63	0.21	0.28	189
05-040_05-030	05-040	05-030	211.78	09:22 hr	1.45	0.39	0.48	0.31	-795.68	0.40	0.32	0.38	0.21	0.27	525
07-440_27-100	07-440	27-100	227.34	10:03 hr	1.57	0.39	0.52	0.31	-865.87	0.39	0.31	0.41	0.21	0.28	453
16-420_16-410	16-420	16-410	208.38	57:56 hr	2.25	0.31	0.84	0.31	-795.10	0.32	0.32	2.10	0.21	0.28	220
27-140_27-130	27-140	27-130	1429.76	81:54 hr	2.47	0.77	0.58	0.31	-5480.17	0.77	0.31	2.47	0.21	0.58	521
27-130_36-090	27-130	36-090	1420.65	81:58 hr	2.47	0.77	0.59	0.31	-5515.03	0.77	0.31	2.46	0.20	0.58	510
05-060_05-040	05-060	05-040	207.12	09:17 hr	1.45	0.38	0.48	0.31	-807.51	0.39	0.31	1.37	0.20	0.26	410
07-390_07-440	07-390	07-440	212.55	09:58 hr	1.49	0.38	0.50	0.31	-831.87	0.38	0.31	0.96	0.20	0.27	403
32-050_32-040	32-050	32-040	232.59	57:37 hr	1.63	0.38	0.55	0.31	-912.48	0.38	0.31	1.59	0.20	0.28	393
36-090_36-080	36-090	36-080	1402.71	10:51 hr	2.46	0.76	0.58	0.31	-5502.95	0.76	0.31	2.43	0.20	0.58	493
04-010_05-060	04-010	05-060	203.65	09:13 hr	1.43	0.38	0.48	0.31	-799.72	0.38	0.31	1.37	0.20	0.26	428
32-040_32-030	32-040	32-030	228.32	57:39 hr	1.61	0.38	0.54	0.30	-901.94	0.38	0.30	1.60	0.20	0.28	172
08-030_08-020	08-030	08-020	195.34	09:50 hr	1.38	0.38	0.46	0.30	-774.20	0.87	0.69	0.35	0.20	0.26	441
48-090_48-040	48-090	SW-MH-19	1357.79	60:16 hr	1.66	0.91	0.36	0.30	-5384.99	0.92	0.31	1.62	0.20	0.54	357
32-060_32-050	32-060	32-050	236.64	57:34 hr	1.67	0.38	0.56	0.30	-939.32	0.38	0.30	1.66	0.20	0.28	244
36-080_36-070	36-080	36-070	1381.53	10:55 hr	2.44	0.76	0.58	0.30	-5489.61	0.76	0.30	2.34	0.20	0.57	491
36-040_36-030	36-040	36-030	1390.75	10:14 hr	2.46	0.76	0.59	0.30	-5546.07	0.76	0.30	2.37	0.20	0.58	489
31-060_16-450	31-060	16-450	212.21	57:52 hr	1.51	0.38	0.51	0.30	-858.46	0.38	0.30	1.51	0.20	0.27	405
28-020_26-130	28-020	26-130	189.17	09:20 hr	2.11	0.30	0.80	0.30	-765.63	1.00	1.00	0.54	0.20	0.27	116
36-070_36-050	36-070	36-050	1375.34	73:13 hr	2.46	0.75	0.59	0.30	-5586.11	2.50	1.00	2.42	0.20	0.57	246
15-270_15-240	15-270	15-240	1355.97	60:06 hr	2.44	0.75	0.59	0.30	-5572.30	0.75	0.30	2.44	0.20	0.57	383
07-400_07-390	07-400	07-390	204.92	09:58 hr	1.48	0.37	0.50	0.30	-842.62	0.38	0.30	0.99	0.20	0.26	431
36-030_36-020	36-030	36-020	1333.68	10:18 hr	2.41	0.75	0.58	0.30	-5515.17	0.75	0.30	2.35	0.19	0.56	494
15-220_48-090	15-220	48-090	1357.16	60:13 hr	1.70	0.90	0.37	0.30	-5619.97	0.90	0.30	1.29	0.19	0.54	74
06-010_07-400	06-010	07-400	202.14	09:49 hr	1.47	0.37	0.50	0.30	-842.23	0.37	0.30	1.35	0.19	0.26	457
32-020_32-010	32-020	32-010	224.00	57:41 hr	1.63	0.37	0.55	0.30	-936.88	0.37	0.30	1.62	0.19	0.27	182
14-010_14-250	14-010	14-250	1311.50	11:57 hr	1.66	0.89	0.37	0.30	-5516.88	1.41	0.47	1.30	0.19	0.53	328
32-010_31-070	32-010	31-070	219.56	57:44 hr	1.60	0.37	0.55	0.30	-925.41	0.37	0.30	1.56	0.19	0.27	335
36-020_14-070	36-020	14-070	1329.39	10:18 hr	2.43	0.74	0.59	0.30	-5615.14	0.74	0.30	2.15	0.19	0.56	106
32-030_32-020	32-030	32-020	225.52	57:40 hr	1.65	0.37	0.57	0.30	-957.39	0.37	0.30	1.65	0.19	0.28	169
08-060_08-030	08-060	08-030	181.66	09:51 hr	1.34	0.37	0.46	0.30	-776.84	0.50	0.40	0.33	0.19	0.25	442
31-070_31-060	31-070	31-060	215.81	57:48 hr	1.59	0.37	0.54	0.29	-923.94	0.37	0.29	1.58	0.19	0.27	403
14-250_14-240	14-250	14-240	1296.70	12:00 hr	1.66	0.88	0.37	0.29	-5552.42	1.57	0.52	0.41	0.19	0.53	307

Existing Wet Weather Flow - Pipe Capacity Results															
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
38-130_38-120	38-130	38-120	1356.47	59:51 hr	2.53	0.73	0.61	0.29	-5920.38	0.76	0.30	0.61	0.19	0.57	463
40-140_40-280	40-140	40-280	85.84	09:25 hr	1.46	0.24	0.62	0.29	-382.42	0.83	1.00	0.35	0.18	0.19	452
14-240_34-170	14-240	4-R	1278.01	12:05 hr	1.23	1.01	0.25	0.29	-5694.15	1.73	0.49	0.28	0.18	0.50	675
29-030_29-020	29-030	29-020	334.43	10:10 hr	1.77	0.43	0.56	0.29	-1513.51	1.50	1.00	0.42	0.18	0.32	432
29-020_29-010	29-020	29-010	337.44	10:14 hr	1.79	0.43	0.57	0.29	-1529.12	1.50	1.00	0.42	0.18	0.32	449
29-010_40-130	29-010	40-130	339.23	10:18 hr	1.80	0.43	0.57	0.29	-1541.48	1.50	1.00	0.43	0.18	0.32	455
29-060_29-050	29-060	29-050	334.46	10:00 hr	1.78	0.43	0.57	0.29	-1531.46	1.50	1.00	0.42	0.18	0.32	308
38-160_38-130	38-160	38-130	1357.05	59:48 hr	2.61	0.72	0.64	0.29	-6238.23	0.72	0.29	2.15	0.18	0.57	484
29-040_29-030	29-040	29-030	334.43	10:06 hr	1.79	0.43	0.57	0.29	-1552.05	1.50	1.00	0.42	0.18	0.32	433
41-290_41-300	41-290	41-300	325.28	09:43 hr	1.75	0.43	0.56	0.28	-1514.54	1.50	1.00	0.41	0.18	0.32	495
29-050_29-040	29-050	29-040	334.47	10:04 hr	1.80	0.43	0.57	0.28	-1559.39	1.50	1.00	0.42	0.18	0.32	305
51-040_275BYPASSLS	OM-20	275BYPASSWW_JDM	759.45	58:29 hr	3.01	0.50	0.89	0.28	-3562.80	1.75	1.00	0.70	0.18	0.47	378
41-300_41-310	41-300	41-310	325.28	09:48 hr	1.77	0.42	0.57	0.28	-1546.74	1.50	1.00	0.41	0.17	0.32	568
41-310_29-070	41-310	29-070	325.28	09:53 hr	1.77	0.42	0.57	0.28	-1548.36	1.50	1.00	0.41	0.17	0.32	567
29-070_29-060	29-070	29-060	325.27	09:57 hr	1.77	0.42	0.57	0.28	-1550.10	1.50	1.00	0.41	0.17	0.32	565
24-090_24-080	24-090	24-080	167.82	09:20 hr	1.32	0.35	0.46	0.28	-800.78	0.35	0.28	1.32	0.17	0.24	54
8	15-095	34-090	642.33	10:50 hr	2.58	0.49	0.76	0.28	-3069.08	0.88	0.50	0.59	0.17	0.43	1735
51-070_51-060	51-070	51-060	743.61	10:29 hr	3.00	0.49	0.89	0.28	-3578.63	1.75	1.00	0.69	0.17	0.46	378
24-040_24-030	24-040	24-030	172.20	09:27 hr	1.36	0.35	0.48	0.28	-830.88	0.35	0.28	1.36	0.17	0.24	17
24-030_24-020	24-030	24-020	175.82	09:28 hr	1.41	0.35	0.50	0.28	-867.51	0.55	0.44	0.32	0.17	0.24	163
09-030_09-020	09-030	09-020	100.21	09:26 hr	1.26	0.28	0.50	0.28	-497.41	0.28	0.28	1.26	0.17	0.19	166
35-020_35-010	35-020	35-010	228.77	09:12 hr	1.29	0.41	0.42	0.28	-1147.05	0.41	0.28	1.28	0.17	0.26	118
24-060_24-050	24-060	24-050	170.07	09:25 hr	1.38	0.34	0.49	0.28	-857.53	0.34	0.28	1.38	0.17	0.24	208
09-040_09-030	09-040	09-030	99.71	09:18 hr	1.26	0.28	0.50	0.28	-502.92	0.28	0.28	1.12	0.17	0.19	163
14-070_14-060	14-070	14-060	1299.75	35:42 hr	1.84	0.82	0.42	0.27	-6603.82	0.82	0.27	1.77	0.16	0.53	418
24-050_24-040	24-050	24-040	172.21	09:27 hr	1.41	0.34	0.50	0.27	-880.04	0.35	0.28	0.31	0.16	0.24	122
05-430_PROSPECTLS	05-430	PROSPECTWW	812.11	11:41 hr	2.06	0.61	0.55	0.27	-4167.70	0.61	0.27	2.02	0.16	0.45	611
15-280_15-270	15-280	15-270	1356.05	60:04 hr	2.78	0.68	0.70	0.27	-6975.30	0.72	0.29	0.61	0.16	0.57	162
14-040_14-030	14-040	14-030	1274.30	11:48 hr	1.82	0.82	0.42	0.27	-6587.26	0.82	0.27	1.79	0.16	0.52	467
08-090_08-060	08-090	08-060	156.32	09:46 hr	1.29	0.34	0.46	0.27	-811.72	0.35	0.28	0.28	0.16	0.23	442
14-050_14-040	14-050	14-040	1281.82	35:48 hr	1.85	0.81	0.43	0.27	-6708.42	0.81	0.27	1.83	0.16	0.53	480
01-520_01-530	01-520	01-530	215.96	09:09 hr	2.80	0.27	1.12	0.27	-1130.51	0.30	0.30	0.61	0.16	0.29	282
24-080_24-070	24-080	24-070	169.67	09:25 hr	1.41	0.34	0.51	0.27	-888.98	0.34	0.27	1.41	0.16	0.24	385
14-030_14-020	14-030	14-020	1268.25	11:52 hr	1.83	0.81	0.42	0.27	-6657.88	0.81	0.27	1.77	0.16	0.52	445
01-600_01-590	01-600	01-590	38.12	09:14 hr	1.11	0.18	0.55	0.27	-200.28	0.38	0.57	0.24	0.16	0.13	229
14-060_14-050	14-060	14-050	1290.39	35:44 hr	1.87	0.81	0.43	0.27	-6789.94	0.81	0.27	1.80	0.16	0.53	290
34-040_34-030	34-040	34-030	1486.96	60:30 hr	4.85	0.54	1.38	0.27	-7850.41	1.30	0.65	1.04	0.16	0.64	39
04-140_04-110	04-140	04-110	155.52	09:02 hr	2.92	0.22	1.29	0.27	-823.76	0.29	0.35	0.63	0.16	0.26	327
24-070_24-060	24-070	24-060	169.62	09:23 hr	1.43	0.33	0.52	0.27	-910.31	0.34	0.27	0.31	0.16	0.24	36
P-100	P3-18	SW-MH-20	321.70	11:36 hr	1.07	0.53	0.31	0.27	-1748.86	0.57	0.28	1.07	0.16	0.29	508
06-170_06-160	06-170	06-160	84.99	09:27 hr	1.13	0.27	0.46	0.27	-466.66	0.27	0.27	1.13	0.15	0.18	405
09-080_09-040	09-080	09-040	91.72	09:19 hr	1.23	0.26	0.50	0.26	-510.80	0.27	0.27	0.26	0.15	0.19	326
10-500_21-140	10-500	21-140	575.81	58:09 hr	2.55	0.46	0.79	0.26	-3243.50	0.46	0.26	2.54	0.15	0.41	202
40-040_40-030	40-040	40-030	315.36	09:26 hr	2.74	0.33	1.00	0.26	-1780.21	1.25	1.00	0.57	0.15	0.33	479
40-050_40-040	40-050	40-040	315.21	09:23 hr	2.74	0.33	1.00	0.26	-1781.33	1.25	1.00	0.57	0.15	0.33	360
21-140_21-130	21-140	21-130	580.82	58:11 hr	2.59	0.46	0.80	0.26	-3310.95	0.55	0.31	0.53	0.15	0.41	453
05-100_05-090	05-100	05-030	40.70	09:19 hr	0.56	0.26	0.23	0.26	-232.14	0.61	0.61	0.12	0.15	0.12	449
48-010_34-090	48-010	34-090	2013.79	60:19 hr	3.06	0.78	0.72	0.26	-11533.41	1.04	0.35	0.61	0.15	0.66	221
34-170_34-160	34-170	34-160	1273.95	12:08 hr	1.43	0.91	0.31	0.26	-7309.52	1.92	0.55	0.28	0.15	0.50	83
05-480_05-510	05-480	05-510	62.32	09:08 hr	1.23	0.22	0.55	0.26	-357.75	0.22	0.26	1.23	0.15	0.16	347
08-120_08-090	08-120	08-090	142.62	09:50 hr	1.25	0.32	0.46	0.26	-822.56	0.33	0.27	0.26	0.15	0.22	517
01-140_01-520	01-140	01-520	215.83	09:07 hr	2.97	0.26	1.22	0.26	-1248.82	0.26	0.26	0.61	0.15	0.29	343
6	09-020	09-310	108.48	09:30 hr	1.50	0.26	0.62	0.26	-633.46	0.27	0.27	0.31	0.15	0.20	1149
41-260_41-270	41-260	41-270	66.85	09:10 hr	1.35	0.21	0.61	0.26	-396.69	0.83	1.00	0.27	0.14	0.17	244
24-120_24-090	24-120	24-090	150.74	09:20 hr	1.35	0.32	0.50	0.26	-896.05	0.34	0.27	0.27	0.14	0.22	301
24-010_49-150	24-010	49-150	623.48	11:45 hr	3.88	0.38	1.30	0.26	-3707.96	0.43	0.29	0.64	0.14	0.44	44
40-150_40-140	40-150	40-140	66.67	09:22 hr	1.35	0.21	0.61	0.26	-396.74	0.83	1.00	0.27	0.14	0.17	453
41-270_41-280	41-270	41-280	66.85	09:13 hr	1.35	0.21	0.61	0.26	-399.45	0.83	1.00	0.27	0.14	0.17	340
24-130_24-120	24-130	24-120	150.17	09:18 hr	1.35	0.32	0.50	0.26	-897.37	0.32	0.26	1.28	0.14	0.22	354
41-240_41-250	41-240	41-250	66.89	09:09 hr	1.35	0.21	0.61	0.26	-400.40	0.83	1.00	0.27	0.14	0.17	347
04-210_04-140	04-210	04-140	132.21	09:01 hr	2.68	0.21	1.21	0.26	-792.87	0.22	0.26	0.54	0.14	0.24	310
41-140_41-240	41-140	41-240	65.53	09:05 hr	1.33	0.21	0.60	0.26	-393.57	0.83	1.00	0.44	0.14	0.16	60
9	4-R	34-170	1275.26	12:07 hr	1.47	0.89	0.32	0.26	-7659.13	1.86	0.53	0.28	0.14	0.50	257
41-280_41-290	41-280	41-290	66.86	09:15 hr	1.36	0.21	0.62	0.26	-401.92	0.83	1.00	0.27	0.14	0.17	168
41-250_41-260	41-250	41-260	66.89	09:10 hr	1.36	0.21	0.62	0.26	-402.41	0.83	1.00	0.27	0.14	0.17	132
40-160_40-150	40-160	40-150	58.07	09:20 hr	1.19	0.21	0.54	0.25	-355.05	0.83	1.00	0.24	0.14	0.15	478
09-110_09-080	09-110	09-080	84.93	09:17 hr	1.21	0.25	0.50	0.25	-521.64	0.26	0.26	0.24	0.14	0.18	328

Existing Wet Weather Flow - Pipe Capacity Results															
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
02-180_05-450	02-180	05-450	818.33	11:32 hr	2.31	0.57	0.64	0.25	-5036.22	0.57	0.25	2.28	0.14	0.45	164
05-440_05-430	05-440	05-430	816.24	11:35 hr	2.31	0.57	0.64	0.25	-5040.91	0.57	0.25	2.28	0.14	0.45	277
05-450_05-440	05-450	05-440	817.21	11:34 hr	2.32	0.57	0.65	0.25	-5085.79	0.57	0.25	2.30	0.14	0.45	362
09-130_09-110	09-130	09-110	82.49	09:13 hr	1.19	0.25	0.50	0.25	-513.98	0.25	0.25	1.15	0.14	0.18	152
26-090_41-290	26-090	41-290	258.51	09:40 hr	1.68	0.37	0.57	0.25	-1644.93	1.50	1.00	0.33	0.14	0.28	506
40-130_40-120	40-130	40-120	428.65	10:20 hr	2.82	0.37	0.97	0.25	-2781.62	1.50	1.00	0.54	0.13	0.36	310
06-180_06-170	06-180	06-170	71.69	09:23 hr	1.07	0.25	0.45	0.25	-469.44	0.26	0.26	0.20	0.13	0.16	457
19-060_19-030	19-060	19-030	140.68	56:50 hr	1.34	0.31	0.51	0.24	-929.14	0.31	0.24	1.35	0.13	0.22	281
08-150_08-120	08-150	08-120	126.48	09:46 hr	1.21	0.31	0.46	0.24	-838.00	0.32	0.25	0.23	0.13	0.21	409
06-190_06-180	06-190	06-180	69.85	09:18 hr	1.05	0.24	0.44	0.24	-465.14	0.24	0.24	0.99	0.13	0.16	368
18-620_18-630	18-620	18-630	31.47	09:06 hr	1.07	0.16	0.56	0.24	-210.87	0.16	0.24	1.07	0.13	0.12	171
05-470_05-480	05-470	05-480	54.91	09:05 hr	1.19	0.20	0.56	0.24	-368.63	0.21	0.25	0.30	0.13	0.15	38
18-610_18-620	18-610	18-620	31.48	09:06 hr	1.07	0.16	0.56	0.24	-211.53	0.16	0.24	1.04	0.13	0.12	320
SW-P-20	SW-MH-20	SW-MH-5	321.65	11:32 hr	1.22	0.49	0.37	0.24	-2169.29	0.68	0.34	0.23	0.13	0.29	201
P0	MH-101	HWY81WW	47.32	09:06 hr	1.03	0.20	0.48	0.24	-319.23	0.20	0.24	1.03	0.13	0.14	65
P2-13	MH-INT2-6	MH-INT2-5	312.91	11:06 hr	1.18	0.49	0.36	0.24	-2111.84	0.49	0.24	1.18	0.13	0.29	119
40-020_40-010	40-020	40-010	315.69	09:30 hr	3.06	0.30	1.17	0.24	-2135.01	1.25	1.00	0.57	0.13	0.33	303
P2-3	MH-INT2-16	MH-INT2-15	312.96	10:38 hr	1.19	0.48	0.36	0.24	-2119.45	0.48	0.24	1.19	0.13	0.29	500
P2-4	MH-INT2-15	MH-INT2-14	312.94	10:37 hr	1.19	0.48	0.36	0.24	-2119.48	0.48	0.24	1.19	0.13	0.29	500
P2-7	MH-INT2-12	MH-INT2-11	312.92	10:48 hr	1.19	0.48	0.36	0.24	-2119.49	0.48	0.24	1.19	0.13	0.29	500
P2-11	MH-INT2-8	MH-INT2-7	312.91	11:03 hr	1.19	0.48	0.36	0.24	-2119.50	0.48	0.24	1.19	0.13	0.29	500
P2-10	MH-INT2-9	MH-INT2-8	312.92	10:59 hr	1.19	0.48	0.36	0.24	-2119.50	0.48	0.24	1.19	0.13	0.29	500
P2-14	MH-INT2-5	MH-INT2-4	312.91	11:10 hr	1.19	0.48	0.36	0.24	-2123.04	0.48	0.24	1.19	0.13	0.29	420
P2-8	MH-INT2-11	MH-INT2-10	312.94	10:53 hr	1.19	0.48	0.36	0.24	-2124.40	0.48	0.24	1.19	0.13	0.29	354
40-030_40-020	40-030	40-020	315.69	09:29 hr	3.07	0.30	1.17	0.24	-2143.42	1.25	1.00	0.57	0.13	0.33	418
P2-6	MH-INT2-13	MH-INT2-12	312.92	10:44 hr	1.19	0.48	0.36	0.24	-2131.47	0.48	0.24	1.13	0.13	0.29	495
P2-17	MH-INT2-2	MH-INT2-1	312.92	11:22 hr	1.19	0.48	0.36	0.24	-2131.99	0.48	0.24	1.19	0.13	0.29	352
41-130_41-140	41-130	41-140	59.57	09:03 hr	1.31	0.20	0.61	0.24	-407.80	0.83	1.00	0.24	0.13	0.16	365
P2-15	MH-INT2-4	MH-INT2-3	312.96	11:21 hr	1.20	0.48	0.36	0.24	-2143.51	0.48	0.24	1.20	0.13	0.29	464
P2-12	MH-INT2-7	MH-INT2-6	312.92	11:06 hr	1.20	0.48	0.36	0.24	-2147.38	0.48	0.24	0.77	0.13	0.29	206
P2-5	MH-INT2-14	MH-INT2-13	312.92	10:40 hr	1.20	0.48	0.36	0.24	-2148.51	0.48	0.24	1.15	0.13	0.29	488
P2-16	MH-INT2-3	MH-INT2-2	312.96	11:25 hr	1.20	0.48	0.36	0.24	-2151.25	0.48	0.24	1.18	0.13	0.29	500
P2-9	MH-INT2-10	MH-INT2-9	312.94	10:57 hr	1.20	0.48	0.36	0.24	-2151.27	0.48	0.24	1.12	0.13	0.29	500
P2-2	MH-INT3-15	MH-INT2-16	312.96	10:34 hr	1.20	0.48	0.36	0.24	-2151.69	0.48	0.24	1.17	0.13	0.29	154
10-510_10-500	10-510	10-500	227.29	57:17 hr	1.55	0.36	0.54	0.24	-1568.27	0.41	0.27	0.29	0.13	0.26	423
40-010_51-090	40-010	51-090	315.78	09:31 hr	3.11	0.30	1.19	0.24	-2185.09	1.25	1.00	0.57	0.13	0.33	403
02-010_05-470	02-010	05-470	52.95	09:05 hr	1.17	0.20	0.55	0.24	-366.72	0.20	0.24	0.22	0.13	0.15	309
11-040_38-160	11-040	38-160	897.37	59:46 hr	2.21	0.60	0.60	0.24	-6230.54	0.65	0.26	0.40	0.13	0.46	127
16-450_16-440	16-450	16-440	209.71	57:53 hr	2.09	0.30	0.80	0.24	-1480.37	0.37	0.30	0.38	0.12	0.27	53
06-110_06-010	06-110	06-010	122.27	09:49 hr	1.22	0.30	0.47	0.24	-863.81	0.34	0.27	0.22	0.12	0.20	382
24-170_24-160	24-170	24-160	125.70	09:14 hr	1.25	0.30	0.48	0.24	-888.32	0.30	0.24	1.25	0.12	0.20	99
09-150_09-140	09-150	09-140	69.83	09:14 hr	1.09	0.24	0.47	0.24	-493.60	0.24	0.24	1.09	0.12	0.16	130
P2-18	MH-INT2-1	P3-18	312.92	11:26 hr	1.23	0.47	0.37	0.24	-2241.63	0.50	0.25	0.55	0.12	0.29	489
02-235_02-230	02-235	02-230	665.19	11:25 hr	2.07	0.53	0.60	0.24	-4787.88	0.53	0.24	2.03	0.12	0.41	379
40-120_51-090	40-120	51-090	428.62	10:20 hr	3.00	0.35	1.06	0.24	-3090.13	1.50	1.00	0.54	0.12	0.36	171
06-120_06-110	06-120	06-110	121.62	09:44 hr	1.23	0.29	0.47	0.24	-876.97	0.30	0.24	1.11	0.12	0.20	381
24-160_24-140	24-160	24-140	125.70	09:16 hr	1.28	0.29	0.49	0.23	-915.54	0.29	0.23	1.28	0.12	0.20	195
24-210_24-200	24-210	24-200	118.86	09:09 hr	1.21	0.29	0.47	0.23	-867.15	0.29	0.23	1.21	0.12	0.20	322
24-140_24-130	24-140	24-130	125.65	09:14 hr	1.28	0.29	0.50	0.23	-919.51	0.31	0.24	0.23	0.12	0.20	162
15-240_15-230	15-240	15-230	1357.21	60:09 hr	2.40	0.70	0.60	0.23	-9936.31	0.70	0.23	2.40	0.12	0.54	565
19-160_19-150	19-160	19-150	6.18	55:04 hr	0.22	0.16	0.12	0.23	-45.39	0.16	0.23	0.22	0.12	0.05	131
15-230_15-220	15-230	15-220	1357.25	60:13 hr	2.41	0.70	0.60	0.23	-10003.69	0.80	0.27	0.43	0.12	0.54	565
17-020_17-010	17-020	17-010	178.33	57:22 hr	1.27	0.35	0.45	0.23	-1321.47	0.35	0.23	1.27	0.12	0.23	258
51-060_275BYPASSLS	51-060	OM-20	743.61	10:28 hr	3.90	0.41	1.28	0.23	-5522.09	1.75	1.00	0.69	0.12	0.46	22
06-130_06-120	06-130	06-120	117.26	09:41 hr	1.21	0.29	0.47	0.23	-872.85	0.29	0.23	1.01	0.12	0.20	440
37-010_32-130	37-010	32-130	98.34	09:21 hr	1.58	0.23	0.69	0.23	-732.33	0.23	0.23	1.58	0.12	0.19	782
06-210_06-200	06-210	06-200	63.71	09:16 hr	1.03	0.23	0.45	0.23	-475.09	0.23	0.23	1.03	0.12	0.15	319
40-170_40-160	40-170	40-160	57.32	09:16 hr	1.33	0.19	0.64	0.23	-429.09	0.83	1.00	0.23	0.12	0.15	222
06-200_06-190	06-200	06-190	64.56	09:15 hr	1.05	0.23	0.46	0.23	-487.38	0.24	0.24	0.18	0.12	0.16	101
06-220_06-210	06-220	06-210	62.33	09:12 hr	1.01	0.23	0.44	0.23	-472.78	0.23	0.23	0.97	0.12	0.15	126
19-080_19-070	19-080	19-070	20.58	55:10 hr	0.76	0.15	0.40	0.23	-156.55	0.15	0.23	0.75	0.12	0.10	343
24-200_24-170	24-200	24-170	118.87	09:12 hr	1.24	0.29	0.49	0.23	-907.59	0.29	0.23	0.22	0.12	0.20	257
17-030_17-020	17-030	17-020	178.34	57:24 hr	1.30	0.34	0.47	0.23	-1369.36	0.35	0.23	1.09	0.12	0.23	662
02-230_02-220	02-230	02-220	666.37	11:28 hr	2.16	0.52	0.63	0.23	-5120.55	0.52	0.23	2.11	0.12	0.41	516
09-310_08-150	09-310	08-150	110.93	09:41 hr	1.17	0.29	0.46	0.23	-857.87	0.30	0.24	0.20	0.11	0.19	585
02-190_02-180	02-190	02-180	664.46	11:31 hr	2.17	0.51	0.64	0.23	-5176.21	0.52	0.23	0.34	0.11	0.41	285
09-140_09-130	09-140	09-130	70.25	09:12 hr	1.16	0.23	0.51	0.23	-548.35	0.24	0.24	0.20	0.11	0.16	262

Existing Wet Weather Flow - Pipe Capacity Results															
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
02-220_02-190	02-220	02-190	665.01	11:29 hr	2.18	0.51	0.64	0.23	-5206.62	0.51	0.23	2.14	0.11	0.41	214
41-120_41-130	41-120	41-130	52.96	09:01 hr	1.27	0.19	0.61	0.23	-414.97	0.83	1.00	0.22	0.11	0.15	293
17-010_10-520	17-010	10-520	206.27	57:09 hr	1.53	0.34	0.55	0.23	-1633.38	0.34	0.23	1.53	0.11	0.25	211
10-520_10-510	10-520	10-510	207.00	57:12 hr	1.54	0.34	0.56	0.23	-1643.35	0.35	0.23	0.26	0.11	0.25	444
40-060_40-050	40-060	40-050	315.23	09:22 hr	3.41	0.28	1.35	0.22	-2533.61	1.25	1.00	0.57	0.11	0.33	420
19-240_19-230	19-240	19-230	124.80	09:33 hr	1.35	0.28	0.54	0.22	-1005.02	0.28	0.22	1.35	0.11	0.20	397
19-230_19-220	19-230	19-220	124.78	09:30 hr	1.35	0.28	0.54	0.22	-1005.08	0.28	0.22	1.35	0.11	0.20	397
19-220_19-210	19-220	19-210	124.78	09:33 hr	1.35	0.28	0.54	0.22	-1005.19	0.28	0.22	1.35	0.11	0.20	397
02-040_02-010	02-040	02-010	46.14	09:02 hr	1.13	0.19	0.55	0.22	-373.98	0.19	0.23	0.19	0.11	0.14	347
24-220_24-210	24-220	24-210	118.84	09:05 hr	1.30	0.28	0.52	0.22	-972.33	0.29	0.23	0.22	0.11	0.20	532
P3	MH-103A	MH-103	45.38	09:01 hr	1.14	0.18	0.56	0.22	-384.28	0.18	0.22	1.14	0.11	0.14	293
35-300_35-050	35-300	35-050	228.78	09:01 hr	1.79	0.33	0.66	0.22	-1961.46	0.33	0.22	1.79	0.10	0.26	182
01-590_01-580	01-590	01-580	38.23	09:12 hr	1.53	0.14	0.84	0.22	-332.64	0.23	0.35	0.24	0.10	0.13	95
28-050_28-040	28-050	28-040	82.03	09:17 hr	1.46	0.22	0.66	0.22	-719.62	0.22	0.22	1.46	0.10	0.18	416
28-040_28-030	28-040	28-030	82.03	09:20 hr	1.47	0.22	0.66	0.22	-721.38	0.22	0.22	1.47	0.10	0.18	374
33-050_33-040	33-050	33-040	55.48	09:07 hr	1.00	0.21	0.46	0.21	-495.46	0.23	0.23	1.00	0.10	0.14	220
35-040_35-030	35-040	35-030	228.78	09:07 hr	1.88	0.32	0.71	0.21	-2128.34	0.32	0.21	1.88	0.10	0.26	390
40-110_40-100	40-110	40-100	228.74	09:15 hr	1.89	0.31	0.71	0.21	-2139.70	0.31	0.21	1.89	0.10	0.26	351
35-030_35-020	35-030	35-020	228.72	09:09 hr	1.89	0.31	0.71	0.21	-2146.58	0.36	0.24	0.29	0.10	0.26	380
35-050_35-040	35-050	35-040	228.77	09:03 hr	1.92	0.31	0.73	0.21	-2200.34	0.31	0.21	1.77	0.09	0.26	371
17-230_17-220	17-230	17-220	145.21	57:09 hr	1.23	0.31	0.47	0.21	-1413.24	0.31	0.21	1.23	0.09	0.21	368
40-180_40-170	40-180	40-170	56.99	09:12 hr	1.58	0.17	0.80	0.21	-560.53	0.83	1.00	0.23	0.09	0.15	257
17-220_17-210	17-220	17-210	145.50	57:09 hr	1.24	0.31	0.47	0.20	-1437.03	0.31	0.20	1.24	0.09	0.21	339
03-360_03-310	03-360	03-310	281.04	58:28 hr	2.41	0.31	0.91	0.20	-2781.18	0.31	0.21	2.39	0.09	0.29	446
06-140_06-130	06-140	06-130	92.10	09:40 hr	1.14	0.26	0.47	0.20	-911.63	0.27	0.22	0.17	0.09	0.17	445
17-210_17-030	17-210	17-030	145.51	57:12 hr	1.26	0.31	0.48	0.20	-1456.34	0.32	0.22	0.18	0.09	0.21	192
05-510_06-220	05-510	06-220	62.31	09:10 hr	1.21	0.20	0.57	0.20	-624.25	0.22	0.22	0.18	0.09	0.15	224
28-052	28-052	28-050	81.99	09:11 hr	1.60	0.20	0.75	0.20	-825.27	0.21	0.21	0.23	0.09	0.18	234
01-610_01-600	01-610	01-600	37.82	09:12 hr	1.67	0.13	0.96	0.20	-384.20	0.13	0.20	1.67	0.09	0.13	161
06-150_06-140	06-150	06-140	89.81	09:34 hr	1.13	0.25	0.47	0.20	-914.07	0.25	0.20	1.03	0.09	0.17	436
P1	MH-102	MH-101	46.88	09:06 hr	1.33	0.17	0.68	0.20	-479.15	0.17	0.20	1.33	0.09	0.14	227
40-190_40-180	40-190	40-180	56.68	09:09 hr	1.61	0.17	0.83	0.20	-582.17	0.83	1.00	0.23	0.09	0.15	150
35-270_40-190	35-270	40-190	50.66	09:10 hr	1.45	0.17	0.75	0.20	-527.28	0.83	1.00	0.21	0.09	0.14	306
33-270_33-050	33-270	33-050	48.10	09:07 hr	0.96	0.20	0.45	0.20	-501.54	0.21	0.21	0.14	0.09	0.13	196
06-160_06-150	06-160	06-150	88.03	09:33 hr	1.13	0.25	0.48	0.20	-924.30	0.25	0.20	1.04	0.09	0.17	437
35-010_40-110	35-010	40-110	228.74	09:13 hr	2.04	0.30	0.79	0.20	-2417.07	0.31	0.20	0.29	0.09	0.26	306
14-020_14-010	14-020	14-010	1266.94	11:54 hr	2.88	0.59	0.79	0.20	-13765.58	0.94	0.31	0.38	0.08	0.52	439
33-280_33-270	33-280	33-270	46.45	09:06 hr	0.96	0.20	0.46	0.20	-510.17	0.20	0.20	0.13	0.08	0.13	407
19-090_19-080	19-090	19-080	20.61	55:08 hr	0.97	0.13	0.57	0.19	-230.73	0.14	0.21	0.13	0.08	0.10	374
28-058	28-058	28-055	81.99	09:07 hr	1.72	0.19	0.83	0.19	-924.27	0.19	0.19	1.72	0.08	0.18	114
37-020_37-010	37-020	37-010	98.32	09:12 hr	2.06	0.19	0.99	0.19	-1109.92	0.21	0.21	0.28	0.08	0.19	384
28-100_28-090	28-100	28-090	82.05	09:03 hr	1.73	0.19	0.83	0.19	-930.40	0.19	0.19	1.73	0.08	0.18	379
28-055	28-055	28-054	81.99	09:09 hr	1.73	0.19	0.83	0.19	-936.29	0.19	0.19	1.73	0.08	0.18	243
19-010_17-250	19-010	17-250	142.94	56:58 hr	1.35	0.29	0.53	0.19	-1645.13	0.29	0.19	1.35	0.08	0.21	391
28-054	28-054	28-052	81.98	09:10 hr	1.74	0.19	0.84	0.19	-944.33	0.20	0.20	0.23	0.08	0.18	146
P2	MH-103	MH-102	45.36	09:03 hr	1.39	0.16	0.74	0.19	-523.46	0.16	0.20	0.18	0.08	0.14	305
17-250_17-240	17-250	17-240	145.20	57:01 hr	1.37	0.29	0.54	0.19	-1676.23	0.29	0.19	1.37	0.08	0.21	350
17-240_17-230	17-240	17-230	145.20	57:03 hr	1.38	0.29	0.55	0.19	-1694.18	0.30	0.20	0.18	0.08	0.21	410
28-090_28-080	28-090	28-080	81.98	09:03 hr	1.76	0.19	0.85	0.19	-960.95	0.19	0.19	1.76	0.08	0.18	359
40-070_40-060	40-070	40-060	288.43	09:19 hr	3.98	0.24	1.73	0.19	-3389.91	0.26	0.21	0.52	0.08	0.31	420
P2-1	MH-INT3-1	MH-INT3-15	177.88	10:25 hr	0.96	0.38	0.33	0.19	-2111.18	0.47	0.24	0.13	0.08	0.22	30
28-060_28-050	28-060	28-058	81.98	09:06 hr	1.80	0.19	0.88	0.19	-991.13	0.42	0.42	0.23	0.08	0.18	100
19-020_19-010	19-020	19-010	142.95	56:58 hr	1.41	0.28	0.57	0.19	-1761.61	0.28	0.19	0.18	0.08	0.21	376
37-030_37-020	37-030	37-020	97.26	09:10 hr	2.16	0.19	1.06	0.19	-1199.40	0.19	0.19	0.28	0.08	0.19	466
01-620_01-610	01-620	01-610	37.20	09:11 hr	1.86	0.12	1.12	0.19	-459.05	0.13	0.19	0.24	0.08	0.13	395
19-070_19-060	19-070	19-060	136.04	56:01 hr	3.03	0.19	1.49	0.19	-1679.66	0.25	0.25	0.39	0.07	0.23	140
19-030_19-020	19-030	19-020	140.67	56:49 hr	1.40	0.28	0.56	0.18	-1760.06	0.28	0.18	1.38	0.07	0.21	377
P3-7	MH-INT3-7	MH-INT3-6	177.88	10:04 hr	1.00	0.37	0.35	0.18	-2234.66	0.37	0.18	1.00	0.07	0.22	535
40-080_40-070	40-080	40-070	274.08	09:17 hr	3.95	0.23	1.74	0.18	-3446.30	0.23	0.19	0.50	0.07	0.30	412
02-470_YMCALS	02-470	YMCAWW	36.87	09:10 hr	1.20	0.15	0.65	0.18	-464.44	0.15	0.18	1.20	0.07	0.12	97
P3-8	MH-INT3-8	MH-INT3-7	177.88	09:59 hr	1.01	0.37	0.35	0.18	-2257.64	0.37	0.18	0.99	0.07	0.22	525
P3-3	MH-INT3-3	MH-INT3-2	177.88	10:20 hr	1.01	0.37	0.35	0.18	-2263.04	0.37	0.18	1.01	0.07	0.22	562
P3-10	MH-INT3-10	MH-INT3-9	177.94	09:56 hr	1.01	0.37	0.35	0.18	-2265.09	0.37	0.18	1.01	0.07	0.22	496
P3-2	MH-INT3-2	MH-INT3-1	177.88	10:25 hr	1.01	0.37	0.35	0.18	-2269.07	0.41	0.21	0.13	0.07	0.22	585
P3-9	MH-INT3-9	MH-INT3-8	177.88	09:54 hr	1.01	0.37	0.35	0.18	-2269.26	0.37	0.18	1.00	0.07	0.22	520
P3-4	MH-INT3-4	MH-INT3-3	177.88	10:15 hr	1.02	0.36	0.36	0.18	-2285.08	0.36	0.18	0.98	0.07	0.22	552
P3-6	MH-INT3-6	MH-INT3-5	177.88	10:07 hr	1.02	0.36	0.36	0.18	-2287.23	0.36	0.18	1.02	0.07	0.22	333

Existing Wet Weather Flow - Pipe Capacity Results															
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
P3-5	MH-INT3-5	MH-INT3-4	177.88	10:10 hr	1.02	0.36	0.36	0.18	-2287.30	0.36	0.18	1.02	0.07	0.22	333
P3-13	MH-INT3-13	MH-INT3-12	159.01	09:33 hr	0.91	0.36	0.32	0.18	-2055.60	0.36	0.18	0.91	0.07	0.20	95
03-310_03-050	03-310	03-050	281.88	58:31 hr	2.12	0.32	0.80	0.18	-3664.54	0.32	0.18	2.11	0.07	0.28	418
02-440_02-470	02-440	02-470	34.32	09:13 hr	1.15	0.15	0.63	0.18	-456.55	0.15	0.18	0.14	0.07	0.12	520
02-450_02-440	02-450	02-440	34.14	09:04 hr	1.16	0.15	0.63	0.18	-459.25	0.15	0.18	1.12	0.07	0.12	535
40-100_40-090	40-100	40-090	228.72	09:15 hr	2.41	0.27	0.99	0.18	-3110.08	0.27	0.18	2.41	0.07	0.26	150
03-100_03-090	03-100	03-090	252.10	58:23 hr	2.68	0.26	1.10	0.18	-3481.51	0.26	0.18	2.68	0.07	0.28	164
10-530_10-630	10-530	10-630	352.22	58:41 hr	2.77	0.31	1.06	0.18	-4911.36	0.31	0.18	2.77	0.07	0.32	417
03-090_03-080	03-090	03-080	250.89	58:25 hr	2.69	0.26	1.11	0.18	-3502.12	0.26	0.18	2.68	0.07	0.28	322
10-230_10-530	10-230	10-530	352.21	58:39 hr	2.79	0.31	1.07	0.17	-4966.16	0.31	0.17	2.79	0.07	0.32	424
10-630_10-500	10-630	10-500	352.04	58:43 hr	2.81	0.30	1.08	0.17	-5017.51	0.38	0.22	0.33	0.07	0.32	414
03-110_03-100	03-110	03-100	252.38	58:23 hr	2.75	0.26	1.14	0.17	-3611.07	0.26	0.17	2.42	0.07	0.28	289
P3-11	MH-INT3-11	MH-INT3-10	159.04	09:42 hr	0.98	0.34	0.35	0.17	-2297.72	0.36	0.18	0.11	0.06	0.20	464
P3-12	MH-INT3-12	MH-INT3-11	159.05	09:39 hr	0.98	0.34	0.35	0.17	-2303.69	0.34	0.17	0.98	0.06	0.20	334
03-080_03-070	03-080	03-070	250.19	58:25 hr	2.77	0.26	1.16	0.17	-3675.78	0.26	0.17	2.77	0.06	0.28	174
02-240_02-235	02-240	02-235	657.41	59:26 hr	3.24	0.38	1.10	0.17	-9689.50	0.44	0.19	0.34	0.06	0.41	31
40-090_40-080	40-090	40-080	228.74	09:16 hr	2.57	0.25	1.08	0.17	-3442.21	0.35	0.23	0.29	0.06	0.26	134
10-540_10-230	10-540	10-230	294.37	58:36 hr	2.46	0.29	0.96	0.17	-4503.59	0.30	0.17	2.06	0.06	0.29	155
35-220_35-230	35-220	35-230	41.28	09:05 hr	1.55	0.14	0.88	0.17	-646.82	0.83	1.00	0.17	0.06	0.13	281
35-230_35-270	35-230	35-270	47.61	09:06 hr	1.80	0.14	1.02	0.17	-753.96	0.83	1.00	0.19	0.06	0.14	319
05-130_05-100	05-130	05-100	32.93	09:08 hr	0.88	0.16	0.46	0.16	-539.83	0.35	0.35	0.09	0.06	0.11	439
47-010_20-480	47-010	20-480	64.58	09:33 hr	1.11	0.20	0.52	0.16	-1059.46	0.20	0.16	1.11	0.06	0.15	114
05-140_05-130	05-140	05-130	32.95	09:06 hr	0.88	0.16	0.46	0.16	-541.00	0.16	0.16	0.88	0.06	0.11	437
19-250_19-240	19-250	19-240	64.65	09:54 hr	1.12	0.20	0.53	0.16	-1070.40	0.24	0.19	0.12	0.06	0.15	348
32-130_32-120	32-130	32-120	98.33	09:22 hr	1.70	0.20	0.80	0.16	-1636.18	0.20	0.16	1.70	0.06	0.18	323
32-120_32-110	32-120	32-110	99.37	09:23 hr	1.73	0.20	0.81	0.16	-1658.77	0.20	0.16	1.72	0.06	0.18	317
20-480_19-250	20-480	19-250	64.63	09:47 hr	1.13	0.20	0.54	0.16	-1093.48	0.20	0.16	1.13	0.06	0.15	145
10-550_10-540	10-550	10-540	294.61	58:36 hr	2.67	0.28	1.08	0.16	-5104.10	0.28	0.16	0.27	0.05	0.29	276
03-120_03-110	03-120	03-110	244.86	58:21 hr	3.03	0.24	1.31	0.16	-4242.79	0.25	0.17	2.28	0.05	0.27	393
28-030_28-020	28-030	28-020	82.03	09:21 hr	2.30	0.16	1.23	0.16	-1440.57	0.78	0.78	0.23	0.05	0.18	144
02-370_02-380	02-370	02-380	650.81	59:26 hr	8.13	0.24	3.53	0.16	-11463.26	0.24	0.16	7.92	0.05	0.45	15
35-110_35-150	35-110	35-150	27.98	09:03 hr	1.14	0.13	0.67	0.16	-498.46	0.13	0.16	1.14	0.05	0.11	302
47-030_47-020	47-030	47-020	60.73	09:47 hr	1.10	0.20	0.53	0.16	-1082.11	0.20	0.16	1.10	0.05	0.14	324
32-160_32-140	32-160	32-140	58.05	09:10 hr	1.06	0.20	0.51	0.16	-1044.06	0.20	0.16	1.06	0.05	0.14	111
47-050_47-040	47-050	47-040	59.96	09:38 hr	1.09	0.19	0.53	0.16	-1079.25	0.19	0.16	1.09	0.05	0.14	339
47-040_47-030	47-040	47-030	60.51	09:29 hr	1.10	0.19	0.53	0.16	-1089.20	0.20	0.16	1.03	0.05	0.14	339
47-020_47-010	47-020	47-010	60.71	09:45 hr	1.11	0.19	0.53	0.16	-1093.29	0.20	0.16	0.11	0.05	0.14	235
19-100_19-090	19-100	19-090	20.60	55:04 hr	1.32	0.10	0.87	0.16	-371.02	0.12	0.17	0.13	0.05	0.10	391
47-060_47-050	47-060	47-050	59.97	09:37 hr	1.11	0.19	0.53	0.15	-1096.86	0.19	0.16	1.05	0.05	0.14	341
32-290_32-170	32-290	32-170	39.43	09:08 hr	1.15	0.15	0.62	0.15	-729.54	0.16	0.16	0.11	0.05	0.12	191
03-130_03-120	03-130	03-120	206.04	58:20 hr	6.01	0.15	3.24	0.15	-3831.49	0.19	0.19	0.56	0.05	0.28	348
10-570_10-560	10-570	10-560	293.05	58:35 hr	2.81	0.27	1.15	0.15	-5500.33	0.27	0.15	2.80	0.05	0.29	453
20-160_19-180	20-160	19-180	26.85	55:00 hr	1.77	0.10	1.18	0.15	-504.98	0.10	0.15	1.77	0.05	0.11	274
03-140_03-130	03-140	03-130	204.26	58:19 hr	6.01	0.15	3.26	0.15	-3850.44	0.15	0.15	5.79	0.05	0.28	201
32-140_32-090	32-140	32-090	58.05	09:12 hr	1.10	0.19	0.53	0.15	-1103.36	0.19	0.15	1.10	0.05	0.14	207
17-280_17-010	17-280	17-010	27.80	09:02 hr	1.19	0.13	0.71	0.15	-529.99	0.13	0.15	1.19	0.05	0.11	525
32-310_32-290	32-310	32-290	38.36	09:06 hr	1.14	0.15	0.62	0.15	-737.35	0.15	0.15	0.11	0.05	0.12	474
09-160_09-150	09-160	09-150	26.43	09:13 hr	0.79	0.15	0.43	0.15	-513.27	0.19	0.19	0.07	0.05	0.10	371
18-600_18-610	18-600	18-610	30.71	09:01 hr	2.08	0.10	1.40	0.15	-599.81	0.13	0.20	0.20	0.05	0.12	300
28-080_28-070	28-080	28-070	82.01	09:06 hr	2.48	0.15	1.36	0.15	-1615.96	0.15	0.15	2.48	0.05	0.18	362
39-040_32-310	39-040	32-310	37.31	09:02 hr	1.13	0.15	0.62	0.15	-739.57	0.15	0.15	1.11	0.05	0.12	362
37-040_37-030	37-040	37-030	56.39	09:07 hr	1.72	0.15	0.95	0.15	-1123.76	0.17	0.17	0.16	0.05	0.14	428
32-110_PARKHILLLS	32-110	PARKHILLWW	99.40	09:27 hr	1.94	0.19	0.96	0.15	-1982.20	0.19	0.15	1.94	0.05	0.18	222
19-120_19-070	19-120	19-070	114.19	57:00 hr	3.57	0.15	1.98	0.15	-2354.41	0.17	0.17	0.32	0.05	0.21	243
01-630_01-620	01-630	01-620	35.53	09:07 hr	2.52	0.10	1.72	0.15	-741.83	0.11	0.17	0.23	0.05	0.13	411
09-170_09-160	09-170	09-160	24.45	09:09 hr	0.78	0.14	0.44	0.14	-519.49	0.15	0.15	0.07	0.04	0.09	469
WWTP-002_WWTP-003	WWTP-002	WWTP-003	5320.73	60:18 hr	8.38	0.65	2.20	0.14	-113200.18	0.65	0.14	8.25	0.04	0.97	3
05-240_05-140	05-240	05-140	25.72	09:05 hr	0.82	0.14	0.46	0.14	-551.47	0.15	0.15	0.07	0.04	0.10	347
05-280_05-240	05-280	05-240	14.19	08:59 hr	0.46	0.14	0.26	0.14	-308.08	0.14	0.14	0.45	0.04	0.07	347
47-070_47-060	47-070	47-060	49.96	09:24 hr	1.04	0.18	0.52	0.14	-1090.33	0.19	0.15	0.09	0.04	0.13	338
40-280_40-130	40-280	40-130	88.13	09:26 hr	4.23	0.12	2.63	0.14	-2000.38	0.83	1.00	0.94	0.04	0.19	56
33-040_21-080	33-040	21-080	155.01	09:45 hr	1.71	0.24	0.74	0.14	-3588.10	0.54	0.31	0.14	0.04	0.21	548
33-290_33-280	33-290	33-280	22.54	09:03 hr	0.77	0.14	0.44	0.14	-532.46	0.17	0.17	0.06	0.04	0.09	434
09-180_09-170	09-180	09-170	21.63	09:11 hr	0.75	0.14	0.43	0.14	-518.75	0.14	0.14	0.06	0.04	0.09	467
03-070_03-360	03-070	03-360	276.83	58:26 hr	4.26	0.20	2.00	0.14	-6666.40	0.25	0.17	1.43	0.04	0.29	21
10-580_10-570	10-580	10-570	292.67	58:32 hr	3.33	0.24	1.45	0.14	-7105.13	0.25	0.14	2.45	0.04	0.29	468
32-170_32-160	32-170	32-160	56.09	09:10 hr	1.26	0.17	0.66	0.13	-1384.31	0.18	0.15	0.10	0.04	0.14	159

Existing Wet Weather Flow - Pipe Capacity Results															
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
37-230_37-220	37-230	37-220	33.26	09:03 hr	1.21	0.13	0.71	0.13	-858.70	0.13	0.13	1.21	0.04	0.11	255
24-320_24-300	24-320	24-300	66.27	09:01 hr	2.41	0.13	1.41	0.13	-1712.69	0.29	0.29	0.19	0.04	0.16	409
02-460_02-450	02-460	02-450	14.20	09:04 hr	0.75	0.11	0.48	0.13	-371.41	0.13	0.15	0.06	0.04	0.08	883
37-240_37-230	37-240	37-230	32.94	09:00 hr	1.21	0.13	0.71	0.13	-862.11	0.13	0.13	1.19	0.04	0.11	318
18-590_18-600	18-590	18-600	30.72	09:00 hr	2.56	0.09	1.85	0.13	-817.07	0.09	0.14	0.20	0.04	0.12	217
P9	MH-302	MH-301	15.10	09:18 hr	0.82	0.11	0.53	0.13	-412.08	0.11	0.13	0.82	0.04	0.08	400
10-050_09-180	10-050	09-180	18.88	09:03 hr	0.71	0.13	0.42	0.13	-515.87	0.13	0.13	0.05	0.04	0.08	692
P8	MH-301	HWY81WW	15.08	09:21 hr	0.82	0.11	0.53	0.13	-413.03	0.11	0.13	0.82	0.04	0.08	598
P10	MH-303	MH-302	15.11	09:15 hr	0.82	0.11	0.54	0.13	-413.87	0.11	0.13	0.06	0.04	0.08	500
P11	MH-304	MH-303	15.11	09:12 hr	0.82	0.11	0.54	0.13	-414.07	0.11	0.13	0.82	0.04	0.08	496
35-060_35-110	35-060	35-110	19.94	08:58 hr	1.09	0.11	0.71	0.13	-551.28	0.12	0.14	0.08	0.03	0.09	268
03-050_10-580	03-050	10-580	291.65	58:31 hr	3.65	0.22	1.65	0.13	-8164.86	0.23	0.13	2.99	0.03	0.29	90
02-380_02-240	02-380	02-240	657.86	59:26 hr	8.33	0.22	3.76	0.13	-18723.18	0.29	0.17	0.56	0.03	0.43	41
WH-P-5	WH-MH-9	WH-MH-8	18.90	09:21 hr	0.74	0.13	0.45	0.13	-547.76	0.13	0.13	0.74	0.03	0.08	66
01-650_01-640	01-650	01-640	32.36	09:05 hr	2.86	0.08	2.11	0.13	-940.14	0.08	0.13	2.86	0.03	0.12	78
25-010_24-220	25-010	24-220	24.17	09:05 hr	0.99	0.12	0.61	0.12	-748.61	0.20	0.20	0.07	0.03	0.09	344
10-560_10-550	10-560	10-550	294.40	58:35 hr	4.03	0.21	1.87	0.12	-9389.35	0.24	0.14	0.27	0.03	0.29	107
25-020_25-010	25-020	25-010	24.13	08:59 hr	1.01	0.12	0.62	0.12	-770.43	0.12	0.12	0.99	0.03	0.09	45
P12	MH-305	MH-304	15.11	09:08 hr	0.92	0.10	0.62	0.12	-490.36	0.10	0.12	0.92	0.03	0.08	403
P14	MH-307	MH-306	15.10	08:59 hr	0.92	0.10	0.62	0.12	-489.98	0.10	0.12	0.92	0.03	0.08	389
25-030_25-020	25-030	25-020	24.17	09:01 hr	1.03	0.12	0.64	0.12	-789.88	0.12	0.12	0.07	0.03	0.09	369
P13	MH-306	MH-305	15.08	09:01 hr	0.93	0.10	0.63	0.12	-494.97	0.10	0.12	0.90	0.03	0.08	407
19-140_19-130	19-140	19-130	6.20	55:11 hr	0.60	0.08	0.46	0.12	-206.66	0.08	0.12	0.60	0.03	0.05	329
WH-P-4	WH-MH-10	WH-MH-9	18.87	09:14 hr	0.82	0.12	0.51	0.12	-633.79	0.12	0.12	0.05	0.03	0.08	218
WH-P-8	WH-MH-6	WH-MH-5	18.91	09:39 hr	0.53	0.15	0.29	0.12	-637.78	0.15	0.12	0.53	0.03	0.08	500
18-630_01-650	18-630	01-650	32.34	09:04 hr	3.19	0.08	2.44	0.12	-1102.34	0.08	0.12	0.21	0.03	0.12	205
WH-P-3	WH-MH-11	WH-MH-10	18.87	09:12 hr	0.83	0.12	0.52	0.12	-650.68	0.12	0.12	0.73	0.03	0.08	413
WH-P-1	WH-MH-13	WH-MH-12	18.90	09:13 hr	0.84	0.12	0.53	0.12	-653.07	0.12	0.12	0.84	0.03	0.08	415
WH-P-2	WH-MH-12	WH-MH-11	18.87	09:08 hr	0.84	0.11	0.53	0.11	-662.29	0.11	0.11	0.81	0.03	0.08	412
28-070_28-060	28-070	28-060	82.00	09:06 hr	3.69	0.11	2.33	0.11	-2902.63	0.11	0.11	3.69	0.03	0.18	355
01-640_01-630	01-640	01-630	32.79	09:04 hr	3.33	0.08	2.57	0.11	-1163.94	0.09	0.13	0.21	0.03	0.12	89
19-170_19-160	19-170	19-160	6.19	55:04 hr	0.63	0.08	0.49	0.11	-221.07	0.12	0.17	0.04	0.03	0.05	349
35-150_35-220	35-150	35-220	35.27	09:07 hr	2.30	0.09	1.60	0.11	-1264.03	0.61	0.73	0.14	0.03	0.12	301
34-120_34-110	34-120	34-110	13.77	09:05 hr	0.63	0.11	0.40	0.11	-493.85	0.11	0.11	0.62	0.03	0.07	399
19-150_19-140	19-150	19-140	6.18	55:06 hr	0.63	0.08	0.49	0.11	-222.36	0.08	0.11	0.04	0.03	0.05	279
19-180_19-100	19-180	19-100	20.60	55:01 hr	2.18	0.07	1.71	0.11	-777.35	0.09	0.13	0.13	0.03	0.10	311
19-180_19-170	19-180	19-170	6.16	54:59 hr	0.66	0.07	0.52	0.11	-234.66	0.07	0.11	0.04	0.03	0.05	299
14-300_34-120	14-300	34-120	13.77	09:03 hr	0.66	0.11	0.42	0.11	-533.34	0.11	0.11	0.04	0.03	0.07	395
02-350_02-320	02-350	02-320	4.94	08:42 hr	0.35	0.09	0.25	0.11	-198.05	0.50	0.60	0.02	0.02	0.04	260
11-600_11-590	11-600	11-590	9.53	09:11 hr	0.49	0.10	0.33	0.10	-413.07	0.24	0.24	0.03	0.02	0.06	504
37-050_37-040	37-050	37-040	38.12	09:06 hr	1.99	0.10	1.32	0.10	-1675.27	0.13	0.13	0.11	0.02	0.12	281
WH-P-13	WH-MH-1	MH-INT3-10	18.86	09:49 hr	0.67	0.12	0.41	0.10	-902.99	0.12	0.10	0.67	0.02	0.08	471
09-500_04-210	09-500	04-210	20.37	08:59 hr	1.64	0.08	1.22	0.10	-991.46	0.15	0.18	0.08	0.02	0.09	408
WH-P-6	WH-MH-8	WH-MH-7	18.90	09:25 hr	0.68	0.12	0.41	0.10	-920.66	0.12	0.10	0.68	0.02	0.08	460
WH-P-12	WH-MH-2	WH-MH-1	18.89	09:51 hr	0.69	0.12	0.42	0.10	-943.84	0.12	0.10	0.57	0.02	0.08	507
11-610_11-600	11-610	11-600	7.50	08:54 hr	0.43	0.10	0.29	0.10	-377.58	0.10	0.10	0.02	0.02	0.05	503
P3-14	19-210	MH-INT3-13	159.04	09:34 hr	2.35	0.19	1.15	0.09	-8381.95	0.19	0.09	2.35	0.02	0.20	651
WH-P-11	WH-MH-3	WH-MH-2	18.84	09:37 hr	0.72	0.12	0.45	0.09	-1004.70	0.12	0.10	0.61	0.02	0.08	503
47-080_47-070	47-080	47-070	20.23	09:27 hr	0.78	0.12	0.49	0.09	-1099.76	0.14	0.11	0.04	0.02	0.08	168
37-210_37-200	37-210	37-200	38.08	09:02 hr	2.30	0.09	1.61	0.09	-2075.62	0.09	0.09	2.30	0.02	0.12	189
3	07-360-JDM	07-350	23.25	08:57 hr	0.90	0.12	0.56	0.09	-1269.16	0.54	0.43	0.04	0.02	0.09	192
47-100_47-090	47-100	47-090	20.08	09:25 hr	0.78	0.12	0.49	0.09	-1099.04	0.12	0.09	0.78	0.02	0.08	229
WH-P-10	WH-MH-4	WH-MH-3	18.91	09:47 hr	0.74	0.12	0.46	0.09	-1039.69	0.12	0.09	0.64	0.02	0.08	498
4	02-300	02-180	156.10	09:52 hr	6.10	0.12	3.83	0.09	-8635.24	0.33	0.27	0.28	0.02	0.23	46
47-090_47-080	47-090	47-080	20.07	09:26 hr	0.79	0.12	0.49	0.09	-1114.11	0.12	0.09	0.04	0.02	0.08	230
WH-P-9	WH-MH-5	WH-MH-4	18.84	09:29 hr	0.75	0.11	0.47	0.09	-1062.81	0.12	0.09	0.66	0.02	0.08	499
37-200_37-050	37-200	37-050	38.12	09:05 hr	2.39	0.09	1.70	0.09	-2198.10	0.10	0.10	0.11	0.02	0.12	185
WH-P-7	WH-MH-7	WH-MH-6	18.89	09:28 hr	0.78	0.11	0.50	0.09	-1125.17	0.13	0.10	0.03	0.02	0.08	500
06-300_06-130	06-300	06-130	14.68	09:04 hr	0.62	0.11	0.40	0.09	-904.19	0.20	0.16	0.03	0.02	0.07	430
09-510_09-500	09-510	09-500	15.24	08:57 hr	1.47	0.07	1.17	0.09	-967.45	0.08	0.09	0.06	0.02	0.08	470
47-110_47-100	47-110	47-100	16.64	09:29 hr	0.74	0.11	0.49	0.08	-1118.52	0.11	0.09	0.03	0.01	0.07	223
37-220_37-210	37-220	37-210	35.72	09:05 hr	2.56	0.08	1.90	0.08	-2490.83	0.09	0.09	0.10	0.01	0.11	140
35-310_35-330	35-310	35-330	20.71	09:05 hr	1.53	0.08	1.15	0.08	-1509.69	0.08	0.08	1.53	0.01	0.09	657
35-320_35-310	35-320	35-310	20.70	09:00 hr	1.53	0.08	1.15	0.08	-1514.88	0.08	0.08	1.50	0.01	0.09	808
47-130_47-110	47-130	47-110	15.08	09:19 hr	0.72	0.10	0.48	0.08	-1111.68	0.10	0.08	0.03	0.01	0.07	233
55-010_47-130	55-010	47-130	14.81	09:20 hr	0.72	0.10	0.48	0.08	-1117.53	0.10	0.08	0.03	0.01	0.07	336
55-060_55-040	55-060	55-040	13.16	09:06 hr	0.65	0.10	0.44	0.08	-1020.86	0.10	0.08	0.65	0.01	0.07	237

Existing Wet Weather Flow - Pipe Capacity Results

ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
39-140_39-130	39-140	39-130	8.27	08:54 hr	0.64	0.08	0.49	0.08	-642.56	0.08	0.08	0.64	0.01	0.05	583
55-040_55-030	55-040	55-030	13.12	09:06 hr	0.65	0.10	0.44	0.08	-1024.72	0.10	0.08	0.65	0.01	0.07	463
55-080_55-070	55-080	55-070	13.13	08:57 hr	0.65	0.10	0.44	0.08	-1026.25	0.10	0.08	0.65	0.01	0.07	375
55-030_55-020	55-030	55-020	13.12	09:09 hr	0.65	0.10	0.44	0.08	-1029.02	0.10	0.08	0.65	0.01	0.07	451
55-020_55-010	55-020	55-010	13.11	09:13 hr	0.65	0.10	0.44	0.08	-1028.75	0.10	0.08	0.02	0.01	0.07	452
55-070_55-060	55-070	55-060	13.12	08:59 hr	0.65	0.10	0.45	0.08	-1030.50	0.10	0.08	0.63	0.01	0.07	326
07-190_07-200	07-190	07-200	3.47	08:58 hr	0.39	0.07	0.33	0.08	-275.15	0.81	0.97	0.36	0.01	0.04	363
39-030_39-040	39-030	39-040	13.26	08:59 hr	1.05	0.08	0.81	0.08	-1078.15	0.11	0.11	0.04	0.01	0.07	149
39-130_39-120	39-130	39-120	9.21	09:03 hr	0.75	0.08	0.58	0.08	-768.50	0.08	0.08	0.75	0.01	0.06	344
08-230_07-340	08-230	07-340	11.44	09:03 hr	0.60	0.09	0.42	0.08	-976.38	0.31	0.25	0.02	0.01	0.06	442
09-010_11-610	09-010	11-610	5.42	08:55 hr	0.46	0.07	0.36	0.07	-478.53	0.09	0.09	0.02	0.01	0.04	505
51-020_51-030	51-020	51-030	13.17	09:01 hr	0.71	0.09	0.50	0.07	-1165.98	1.25	1.00	0.02	0.01	0.07	274
35-330_35-300	35-330	35-300	20.73	09:07 hr	1.78	0.07	1.41	0.07	-1891.24	0.20	0.20	0.06	0.01	0.09	23
P1-1	MH-EXT1-1	26-090	20.87	09:42 hr	0.80	0.11	0.52	0.07	-1905.14	1.50	1.00	0.03	0.01	0.08	77
05-080_05-070	05-080	05-070	3.32	09:01 hr	0.41	0.06	0.36	0.07	-303.38	0.06	0.07	0.41	0.01	0.04	434
P35	MH-505	MH-504	0.29	08:04 hr	0.04	0.06	0.03	0.07	-26.73	0.06	0.07	0.04	0.01	0.01	59
FP-P-1	FP-MH-1	FP-MH-2	6.74	08:47 hr	0.60	0.07	0.48	0.07	-642.73	0.07	0.07	0.60	0.01	0.05	426
FP-P-2	FP-MH-2	FP-MH-3	6.76	08:55 hr	0.60	0.07	0.48	0.07	-646.60	0.07	0.07	0.60	0.01	0.05	434
39-100_39-030	39-100	39-030	11.74	08:59 hr	1.06	0.07	0.86	0.07	-1152.58	0.07	0.07	0.03	0.01	0.07	150
P1-14	MH-EXT1-14	MH-EXT1-13	20.86	09:06 hr	0.85	0.11	0.56	0.07	-2080.28	0.11	0.07	0.85	0.01	0.08	373
P1-3	MH-EXT1-3	MH-EXT1-2	20.83	09:29 hr	0.85	0.11	0.56	0.07	-2097.51	1.50	1.00	0.03	0.01	0.08	277
P1-7	MH-EXT1-7	MH-EXT1-6	20.87	09:27 hr	0.85	0.11	0.57	0.07	-2101.65	0.42	0.28	0.72	0.01	0.08	529
P1-11	MH-EXT1-11	MH-EXT1-10	20.85	09:12 hr	0.86	0.10	0.57	0.07	-2104.30	0.10	0.07	0.85	0.01	0.08	275
P1-13	MH-EXT1-13	MH-EXT1-12	20.83	09:04 hr	0.85	0.10	0.57	0.07	-2103.35	0.10	0.07	0.85	0.01	0.08	398
P1-4	MH-EXT1-4	MH-EXT1-3	20.85	09:29 hr	0.86	0.10	0.57	0.07	-2105.88	1.50	1.00	0.03	0.01	0.08	456
P1-6	MH-EXT1-6	MH-EXT1-5	20.86	09:25 hr	0.86	0.10	0.57	0.07	-2106.49	1.15	0.77	0.03	0.01	0.08	315
P1-5	MH-EXT1-5	MH-EXT1-4	20.83	09:22 hr	0.86	0.10	0.57	0.07	-2105.23	1.50	1.00	0.03	0.01	0.08	111
P1-12	MH-EXT1-12	MH-EXT1-11	20.82	09:07 hr	0.86	0.10	0.57	0.07	-2108.74	0.10	0.07	0.82	0.01	0.08	400
P1-9	MH-EXT1-9	MH-EXT1-8	20.83	09:14 hr	0.86	0.10	0.57	0.07	-2110.49	0.10	0.07	0.86	0.01	0.08	207
P1-2	MH-EXT1-2	MH-EXT1-1	20.83	09:33 hr	0.86	0.10	0.57	0.07	-2112.20	1.50	1.00	0.03	0.01	0.08	469
P1-8	MH-EXT1-8	MH-EXT1-7	20.84	09:16 hr	0.86	0.10	0.57	0.07	-2114.20	0.10	0.07	0.80	0.01	0.08	206
P1-10	MH-EXT1-10	MH-EXT1-9	20.84	09:13 hr	0.86	0.10	0.57	0.07	-2133.69	0.10	0.07	0.81	0.01	0.08	322
08-240_08-230	08-240	08-230	9.48	09:00 hr	0.57	0.09	0.42	0.07	-990.55	0.09	0.07	0.02	0.01	0.06	439
51-030_51-040	51-030	OM-20	14.82	09:03 hr	0.95	0.08	0.71	0.07	-1690.70	1.25	1.00	0.03	0.01	0.07	575
10-190_10-140	10-190	10-140	3.30	08:45 hr	0.49	0.05	0.45	0.07	-388.90	0.05	0.07	0.49	0.01	0.04	158
FP-P-3	FP-MH-3	WH-MH-13	6.81	09:11 hr	0.71	0.06	0.59	0.06	-811.90	0.09	0.09	0.02	0.01	0.05	423
NORPARK	NORPARK	EAST_MICHIGAN	26.91	08:58 hr	1.82	0.08	1.38	0.06	-3303.58	1.25	1.00	1.82	0.01	0.09	26
05-070_07-350	05-070	07-350	3.47	09:02 hr	0.44	0.06	0.39	0.06	-547.51	0.29	0.29	0.01	0.01	0.04	449
07-180_07-190	07-180	07-190	1.66	08:58 hr	0.31	0.05	0.31	0.06	-278.29	0.54	0.64	0.01	0.01	0.03	198
05-090_05-080	05-090	05-080	1.79	08:39 hr	0.34	0.05	0.34	0.06	-301.15	0.05	0.06	0.01	0.01	0.03	445
08-260_08-240	08-260	08-240	5.75	09:11 hr	0.49	0.07	0.40	0.05	-992.78	0.08	0.06	0.01	0.01	0.04	441
EASTPASEWALKPIPE	EASTPASEWALKMH	EASTPASEWALKWW	47.35	08:58 hr	4.18	0.07	3.47	0.05	-8534.92	1.25	1.00	0.09	0.01	0.12	5
10-130_10-050	10-130	10-050	6.65	09:03 hr	0.94	0.05	0.88	0.05	-1239.43	0.09	0.09	0.02	0.01	0.05	386
COUNTRY_CLUB_P	COUNTRY_CLUB_DMD	COUNTRY_CLUB	4.07	08:54 hr	1.34	0.03	1.55	0.05	-797.86	0.67	1.00	0.03	0.01	0.04	112
25-060_25-050	25-060	25-050	4.05	08:51 hr	0.59	0.05	0.56	0.05	-797.58	0.05	0.05	0.59	0.01	0.04	352
25-050_25-030	25-050	25-030	4.06	09:02 hr	0.60	0.05	0.57	0.05	-801.74	0.08	0.08	0.01	0.01	0.04	309
15-120_15-110	15-120	15-110	5.13	09:00 hr	0.75	0.05	0.72	0.05	-1016.50	0.37	0.37	0.01	0.01	0.04	352
10-140_10-130	10-140	10-130	6.04	08:58 hr	0.91	0.05	0.88	0.05	-1247.19	0.05	0.05	0.02	0.00	0.05	383
39-110_39-100	39-110	39-100	10.26	09:03 hr	1.67	0.05	1.64	0.05	-2344.43	0.06	0.06	0.03	0.00	0.06	153
08-270_08-260	08-270	08-260	4.04	08:50 hr	0.44	0.06	0.40	0.05	-993.51	0.06	0.05	0.01	0.00	0.04	518
17-290_17-280	17-290	17-280	2.23	08:36 hr	0.55	0.04	0.61	0.05	-554.63	0.08	0.10	0.01	0.00	0.03	530
P1-15	MH-EXT1-15	MH-EXT1-14	20.85	09:00 hr	1.66	0.07	1.38	0.04	-5483.88	0.09	0.06	0.03	0.00	0.08	102
P27	MH-202	MH-201	1.48	08:26 hr	0.39	0.04	0.44	0.04	-402.98	0.04	0.04	0.39	0.00	0.02	487
39-120_39-110	39-120	39-110	10.22	08:56 hr	1.95	0.04	2.03	0.04	-2958.29	0.05	0.05	0.03	0.00	0.06	362
15-150_15-140	15-150	15-140	2.09	08:40 hr	0.60	0.03	0.69	0.04	-636.80	0.04	0.04	0.01	0.00	0.03	367
P1-18	MH-EXT1-18	MH-EXT1-17	6.32	08:56 hr	0.60	0.06	0.52	0.04	-2124.39	0.06	0.04	0.60	0.00	0.04	451
P1-17	MH-EXT1-17	MH-EXT1-16	6.30	08:54 hr	0.59	0.06	0.52	0.04	-2122.80	0.06	0.04	0.60	0.00	0.04	448
30-020_30-010	30-020	30-010	2.87	08:59 hr	0.63	0.04	0.68	0.04	-1005.58	0.04	0.04	0.63	0.00	0.03	402
05-310_05-280	05-310	05-280	0.89	08:24 hr	0.20	0.04	0.22	0.04	-321.45	0.09	0.09	0.00	0.00	0.02	346
15-140_15-120	15-140	15-120	2.81	08:29 hr	0.63	0.04	0.70	0.04	-1029.86	0.04	0.04	0.01	0.00	0.03	405
P1-19	MH-EXT1-19	MH-EXT1-18	6.32	08:53 hr	0.64	0.06	0.57	0.04	-2348.73	0.06	0.04	0.01	0.00	0.04	278
03-010_09-510	03-010	09-510	2.41	08:55 hr	0.81	0.03	0.99	0.04	-933.99	0.05	0.06	0.01	0.00	0.03	463
30-010_25-070	30-010	25-070	3.01	08:57 hr	0.74	0.04	0.83	0.04	-1245.48	0.04	0.04	0.74	0.00	0.03	391
25-070_25-060	25-070	25-060	3.01	09:00 hr	0.74	0.04	0.84	0.04	-1258.74	0.04	0.04	0.74	0.00	0.03	413
03-150_03-120	03-150	03-120	13.90	08:57 hr	2.21	0.04	2.25	0.04	-5881.26	0.04	0.04	2.21	0.00	0.07	312
34-110_34-140	34-110	34-140	13.72	09:01 hr	1.19	0.06	1.04	0.03	-6382.77	0.47	0.27	0.01	0.00	0.06	414
P28	MH-203	MH-202	0.75	08:44 hr	0.32	0.03	0.42	0.03	-404.46	0.03	0.04	0.00	0.00	0.02	485
08-280_08-270	08-280	08-270	1.79	08:40 hr	0.34	0.04	0.37	0.03	-994.44	0.05	0.04	0.00	0.00	0.02	409
P26	MH-201	MH-102	1.48	08:28 hr	0.64	0.03	0.85	0.03	-823.40	0.10	0.12	0.01	0.00	0.02	486
19-130_19-120	19-130	19-120	6.20	55:10 hr	1.88	0.03	2.28	0.03	-3487.90	0.07	0.07	0.02	0.00	0.05	38
9-470_08-280	9-470	08-280	0.88	08:12 hr	0.29	0.03	0.36	0.03	-555.04	0.03	0.03	0.00	0.00	0.02	424
P1-16	MH-EXT1-16	MH-EXT1-15	6.34	09:06 hr	1.11	0.04	1.20	0.03	-5190.33	0.05	0.04	0.01	0.00	0.04	106
04-010_9-470	6	04-010	0.87	08:02 hr	0.37	0.03	0.50	0.03	-795.10	0.79	0.79	0.00	0.00	0.02	333
P31	MH-501	MH-402	0.43	08:13 hr	0.28	0.02	0.43	0.02	-430.37	0.02	0.02	0.28	0.00	0.01	55
P47	MH-401A	MH-101	0.42	08:17 hr	0.28	0.02	0.43	0.02	-430.22	0.06	0.07	0.19	0.00	0.01	496
P32	MH--502	MH-501	0.41	08:05 hr	0.27	0.02	0.42	0.02	-427.47	0.02	0.02	0.28	0.00	0.01	451
P44	MH-402	MH-401A	0.45	08:44 hr	0.30	0.02	0.47	0.02	-476.92	0.02	0.02	0.00	0.00	0.01	141
P34	MH-504	MH-503	0.24	07:49 hr	0.23	0.02	0.41	0.02	-426.49	0.02	0.02	0.25	0.00	0.01	453
P36	MH-506	MH-505	0.24	07:44 hr	0.23	0.02	0.41	0.02	-427.18	0.04	0.05	0.00	0.00	0.01	416
P33	MH-503	MH--502	0.24	07:52 hr	0.23	0.02	0.41	0.02	-427.77	0.02	0.02	0.00	0.00	0.01	450
12-410_12-300	12-410	12-300	0.14	07:56 hr	0.10	0.02	0.17	0.02	-283.34	0.29	0.29	0.00	0.00	0.01	192

Existing Wet Weather Flow - Pipe Capacity Results															
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
P4	MH-104	MH-103A	0.15	08:57 hr	0.20	0.01	0.39	0.01	-431.15	0.10	0.12	0.00	0.00	0.01	181
15-170_15-150	15-170	15-150	0.14	07:56 hr	0.26	0.01	0.57	0.01	-640.99	0.02	0.03	0.00	0.00	0.01	175
P5	MH-105	MH-104	0.09	04:39 hr	0.17	0.01	0.39	0.01	-421.89	0.01	0.01	0.20	0.00	0.01	566
P6	MH-107	MH-105	0.09	04:33 hr	0.17	0.01	0.39	0.01	-429.73	0.01	0.01	0.20	0.00	0.01	534
P7	MH-108	MH-107	0.08	04:27 hr	0.17	0.01	0.39	0.01	-429.62	0.01	0.01	0.20	0.00	0.01	534
19-050_19-040	19-050	19-040	0.00	00:00 hr	0.00	0.00	0.00	0.00	-1136.32	0.00	0.00	0.00	0.00	0.00	425
19-200_19-050	19-200	19-050	0.00	00:00 hr	0.00	0.00	0.00	0.00	-1120.48	0.00	0.00	0.00	0.00	0.00	101
02-300_05-310	4	05-310	0.00	00:00 hr	0.00	0.00	0.00	0.00	-341.80	0.02	0.02	0.00	0.00	0.00	308
19-210_19-200	19-210	19-200	0.00	00:00 hr	0.00	0.00	0.00	0.00	-1138.85	0.00	0.00	0.00	0.00	0.00	397
19-040_19-030	19-040	19-030	0.00	00:00 hr	0.00	0.00	0.00	0.00	-1129.53	0.14	0.11	0.00	0.00	0.00	424
P15	M-308	MH-307	0.00	00:00 hr	0.00	0.00	0.00	0.00	-548.12	0.00	0.00	0.00	0.00	0.00	253
02-360_02235	02-360	02-235	0.00	00:00 hr	0.00	0.00	0.00	0.00	-6191.66	0.26	0.17	0.00	0.00	0.00	142
P16	MH-309	M-308	0.00	00:00 hr	0.00	0.00	0.00	0.00	-427.62	0.00	0.00	0.00	0.00	0.00	88
P17	MH-310	MH-309	0.00	00:00 hr	0.00	0.00	0.00	0.00	-339.99	0.00	0.00	0.00	0.00	0.00	505
P29	MH-204	MH-203	0.00	00:00 hr	0.00	0.00	0.00	0.00	-403.81	0.01	0.02	0.00	0.00	0.00	488
12-370_12-410	12-370	12-410	0.00	00:00 hr	0.00	0.00	0.00	0.00	-270.69	0.24	0.24	0.00	0.00	0.00	105
WP-P-1	WP-MH-1	35-300	0.00	00:00 hr	0.00	0.00	0.00	0.00	-50.70	0.36	0.36	0.00	0.00	0.00	8296
P30	MH-205	MH-204	0.00	00:00 hr	0.00	0.00	0.00	0.00	-113.22	0.00	0.00	0.00	0.00	0.00	456
P18	MH-403	MH-401A	0.00	00:00 hr	0.00	0.00	0.00	0.00	-432.80	0.00	0.00	0.00	0.00	0.00	448
P19	MH-404	MH-403	0.00	00:00 hr	0.00	0.00	0.00	0.00	-444.75	0.00	0.00	0.00	0.00	0.00	443
P20	MH-404A	MH-404	0.00	00:00 hr	0.00	0.00	0.00	0.00	-427.34	0.00	0.00	0.00	0.00	0.00	476
30-060_30-020	30-060	30-020	0.00	00:00 hr	0.00	0.00	0.00	0.00	-1096.72	0.02	0.02	0.00	0.00	0.00	340
P21	MH-405	MH-404A	0.00	00:00 hr	0.00	0.00	0.00	0.00	-587.46	0.00	0.00	0.00	0.00	0.00	68
P22	MH-406	MH-405	0.00	00:00 hr	0.00	0.00	0.00	0.00	-426.59	0.00	0.00	0.00	0.00	0.00	510
P42	MH-701	MH-102	0.00	00:00 hr	0.00	0.00	0.00	0.00	-274.89	0.00	0.00	0.00	0.00	0.00	191
P43	MH-702	MH-701	0.00	00:00 hr	0.00	0.00	0.00	0.00	-224.10	0.00	0.00	0.00	0.00	0.00	275
P23	MH-407	MH-406	0.00	00:00 hr	0.00	0.00	0.00	0.00	-427.07	0.00	0.00	0.00	0.00	0.00	500

Appendix C. Future System Pipe Capacity Evaluation

Future Wet Weather Flow - Pipe Capacity Results															
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
07-200_07-210	07-200	07-210	1706.81	58:10 hr	2.09	1.24	0.41	0.71	-300.49	1.24	0.71	2.09	0.85	0.71	530
07-145_13-100	07-145	13-100	1636.03	11:17 hr	2.07	1.20	0.41	0.69	-369.51	1.20	0.69	2.06	0.82	0.70	468
02-310_02-300	02-310	02-300	156.08	09:50 hr	0.89	0.56	0.26	0.67	-40.80	0.56	0.67	0.89	0.79	0.26	477
02-320_02-310	02-320	02-310	153.54	09:48 hr	0.89	0.55	0.26	0.66	-43.08	0.56	0.67	0.81	0.78	0.25	201
13-100_13-090	13-100	13-090	1622.87	11:20 hr	2.14	1.16	0.43	0.66	-462.47	1.16	0.66	2.10	0.78	0.69	468
07-210_07-220	07-210	07-220	1564.49	58:23 hr	2.07	1.15	0.42	0.66	-461.44	1.15	0.66	2.06	0.77	0.68	533
13-090_13-080	13-090	13-080	1610.05	11:23 hr	2.14	1.15	0.43	0.66	-490.49	1.15	0.66	2.05	0.77	0.69	334
13-080_13-070	13-080	13-070	1594.16	11:26 hr	2.14	1.14	0.43	0.65	-505.84	1.14	0.65	2.11	0.76	0.69	334
13-070_13-060	13-070	13-060	1578.84	11:30 hr	2.13	1.14	0.43	0.65	-514.72	1.14	0.65	2.07	0.75	0.68	429
07-220_07-145	07-220	07-145	1503.68	58:26 hr	2.05	1.13	0.42	0.64	-515.10	1.13	0.64	2.02	0.74	0.67	374
13-060_13-050	13-060	13-050	1565.83	11:34 hr	2.14	1.12	0.43	0.64	-537.80	1.12	0.64	2.12	0.74	0.68	448
08-250_08-240	08-250	2ND_ST	144.40	09:36 hr	0.39	0.80	0.09	0.64	-50.62	0.80	0.64	0.39	0.74	0.22	1555
14-130_14-120	14-130	14-120	1612.15	11:46 hr	2.25	1.10	0.46	0.63	-617.03	1.10	0.63	2.23	0.72	0.69	420
13-040_14-130	13-040	14-130	1553.37	11:42 hr	2.17	1.10	0.44	0.63	-595.89	1.10	0.63	2.15	0.72	0.68	440
07-431_07-430	07-431	07-430	328.06	10:15 hr	0.90	0.78	0.22	0.63	-128.77	0.78	0.63	0.90	0.72	0.33	526
08-020_07-480	08-020	07-431	325.45	10:15 hr	0.90	0.78	0.22	0.63	-128.83	0.94	0.75	0.89	0.72	0.33	532
05-095_08-250	05-095	08-250	144.50	09:13 hr	0.62	0.62	0.17	0.62	-57.95	0.78	0.78	0.41	0.71	0.23	439
13-050_13-040	13-050	13-040	1554.20	11:38 hr	2.19	1.09	0.45	0.62	-625.10	1.09	0.62	2.18	0.71	0.68	428
16-330_16-320	16-330	16-320	332.97	93:08 hr	1.67	0.55	0.47	0.55	-233.80	0.55	0.55	1.45	0.59	0.36	400
05-360_05-350	05-360	05-350	97.67	09:06 hr	0.49	0.55	0.14	0.55	-69.98	0.71	0.71	0.40	0.58	0.19	183
OM-3	OM-4	OM-3	2276.72	85:12 hr	1.85	1.37	0.33	0.55	-1642.05	2.21	0.89	1.79	0.58	0.74	500
SW-P-1	MH_EXIST	SW-MH-1	383.57	09:50 hr	1.24	0.68	0.30	0.55	-277.18	0.69	0.55	1.25	0.58	0.36	73
01-570_01-130	01-570	01-130	71.21	09:17 hr	0.84	0.35	0.30	0.53	-57.51	0.35	0.53	0.84	0.55	0.18	54
21-050_21-040	21-050	21-040	799.11	59:05 hr	1.37	0.93	0.30	0.53	-647.07	0.93	0.53	1.37	0.55	0.48	122
16-250_16-240	16-250	16-240	333.49	93:17 hr	1.77	0.53	0.51	0.53	-275.25	0.53	0.53	1.53	0.55	0.36	284
GM-1	08-020	07-260	416.70	10:10 hr	0.98	0.79	0.23	0.53	-345.70	1.14	0.76	0.96	0.55	0.36	346
07-260_07-200	07-260	07-200	406.36	10:13 hr	0.96	0.79	0.23	0.53	-339.03	1.25	0.83	0.96	0.55	0.35	402
16-290_16-250	16-290	16-250	332.84	93:14 hr	1.77	0.53	0.51	0.53	-278.68	0.53	0.53	1.52	0.54	0.36	357
21-070_21-060	21-070	21-060	798.36	58:59 hr	1.39	0.92	0.30	0.53	-670.10	0.92	0.53	1.39	0.54	0.48	401
16-320_16-290	16-320	16-290	332.62	93:11 hr	1.77	0.53	0.51	0.53	-279.44	0.53	0.53	1.53	0.54	0.36	316
34-050_34-030	34-050	34-030	2633.60	60:29 hr	1.56	1.57	0.26	0.52	-2231.41	1.57	0.52	1.56	0.54	0.76	228
21-060_21-050	21-060	21-050	801.70	59:03 hr	1.42	0.91	0.31	0.52	-706.80	0.91	0.52	1.03	0.53	0.48	514
14-100_14-090	14-100	14-090	1591.60	11:56 hr	2.26	1.00	0.47	0.50	-1597.79	1.00	0.50	2.25	0.50	0.66	418
14-120_14-110	14-120	14-110	1598.58	11:50 hr	2.27	1.00	0.47	0.50	-1612.71	1.00	0.50	2.27	0.50	0.66	462
07-290_08-020	07-290	08-020	364.78	09:44 hr	1.33	0.62	0.35	0.50	-370.23	1.00	0.80	0.66	0.50	0.35	438
21-080_21-070	21-080	21-070	803.55	58:55 hr	1.50	0.87	0.33	0.50	-821.69	0.87	0.50	1.35	0.49	0.48	462
05-350_05-095	05-350	05-095	97.66	09:10 hr	0.56	0.50	0.17	0.50	-100.20	0.74	0.74	0.28	0.49	0.19	460
05-370_05-360	05-370	05-360	97.64	09:02 hr	0.56	0.50	0.17	0.50	-100.62	0.69	0.69	0.28	0.49	0.19	196
05-380_05-370	05-380	05-370	97.71	09:03 hr	0.56	0.49	0.17	0.49	-101.38	0.65	0.65	0.45	0.49	0.19	389
01-130_01-120	01-130	01-120	71.20	09:20 hr	0.92	0.33	0.33	0.49	-73.88	0.33	0.49	0.92	0.49	0.18	309
SW-P-2	SW-MH-1	SW-MH-2	480.03	09:55 hr	1.79	0.61	0.47	0.49	-511.17	0.61	0.49	1.73	0.48	0.41	407
01-270_01-260	01-270	01-260	195.73	09:03 hr	2.59	0.32	0.94	0.49	-214.84	0.32	0.49	2.59	0.48	0.31	195
SW-P-4	SW-MH-3	SW-MH-4	439.34	10:03 hr	1.65	0.61	0.44	0.49	-483.31	0.61	0.49	1.64	0.48	0.39	514
16-360_16-350	16-360	16-350	333.99	93:00 hr	1.97	0.49	0.59	0.49	-369.20	0.49	0.49	1.97	0.48	0.36	270
14-110_14-100	14-110	14-100	1595.72	11:52 hr	2.37	0.96	0.50	0.48	-1801.40	0.96	0.48	2.34	0.47	0.66	234
16-430_16-420	16-430	16-420	329.20	92:55 hr	1.96	0.48	0.59	0.48	-373.74	0.48	0.48	1.94	0.47	0.36	265
SW-P-3	SW-MH-2	SW-MH-3	451.52	09:58 hr	1.72	0.60	0.46	0.48	-513.54	0.60	0.48	1.71	0.47	0.39	341
01-580_01-570	01-580	01-570	68.66	09:19 hr	0.93	0.32	0.34	0.48	-78.97	0.34	0.50	0.44	0.47	0.18	461
14-090_14-080	14-090	14-080	1588.03	12:02 hr	2.38	0.96	0.51	0.48	-1838.14	0.96	0.48	2.36	0.46	0.66	671
01-120_05-310	01-120	02-320	148.54	09:44 hr	2.01	0.32	0.74	0.48	-173.18	0.44	0.65	0.95	0.46	0.27	3206
16-350_16-340	16-350	16-340	333.69	93:03 hr	2.03	0.47	0.61	0.47	-400.22	0.47	0.47	2.00	0.45	0.36	243
14-080_34-040	14-080	34-140	1586.04	12:05 hr	2.43	0.94	0.52	0.47	-1927.94	0.94	0.47	2.40	0.45	0.66	311
SW-P-5	SW-MH-4	SW-MH-5	436.39	10:04 hr	1.71	0.59	0.46	0.47	-531.99	0.60	0.48	1.70	0.45	0.39	156
02-250_02-370	02-250	02-370	717.49	11:58 hr	1.98	0.70	0.49	0.47	-898.76	0.70	0.47	1.96	0.44	0.47	325
OM-2	OM-3	OM-2	1718.66	85:17 hr	1.72	1.16	0.33	0.46	-2188.92	1.16	0.46	1.70	0.44	0.64	503
196	34-140	34-040	1597.11	12:08 hr	2.50	0.93	0.54	0.46	-2044.41	1.05	0.52	2.23	0.44	0.66	352
21-110_21-100	21-110	21-100	657.58	58:01 hr	1.85	0.69	0.46	0.46	-860.77	0.69	0.46	1.84	0.43	0.45	194
16-440_16-430	16-440	16-430	326.76	92:53 hr	1.33	0.57	0.36	0.46	-432.39	0.57	0.46	1.29	0.43	0.33	44
07-430_12-400	07-430	12-400	338.61	10:10 hr	0.96	0.69	0.24	0.46	-448.54	0.69	0.46	0.96	0.43	0.32	541
15-180_15-110	15-180	15-110	628.37	10:33 hr	1.31	0.80	0.30	0.46	-843.96	0.80	0.46	1.31	0.43	0.42	469
34-160_WWTP-002	34-160	1R	5483.17	12:19 hr	1.74	2.04	0.25	0.45	-7498.80	2.04	0.45	1.74	0.42	0.99	604
15-200_15-190	15-200	15-190	223.39	09:37 hr	1.47	0.45	0.45	0.45	-322.07	0.45	0.45	1.47	0.41	0.29	397
12-210_15-200	12-210	15-200	218.13	09:34 hr	1.44	0.45	0.44	0.45	-314.92	0.45	0.45	1.43	0.41	0.29	452
12-380_12-040	12-380	12-040	349.47	10:17 hr	1.02	0.67	0.26	0.44	-506.85	0.67	0.44	1.02	0.41	0.33	427
01-180_01-150	01-180	01-150	213.56	09:06 hr	3.22	0.29	1.23	0.44	-320.32	0.29	0.44	3.22	0.40	0.32	171

Future Wet Weather Flow - Pipe Capacity Results															
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
16-410_16-360	16-410	16-360	332.22	92:58 hr	2.23	0.44	0.70	0.44	-501.62	0.46	0.46	1.65	0.40	0.36	203
12-390_12-380	12-390	12-380	346.33	10:14 hr	1.04	0.66	0.26	0.44	-526.39	0.66	0.44	0.90	0.40	0.33	645
16-340_16-330	16-340	16-330	333.61	93:04 hr	2.26	0.44	0.71	0.44	-511.72	0.44	0.44	2.18	0.39	0.36	187
02-290_02-270	02-290	02-270	774.98	58:42 hr	2.34	0.65	0.60	0.44	-1200.94	0.65	0.44	2.29	0.39	0.49	349
21-120_21-110	21-120	21-110	582.54	58:00 hr	1.76	0.65	0.45	0.43	-904.45	0.67	0.45	0.73	0.39	0.43	455
16-240_03-140	16-240	03-140	333.50	93:20 hr	2.28	0.43	0.71	0.43	-521.75	0.43	0.43	2.02	0.39	0.36	320
21-130_21-120	21-130	21-120	583.09	57:56 hr	1.78	0.65	0.46	0.43	-930.66	0.65	0.43	1.73	0.39	0.43	215
12-020_12-010	12-020	12-010	393.64	10:27 hr	1.21	0.64	0.31	0.43	-638.17	0.64	0.43	1.21	0.38	0.35	483
07-340_07-290	07-340	07-290	343.21	09:40 hr	1.53	0.53	0.43	0.43	-560.83	0.71	0.57	0.62	0.38	0.34	434
04-110_04-080	04-110	04-080	179.41	09:05 hr	1.81	0.35	0.63	0.42	-298.73	0.35	0.42	1.81	0.38	0.28	327
02-270_02-260	02-270	02-260	733.24	58:45 hr	2.30	0.63	0.60	0.42	-1233.78	0.74	0.49	0.85	0.37	0.48	370
34-090_34-080	34-090	34-080	2641.32	60:26 hr	2.07	1.27	0.38	0.42	-4448.79	1.32	0.44	1.90	0.37	0.76	717
07-350_07-340	07-350	07-340	329.34	09:37 hr	1.49	0.53	0.42	0.42	-556.17	0.53	0.42	1.36	0.37	0.34	453
12-040_12-020	12-040	12-020	390.32	10:22 hr	1.23	0.63	0.32	0.42	-666.20	0.63	0.42	1.06	0.37	0.35	460
02-260_02-250	02-260	02-250	722.17	11:54 hr	2.28	0.63	0.59	0.42	-1234.97	1.17	0.78	0.84	0.37	0.48	350
OM-1	OM-2	OM-1	1421.27	85:22 hr	1.63	1.04	0.33	0.42	-2489.90	1.04	0.42	1.63	0.36	0.58	502
24-020_24-010	24-020	24-010	378.55	82:57 hr	1.75	0.52	0.50	0.42	-666.53	0.52	0.42	1.63	0.36	0.36	232
12-400_12-390	12-400	12-390	341.39	10:09 hr	1.10	0.62	0.29	0.42	-605.59	0.64	0.43	0.68	0.36	0.32	399
01-200_01-180	01-200	01-180	213.37	09:04 hr	3.47	0.28	1.36	0.41	-379.38	0.28	0.43	1.36	0.36	0.32	162
11-070_11-060	11-070	11-060	877.09	59:21 hr	2.07	0.73	0.50	0.41	-1559.82	0.73	0.41	2.06	0.36	0.50	360
11-080_11-070	11-080	11-070	872.51	59:18 hr	2.06	0.73	0.50	0.41	-1554.75	0.73	0.41	2.05	0.36	0.50	371
11-050_11-040	11-050	11-040	877.60	59:27 hr	2.08	0.72	0.51	0.41	-1573.94	0.72	0.41	2.07	0.36	0.50	305
198	34-030	34-160	4186.09	12:40 hr	2.48	1.45	0.43	0.41	-7507.85	1.79	0.51	0.92	0.36	0.92	795
11-060_11-050	11-060	11-050	877.56	59:24 hr	2.09	0.72	0.51	0.41	-1586.94	0.72	0.41	2.08	0.36	0.50	360
11-090_11-080	11-090	11-080	867.67	59:15 hr	2.09	0.71	0.51	0.41	-1612.49	0.72	0.41	1.97	0.35	0.50	190
51-090_51-080	51-090	51-080	884.80	11:28 hr	2.15	0.71	0.53	0.41	-1664.90	0.71	0.41	2.15	0.35	0.51	501
OM-18	OM-19	OM-18	922.25	59:41 hr	1.72	0.81	0.39	0.41	-1742.27	0.81	0.41	1.72	0.35	0.50	559
49-150_02-290	49-150	02-290	670.19	82:57 hr	2.22	0.61	0.59	0.41	-1270.47	0.61	0.41	2.12	0.35	0.46	65
51-080_51-070	51-080	51-070	884.80	11:31 hr	2.17	0.71	0.53	0.40	-1695.00	0.71	0.40	2.17	0.34	0.51	313
12-010_15-180	12-010	15-180	394.39	10:30 hr	1.31	0.61	0.35	0.40	-755.69	0.70	0.47	0.50	0.34	0.35	389
21-020_21-010	21-020	21-010	833.54	59:13 hr	2.05	0.70	0.51	0.40	-1619.74	0.70	0.40	2.04	0.34	0.49	152
21-010_11-090	21-010	11-090	832.75	59:14 hr	2.06	0.70	0.51	0.40	-1627.94	0.71	0.40	1.46	0.34	0.49	101
15-100_15-095	15-100	15-095	637.57	10:40 hr	1.58	0.70	0.39	0.40	-1250.79	0.70	0.40	1.58	0.34	0.43	285
33-150_33-140	33-150	33-140	103.17	09:30 hr	1.76	0.27	0.70	0.40	-202.93	0.37	0.56	1.72	0.34	0.22	167
OM-19	OM-20	OM-19	922.25	59:36 hr	1.76	0.80	0.41	0.40	-1836.37	0.80	0.40	1.76	0.33	0.50	573
OM-17	OM-18	OM-17	922.25	59:46 hr	1.76	0.80	0.41	0.40	-1842.28	0.80	0.40	1.76	0.33	0.50	530
OM-13	OM-14	OM-13	922.25	60:01 hr	1.77	0.79	0.41	0.40	-1850.38	0.79	0.40	1.77	0.33	0.50	446
OM-16	OM-17	OM-16	922.31	59:58 hr	1.77	0.79	0.41	0.40	-1855.46	0.79	0.40	1.77	0.33	0.50	525
11	1R	WWTP-002	5479.49	12:22 hr	2.08	1.78	0.32	0.40	-11077.14	1.78	0.40	2.07	0.33	0.99	400
OM-14	OM-15	OM-14	922.25	59:57 hr	1.78	0.79	0.41	0.40	-1867.20	0.79	0.40	1.74	0.33	0.50	440
33-030_33-040	33-030	33-040	100.69	09:42 hr	1.75	0.26	0.70	0.39	-205.31	0.26	0.39	1.73	0.33	0.22	287
16-420_16-410	16-420	16-410	328.81	92:56 hr	2.55	0.39	0.84	0.39	-674.67	0.41	0.41	1.67	0.33	0.36	220
OM-15	OM-16	OM-15	922.25	59:53 hr	1.79	0.79	0.42	0.39	-1893.15	0.79	0.39	1.79	0.33	0.50	206
21-030_21-020	21-030	21-020	798.65	59:12 hr	2.03	0.69	0.50	0.39	-1644.60	0.69	0.39	1.67	0.33	0.48	605
12-310_12-300	12-310	12-300	139.87	09:16 hr	1.09	0.39	0.36	0.39	-290.05	0.39	0.39	1.09	0.33	0.23	250
15-110_15-100	15-110	15-100	637.56	10:37 hr	1.64	0.68	0.41	0.39	-1344.40	0.69	0.40	0.59	0.32	0.43	414
12-320_12-310	12-320	12-310	139.88	09:14 hr	1.11	0.39	0.37	0.39	-298.51	0.39	0.39	1.06	0.32	0.23	201
21-040_21-030	21-040	21-030	798.40	59:06 hr	2.06	0.68	0.52	0.39	-1709.43	0.68	0.39	2.04	0.32	0.48	162
12-200_12-210	12-200	12-210	200.03	09:31 hr	1.59	0.39	0.53	0.39	-429.16	0.41	0.41	0.57	0.32	0.28	584
OM-0	OM-1	14-010	1295.67	85:26 hr	1.65	0.97	0.35	0.39	-2805.80	0.97	0.39	1.65	0.32	0.56	456
12-330_12-320	12-330	12-320	137.66	09:15 hr	1.10	0.39	0.36	0.39	-298.79	0.39	0.39	1.05	0.32	0.23	445
SW-P-6	SW-MH-5	SW-MH-6	754.96	83:43 hr	1.51	0.77	0.35	0.39	-1645.87	0.77	0.39	1.50	0.31	0.45	189
33-140_33-130	33-140	33-130	95.53	09:33 hr	1.72	0.26	0.70	0.38	-209.85	0.26	0.38	1.69	0.31	0.21	241
31-060_16-450	31-060	16-450	327.44	92:52 hr	1.71	0.47	0.51	0.38	-743.23	0.47	0.38	1.66	0.31	0.33	405
01-150_01-140	01-150	01-140	215.84	09:06 hr	3.98	0.25	1.63	0.38	-494.58	0.26	0.38	1.37	0.30	0.32	18
12-340_12-330	12-340	12-330	133.24	09:08 hr	1.09	0.38	0.37	0.38	-305.31	0.38	0.38	0.99	0.30	0.22	428
SW-P-8	SW-MH-7	SW-MH-8	740.24	83:47 hr	1.52	0.75	0.36	0.38	-1708.21	0.75	0.38	1.46	0.30	0.44	169
SW-P-7	SW-MH-6	SW-MH-7	745.84	83:46 hr	1.54	0.75	0.37	0.38	-1729.94	0.75	0.38	1.49	0.30	0.45	305
33-130_33-120	33-130	33-120	92.20	09:36 hr	1.71	0.25	0.70	0.38	-213.97	0.25	0.38	1.69	0.30	0.21	363
01-260_01-200	01-260	01-200	196.03	09:05 hr	3.64	0.25	1.50	0.38	-455.75	0.26	0.39	1.25	0.30	0.31	237
33-120_33-030	33-120	33-030	91.84	09:40 hr	1.71	0.25	0.70	0.38	-214.12	0.25	0.38	1.70	0.30	0.21	344
26-110_26-100	26-110	26-100	237.56	09:30 hr	1.97	0.37	0.66	0.37	-557.75	0.37	0.37	1.97	0.30	0.30	443
26-100_26-090	26-100	26-090	237.53	09:32 hr	1.97	0.37	0.66	0.37	-558.82	0.37	0.37	1.97	0.30	0.30	292
SW-P-10	SW-MH-9	SW-MH-10	726.85	83:52 hr	1.51	0.75	0.36	0.37	-1717.11	0.75	0.37	1.46	0.30	0.44	495
32-090_32-080	32-090	32-080	361.82	92:21 hr	1.93	0.47	0.58	0.37	-854.78	0.47	0.37	1.74	0.30	0.35	194
SW-P-11	SW-MH-10	SW-MH-11	719.46	83:57 hr	1.51	0.74	0.36	0.37	-1727.26	0.74	0.37	1.51	0.29	0.44	507

Future Wet Weather Flow - Pipe Capacity Results															
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
SW-P-9	SW-MH-8	SW-MH-9	735.55	83:48 hr	1.54	0.74	0.37	0.37	-1767.69	0.74	0.37	1.49	0.29	0.44	162
21-100_21-090	21-100	21-090	657.25	58:05 hr	1.80	0.65	0.46	0.37	-1583.43	0.65	0.37	1.80	0.29	0.43	446
32-040_32-030	32-040	32-030	329.24	92:38 hr	1.78	0.46	0.54	0.37	-801.01	0.46	0.37	1.77	0.29	0.34	172
32-080_32-070	32-080	32-070	331.13	92:30 hr	1.79	0.46	0.54	0.37	-806.46	0.46	0.37	1.56	0.29	0.34	620
32-070_32-060	32-070	32-060	330.32	92:32 hr	1.79	0.46	0.54	0.37	-807.31	0.46	0.37	1.55	0.29	0.34	189
34-080_34-050	34-080	34-050	2639.64	60:27 hr	2.48	1.11	0.49	0.37	-6463.80	1.47	0.49	0.82	0.29	0.76	217
SW-P-13	SW-MH-12	SW-MH-13	705.92	84:04 hr	1.50	0.74	0.36	0.37	-1737.39	0.74	0.37	1.44	0.29	0.43	326
SW-P-14	SW-MH-13	SW-MH-14	700.45	84:08 hr	1.49	0.74	0.36	0.37	-1727.64	0.74	0.37	1.48	0.29	0.43	475
SW-P-12	SW-MH-11	SW-MH-12	711.33	84:01 hr	1.51	0.74	0.36	0.37	-1755.37	0.74	0.37	1.50	0.29	0.44	499
32-050_32-040	32-050	32-040	329.50	92:37 hr	1.80	0.46	0.55	0.37	-815.57	0.46	0.37	1.50	0.29	0.34	393
31-070_31-060	31-070	31-060	327.90	92:48 hr	1.79	0.46	0.54	0.37	-811.85	0.46	0.37	1.53	0.29	0.33	403
11-590_12-340	11-590	12-340	125.99	09:04 hr	1.07	0.37	0.37	0.37	-312.28	0.37	0.37	0.36	0.29	0.22	428
21-090_21-080	21-090	21-080	657.09	58:09 hr	1.83	0.64	0.47	0.37	-1632.51	0.75	0.43	0.60	0.29	0.43	407
32-010_31-070	32-010	31-070	328.33	92:44 hr	1.79	0.46	0.55	0.37	-816.64	0.46	0.37	1.66	0.29	0.33	335
SW-P-16	SW-MH-15	SW-MH-16	693.51	84:11 hr	1.49	0.73	0.36	0.37	-1738.68	0.73	0.37	1.48	0.29	0.43	276
32-020_32-010	32-020	32-010	328.76	92:41 hr	1.81	0.46	0.55	0.36	-832.12	0.46	0.36	1.79	0.28	0.33	182
SW-P-18	SW-MH-17	SW-MH-18	683.32	84:20 hr	1.47	0.73	0.36	0.36	-1732.43	0.77	0.38	0.42	0.28	0.43	614
OM-8	OM-9	OM-8	922.30	60:22 hr	1.57	0.82	0.36	0.36	-2344.65	0.82	0.36	1.57	0.28	0.48	437
32-060_32-050	32-060	32-050	329.75	92:34 hr	1.83	0.45	0.56	0.36	-846.22	0.45	0.36	1.58	0.28	0.34	244
SW-P-17	SW-MH-16	SW-MH-17	688.94	84:14 hr	1.50	0.72	0.36	0.36	-1771.13	0.72	0.36	1.49	0.28	0.43	334
OM-10	OM-11	OM-10	922.31	60:16 hr	1.58	0.81	0.36	0.36	-2374.19	0.81	0.36	1.58	0.28	0.48	309
OM-11	OM-12	OM-11	922.31	60:14 hr	1.59	0.81	0.36	0.36	-2394.06	0.81	0.36	1.55	0.28	0.48	305
32-030_32-020	32-030	32-020	328.75	92:40 hr	1.84	0.45	0.57	0.36	-854.17	0.45	0.36	1.83	0.28	0.33	169
OM-9	OM-10	OM-9	922.31	60:20 hr	1.59	0.81	0.37	0.36	-2403.02	0.81	0.36	1.59	0.28	0.48	462
48-030_48-020	48-030	48-020	2022.07	60:17 hr	1.98	1.08	0.39	0.36	-5320.70	1.08	0.36	1.97	0.28	0.66	351
48-040_48-030	48-040	48-030	2025.80	60:14 hr	1.98	1.08	0.39	0.36	-5337.69	1.08	0.36	1.98	0.28	0.66	631
48-020_48-010	48-020	48-010	2019.60	60:18 hr	1.98	1.07	0.39	0.36	-5346.10	1.07	0.36	1.96	0.27	0.66	166
24-400_24-010	24-400	24-010	313.11	09:27 hr	1.80	0.44	0.56	0.35	-854.01	0.44	0.35	1.80	0.27	0.33	372
24-300_24-290	24-300	24-290	311.06	09:22 hr	1.79	0.44	0.56	0.35	-853.60	0.44	0.35	1.79	0.27	0.33	380
05-020_05-010	05-020	05-010	283.04	09:31 hr	1.64	0.44	0.51	0.35	-784.04	0.44	0.35	1.64	0.27	0.31	482
01-280_01-270	01-280	01-270	194.96	09:01 hr	3.96	0.23	1.69	0.35	-540.10	0.28	0.42	1.24	0.27	0.31	469
24-290_24-400	24-290	24-400	312.36	09:24 hr	1.81	0.44	0.56	0.35	-867.36	0.44	0.35	1.70	0.26	0.33	370
12-240_12-200	12-240	12-200	167.27	09:27 hr	1.52	0.35	0.53	0.35	-468.63	0.37	0.37	0.47	0.26	0.25	509
27-080_27-090	27-080	27-090	240.59	10:03 hr	1.41	0.44	0.44	0.35	-683.89	0.44	0.35	1.41	0.26	0.29	59
05-010_07-350	05-010	07-350	288.42	09:33 hr	1.69	0.43	0.53	0.35	-822.83	0.48	0.38	0.52	0.26	0.31	445
29-030_29-020	29-030	29-020	475.92	11:13 hr	1.95	0.52	0.56	0.35	-1372.02	0.52	0.35	1.95	0.26	0.38	432
33-160_WAL-MARTLS	33-160	WAL-MARTWW	47.02	09:02 hr	0.98	0.23	0.42	0.35	-135.80	0.23	0.35	0.98	0.26	0.15	469
29-020_29-010	29-020	29-010	478.93	11:17 hr	1.97	0.52	0.57	0.35	-1387.63	0.52	0.35	1.97	0.26	0.39	449
29-010_40-130	29-010	40-130	480.77	11:21 hr	1.98	0.52	0.57	0.34	-1399.94	0.52	0.34	1.98	0.26	0.39	455
27-090_EASTPARKLS	27-090	EASTPARKWW	240.57	10:02 hr	1.43	0.43	0.45	0.34	-702.59	0.43	0.34	1.43	0.26	0.29	19
29-060_29-050	29-060	29-050	475.89	11:00 hr	1.97	0.52	0.57	0.34	-1390.03	0.52	0.34	1.97	0.26	0.38	308
41-290_41-300	41-290	41-300	466.73	10:43 hr	1.94	0.52	0.56	0.34	-1373.09	0.52	0.34	1.94	0.25	0.38	495
29-040_29-030	29-040	29-030	475.92	11:09 hr	1.98	0.51	0.57	0.34	-1410.57	0.52	0.34	1.63	0.25	0.38	433
29-050_29-040	29-050	29-040	475.92	11:05 hr	1.99	0.51	0.57	0.34	-1417.94	0.51	0.34	1.98	0.25	0.38	305
SW-P-15-1	SW-MH-14	SW-MH-15	349.18	84:09 hr	1.46	0.51	0.42	0.34	-1041.65	0.68	0.45	0.43	0.25	0.33	87
SW-P-15-2	SW-MH-14	SW-MH-15	348.33	84:09 hr	1.46	0.51	0.42	0.34	-1039.14	0.68	0.45	0.43	0.25	0.33	87
41-300_41-310	41-300	41-310	466.73	10:48 hr	1.96	0.51	0.57	0.34	-1405.29	0.51	0.34	1.96	0.25	0.38	568
41-310_29-070	41-310	29-070	466.78	10:58 hr	1.96	0.51	0.57	0.34	-1406.86	0.51	0.34	1.96	0.25	0.38	567
29-070_29-060	29-070	29-060	466.72	10:57 hr	1.96	0.51	0.57	0.34	-1408.65	0.51	0.34	1.18	0.25	0.38	565
05-030_05-020	05-030	05-020	277.41	09:25 hr	1.71	0.42	0.55	0.34	-866.40	0.43	0.34	0.50	0.24	0.31	394
24-090_24-080	24-090	24-080	234.13	10:15 hr	1.45	0.42	0.46	0.33	-734.47	0.42	0.33	1.45	0.24	0.28	54
14-010_14-250	14-010	14-250	1645.63	34:46 hr	1.77	1.00	0.37	0.33	-5182.75	1.51	0.50	1.37	0.24	0.60	328
15-190_15-180	15-190	15-180	230.97	09:41 hr	2.24	0.33	0.80	0.33	-731.00	0.57	0.57	0.65	0.24	0.30	353
26-130_26-120	26-130	26-120	189.15	09:24 hr	1.84	0.33	0.66	0.33	-598.71	0.33	0.33	1.84	0.24	0.27	319
SW-P-19	SW-MH-18	SW-MH-19	682.43	84:20 hr	1.66	0.67	0.42	0.33	-2166.84	0.92	0.46	0.42	0.24	0.43	58
24-040_24-030	24-040	24-030	238.50	10:21 hr	1.49	0.41	0.48	0.33	-764.58	0.41	0.33	1.49	0.24	0.28	17
04-080_04-010	04-080	04-010	195.34	09:09 hr	1.92	0.33	0.69	0.33	-629.97	0.36	0.36	0.55	0.24	0.27	325
26-120_26-110	26-120	26-110	189.15	09:28 hr	1.86	0.33	0.67	0.33	-612.96	0.35	0.35	0.54	0.24	0.27	420
OM-12	OM-13	OM-12	922.26	60:04 hr	2.28	0.66	0.58	0.33	-3022.12	0.66	0.33	2.28	0.23	0.50	335
24-030_24-020	24-030	24-020	242.08	10:20 hr	1.54	0.41	0.50	0.33	-801.24	0.57	0.46	0.44	0.23	0.29	163
24-060_24-050	24-060	24-050	236.34	10:17 hr	1.52	0.41	0.49	0.33	-791.26	0.41	0.33	1.51	0.23	0.28	208
OM-6	OM-7	OM-6	922.28	60:26 hr	1.48	0.81	0.34	0.33	-3106.56	0.81	0.33	1.48	0.23	0.47	300
OM-5	OM-6	OM-5	922.31	60:33 hr	1.48	0.81	0.34	0.33	-3108.65	0.81	0.33	1.48	0.23	0.47	378
48-090_48_040-1	SW-MH-19	48-040	2031.55	60:08 hr	2.27	0.97	0.48	0.32	-6869.92	1.00	0.33	0.61	0.23	0.67	159
14-250_14-240	14-250	14-240	1557.68	34:48 hr	1.75	0.97	0.37	0.32	-5291.44	1.67	0.56	0.46	0.23	0.58	307
24-050_24-040	24-050	24-040	238.44	10:18 hr	1.55	0.40	0.50	0.32	-813.80	0.41	0.33	0.43	0.23	0.28	122

Future Wet Weather Flow - Pipe Capacity Results															
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
01-530_01-540	01-530	01-540	215.94	09:09 hr	2.21	0.32	0.80	0.32	-748.42	0.32	0.32	2.20	0.22	0.29	166
01-540_01-550	01-540	01-550	216.60	09:14 hr	2.22	0.32	0.81	0.32	-752.76	0.32	0.32	2.21	0.22	0.29	353
24-080_24-070	24-080	24-070	235.89	10:14 hr	1.55	0.40	0.51	0.32	-822.76	0.40	0.32	1.55	0.22	0.28	385
12-300_12-240	12-300	12-240	141.38	09:20 hr	1.46	0.32	0.53	0.32	-497.17	0.33	0.33	0.40	0.22	0.23	410
27-100_27-080	27-100	27-080	240.58	10:02 hr	1.59	0.40	0.52	0.32	-847.76	0.42	0.33	0.46	0.22	0.29	78
24-070_24-060	24-070	24-060	235.92	10:16 hr	1.57	0.40	0.52	0.32	-844.01	0.40	0.32	0.43	0.22	0.28	36
14-240_34-170	14-240	4-R	1506.98	34:55 hr	1.29	1.11	0.25	0.32	-5465.19	1.82	0.52	0.34	0.22	0.55	675
01-560_24-300	01-560	24-300	220.21	09:19 hr	2.31	0.32	0.85	0.32	-801.01	0.32	0.32	2.31	0.22	0.29	365
38-110_38-100	38-110	38-100	1357.93	59:37 hr	2.29	0.79	0.53	0.31	-4965.23	0.79	0.31	2.28	0.21	0.57	222
15-410_15-280	15-410	15-280	1358.13	59:46 hr	2.30	0.78	0.54	0.31	-5017.69	0.78	0.31	2.30	0.21	0.57	495
38-120_38-110	38-120	38-110	1357.98	59:35 hr	2.30	0.78	0.54	0.31	-5023.97	0.78	0.31	2.03	0.21	0.57	293
01-550_01-560	01-550	01-560	216.70	09:15 hr	2.30	0.31	0.85	0.31	-803.94	0.31	0.31	2.19	0.21	0.29	323
P-NEW50	38-100	15-420	1357.71	59:40 hr	2.31	0.78	0.54	0.31	-5038.65	0.78	0.31	2.30	0.21	0.57	533
15-420_15-410	15-420	15-410	1357.68	59:41 hr	2.31	0.78	0.54	0.31	-5056.45	0.78	0.31	2.27	0.21	0.57	232
26-090_41-290	26-090	41-290	400.14	10:40 hr	1.90	0.47	0.58	0.31	-1503.30	0.49	0.33	0.50	0.21	0.35	506
05-040_05-030	05-040	05-030	211.78	09:22 hr	1.45	0.39	0.48	0.31	-795.68	0.40	0.32	0.38	0.21	0.27	525
07-440_27-100	07-440	27-100	227.34	10:03 hr	1.57	0.39	0.52	0.31	-865.87	0.39	0.31	0.41	0.21	0.28	453
24-120_24-090	24-120	24-090	217.04	10:10 hr	1.50	0.39	0.50	0.31	-829.75	0.40	0.32	0.39	0.21	0.27	301
24-130_24-120	24-130	24-120	216.44	10:07 hr	1.50	0.39	0.50	0.31	-831.09	0.39	0.31	1.48	0.21	0.27	354
51-070_51-060	51-070	51-060	884.98	11:36 hr	3.15	0.54	0.89	0.31	-3437.27	0.54	0.31	3.15	0.20	0.51	378
05-060_05-040	05-060	05-040	207.12	09:17 hr	1.45	0.38	0.48	0.31	-807.51	0.39	0.31	1.37	0.20	0.26	410
07-390_07-440	07-390	07-440	212.55	09:58 hr	1.49	0.38	0.50	0.31	-831.87	0.38	0.31	0.96	0.20	0.27	403
04-010_05-060	04-010	05-060	203.65	09:13 hr	1.43	0.38	0.48	0.31	-799.72	0.38	0.31	1.37	0.20	0.26	428
48-090_48-040	48-090	SW-MH-19	1359.78	59:59 hr	1.66	0.91	0.36	0.30	-5383.00	0.93	0.31	1.62	0.20	0.54	357
08-030_08-020	08-030	08-020	195.34	09:50 hr	1.38	0.38	0.46	0.30	-774.20	0.87	0.69	0.35	0.20	0.26	441
OM-7	OM-8	OM-7	922.29	60:25 hr	2.03	0.68	0.51	0.30	-3732.68	0.68	0.30	2.03	0.20	0.48	397
28-020_26-130	28-020	26-130	189.15	09:20 hr	2.11	0.30	0.80	0.30	-765.65	0.32	0.32	0.54	0.20	0.27	116
15-270_15-240	15-270	15-240	1358.00	59:49 hr	2.44	0.75	0.59	0.30	-5570.27	0.75	0.30	2.44	0.20	0.57	383
07-400_07-390	07-400	07-390	204.92	09:58 hr	1.48	0.37	0.50	0.30	-842.62	0.38	0.30	0.99	0.20	0.26	431
15-220_48-090	15-220	48-090	1359.05	59:55 hr	1.70	0.90	0.37	0.30	-5618.08	0.90	0.30	1.49	0.19	0.54	74
16-450_16-440	16-450	16-440	327.15	92:53 hr	2.37	0.37	0.81	0.30	-1362.92	0.45	0.36	0.53	0.19	0.33	53
06-010_07-400	06-010	07-400	202.14	09:49 hr	1.47	0.37	0.50	0.30	-842.23	0.37	0.30	1.35	0.19	0.26	457
08-060_08-030	08-060	08-030	181.66	09:51 hr	1.34	0.37	0.46	0.30	-776.84	0.50	0.40	0.33	0.19	0.25	442
24-170_24-160	24-170	24-160	192.07	10:03 hr	1.42	0.37	0.48	0.29	-821.95	0.37	0.29	1.42	0.19	0.25	99
24-210_24-200	24-210	24-200	185.30	10:01 hr	1.37	0.37	0.47	0.29	-800.71	0.37	0.29	1.37	0.19	0.25	322
38-130_38-120	38-130	38-120	1358.65	59:33 hr	2.53	0.73	0.61	0.29	-5918.20	0.76	0.30	0.61	0.19	0.57	463
24-160_24-140	24-160	24-140	192.09	10:06 hr	1.44	0.36	0.50	0.29	-849.16	0.36	0.29	1.44	0.18	0.25	195
24-140_24-130	24-140	24-130	192.05	10:05 hr	1.45	0.36	0.50	0.29	-853.11	0.37	0.30	0.35	0.18	0.25	162
40-140_40-280	40-140	40-280	85.82	09:25 hr	1.46	0.24	0.62	0.29	-382.44	0.24	0.29	1.46	0.18	0.19	452
24-200_24-170	24-200	24-170	185.30	10:03 hr	1.41	0.36	0.49	0.29	-841.17	0.36	0.29	0.34	0.18	0.25	257
38-160_38-130	38-160	38-130	1359.33	59:31 hr	2.61	0.72	0.64	0.29	-6235.95	0.72	0.29	2.13	0.18	0.57	484
40-130_40-120	40-130	40-120	570.11	11:25 hr	3.06	0.43	0.97	0.29	-2640.16	0.43	0.29	3.06	0.18	0.42	310
05-430_PROSPECTLS	05-430	PROSPECTWW	877.20	12:17 hr	2.10	0.64	0.55	0.28	-4102.61	0.64	0.28	2.07	0.18	0.47	611
34-170_34-160	34-170	34-160	1503.15	34:58 hr	1.49	0.99	0.31	0.28	-7080.32	2.01	0.57	0.34	0.18	0.55	83
8	15-095	34-090	637.57	10:51 hr	2.57	0.49	0.76	0.28	-3073.84	0.88	0.50	0.59	0.17	0.43	1735
34-040_34-030	34-040	34-030	1596.19	12:09 hr	4.94	0.56	1.38	0.28	-7741.17	1.39	0.70	1.09	0.17	0.66	39
24-220_24-210	24-220	24-210	185.32	10:00 hr	1.48	0.35	0.52	0.28	-905.85	0.36	0.29	0.96	0.17	0.25	532
9	4-R	34-170	1504.58	34:58 hr	1.54	0.97	0.33	0.28	-7429.82	1.95	0.56	0.34	0.17	0.55	257
09-030_09-020	09-030	09-020	100.21	09:26 hr	1.26	0.28	0.50	0.28	-497.41	0.28	0.28	1.26	0.17	0.19	166
35-020_35-010	35-020	35-010	228.77	09:12 hr	1.29	0.41	0.42	0.28	-1147.05	0.41	0.28	1.28	0.17	0.26	118
09-040_09-030	09-040	09-030	99.71	09:18 hr	1.26	0.28	0.50	0.28	-502.92	0.28	0.28	1.12	0.17	0.19	163
15-280_15-270	15-280	15-270	1358.09	59:47 hr	2.79	0.68	0.70	0.27	-6973.26	0.71	0.29	0.61	0.16	0.57	162
40-120_51-090	40-120	51-090	570.08	11:22 hr	3.26	0.41	1.06	0.27	-2948.67	0.56	0.37	0.72	0.16	0.42	171
08-090_08-060	08-090	08-060	156.32	09:46 hr	1.29	0.34	0.46	0.27	-811.72	0.35	0.28	0.28	0.16	0.23	442
01-520_01-530	01-520	01-530	215.96	09:09 hr	2.80	0.27	1.12	0.27	-1130.51	0.30	0.30	0.61	0.16	0.29	282
01-600_01-590	01-600	01-590	38.12	09:14 hr	1.11	0.18	0.55	0.27	-200.28	0.38	0.57	0.24	0.16	0.13	229
24-010_49-150	24-010	49-150	690.19	82:57 hr	4.00	0.40	1.31	0.27	-3641.24	0.46	0.31	0.71	0.16	0.47	44
04-140_04-110	04-140	04-110	155.52	09:02 hr	2.92	0.22	1.29	0.27	-823.76	0.29	0.35	0.63	0.16	0.26	327
P-100	P3-18	SW-MH-20	328.15	11:43 hr	1.07	0.54	0.31	0.27	-1742.40	0.57	0.28	1.07	0.16	0.29	508
06-170_06-160	06-170	06-160	84.99	09:27 hr	1.13	0.27	0.46	0.27	-466.66	0.27	0.27	1.13	0.15	0.18	405
09-080_09-040	09-080	09-040	91.72	09:19 hr	1.23	0.26	0.50	0.26	-510.80	0.27	0.27	0.26	0.15	0.19	326
02-180_05-450	02-180	05-450	882.37	12:07 hr	2.36	0.59	0.64	0.26	-4972.19	0.59	0.26	2.35	0.15	0.47	164
40-040_40-030	40-040	40-030	315.42	09:26 hr	2.74	0.33	1.00	0.26	-1780.15	0.33	0.26	2.74	0.15	0.33	479
40-050_40-040	40-050	40-040	315.28	09:23 hr	2.74	0.33	1.00	0.26	-1781.27	0.33	0.26	2.73	0.15	0.33	360
05-440_05-430	05-440	05-430	880.26	12:11 hr	2.36	0.59	0.64	0.26	-4976.89	0.59	0.26	2.32	0.15	0.47	277
10-500_21-140	10-500	21-140	570.69	57:51 hr	2.54	0.46	0.79	0.26	-3248.61	0.46	0.26	2.53	0.15	0.40	202

Future Wet Weather Flow - Pipe Capacity Results															
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
05-450_05-440	05-450	05-440	881.65	12:09 hr	2.38	0.59	0.65	0.26	-5021.35	0.59	0.26	2.34	0.15	0.47	362
05-100_05-090	05-100	05-030	40.70	09:19 hr	0.56	0.26	0.23	0.26	-232.14	0.61	0.61	0.12	0.15	0.12	449
48-010_34-090	48-010	34-090	2018.59	60:19 hr	3.07	0.78	0.72	0.26	-11528.62	1.05	0.35	0.61	0.15	0.66	221
05-480_05-510	05-480	05-510	62.32	09:08 hr	1.23	0.22	0.55	0.26	-357.75	0.22	0.26	1.23	0.15	0.16	347
21-140_21-130	21-140	21-130	575.90	57:53 hr	2.58	0.45	0.80	0.26	-3315.88	0.55	0.31	0.52	0.15	0.41	453
08-120_08-090	08-120	08-090	142.62	09:50 hr	1.25	0.32	0.46	0.26	-822.56	0.33	0.27	0.26	0.15	0.22	517
01-140_01-520	01-140	01-520	215.83	09:07 hr	2.97	0.26	1.22	0.26	-1248.82	0.26	0.26	0.61	0.15	0.29	343
6	09-020	09-310	108.48	09:30 hr	1.50	0.26	0.62	0.26	-633.46	0.27	0.27	0.31	0.15	0.20	1149
41-260_41-270	41-260	41-270	66.85	09:10 hr	1.35	0.21	0.61	0.26	-396.69	0.21	0.26	1.35	0.14	0.17	244
40-150_40-140	40-150	40-140	66.68	09:22 hr	1.35	0.21	0.61	0.26	-396.73	0.23	0.27	0.27	0.14	0.17	453
41-270_41-280	41-270	41-280	66.85	09:13 hr	1.35	0.21	0.61	0.26	-399.45	0.21	0.26	1.35	0.14	0.17	340
41-240_41-250	41-240	41-250	66.89	09:09 hr	1.35	0.21	0.61	0.26	-400.40	0.21	0.26	1.35	0.14	0.17	347
04-210_04-140	04-210	04-140	132.21	09:01 hr	2.68	0.21	1.21	0.26	-792.87	0.22	0.26	0.54	0.14	0.24	310
41-140_41-240	41-140	41-240	65.53	09:05 hr	1.33	0.21	0.60	0.26	-393.57	0.21	0.26	1.30	0.14	0.16	60
41-280_41-290	41-280	41-290	66.86	09:15 hr	1.36	0.21	0.62	0.26	-401.92	0.36	0.44	0.27	0.14	0.17	168
41-250_41-260	41-250	41-260	66.89	09:10 hr	1.36	0.21	0.62	0.26	-402.41	0.21	0.26	1.31	0.14	0.17	132
51-060_275BYPASSLS	51-060	OM-20	884.99	11:39 hr	4.10	0.44	1.29	0.25	-5380.71	0.50	0.28	3.44	0.14	0.51	22
40-160_40-150	40-160	40-150	58.07	09:20 hr	1.19	0.21	0.54	0.25	-355.05	0.21	0.25	0.24	0.14	0.15	478
09-110_09-080	09-110	09-080	84.93	09:17 hr	1.21	0.25	0.50	0.25	-521.64	0.26	0.26	0.24	0.14	0.18	328
124	130	30-060	66.84	09:34 hr	0.96	0.25	0.40	0.25	-411.18	0.25	0.25	0.96	0.14	0.16	45
09-130_09-110	09-130	09-110	82.49	09:13 hr	1.19	0.25	0.50	0.25	-513.98	0.25	0.25	1.15	0.14	0.18	152
02-235_02-230	02-235	02-230	731.07	12:00 hr	2.13	0.56	0.60	0.25	-4722.01	0.56	0.25	2.13	0.13	0.43	379
06-180_06-170	06-180	06-170	71.69	09:23 hr	1.07	0.25	0.45	0.25	-469.44	0.26	0.26	0.20	0.13	0.16	457
SW-P-20	SW-MH-20	SW-MH-5	328.15	11:44 hr	1.22	0.49	0.37	0.25	-2162.79	0.68	0.34	0.23	0.13	0.29	201
P2-13	MH-INT2-6	MH-INT2-5	319.35	11:08 hr	1.19	0.49	0.36	0.25	-2105.41	0.49	0.25	1.19	0.13	0.29	119
19-060_19-030	19-060	19-030	140.68	56:50 hr	1.34	0.31	0.51	0.24	-929.14	0.31	0.24	1.35	0.13	0.22	281
P2-7	MH-INT2-12	MH-INT2-11	319.36	10:51 hr	1.19	0.49	0.36	0.24	-2113.05	0.49	0.24	1.19	0.13	0.29	500
P2-11	MH-INT2-8	MH-INT2-7	319.36	11:05 hr	1.19	0.49	0.36	0.24	-2113.06	0.49	0.24	1.19	0.13	0.29	500
P2-10	MH-INT2-9	MH-INT2-8	319.36	11:01 hr	1.19	0.49	0.36	0.24	-2113.06	0.49	0.24	1.19	0.13	0.29	500
08-150_08-120	08-150	08-120	126.48	09:46 hr	1.21	0.31	0.46	0.24	-838.00	0.32	0.25	0.23	0.13	0.21	409
P2-14	MH-INT2-5	MH-INT2-4	319.41	11:24 hr	1.20	0.49	0.36	0.24	-2116.54	0.49	0.24	1.20	0.13	0.29	420
P2-8	MH-INT2-11	MH-INT2-10	319.36	10:53 hr	1.20	0.49	0.36	0.24	-2117.98	0.49	0.24	1.20	0.13	0.29	354
P2-3	MH-INT2-16	MH-INT2-15	318.26	10:37 hr	1.19	0.49	0.36	0.24	-2114.16	0.49	0.24	1.19	0.13	0.29	500
P2-4	MH-INT2-15	MH-INT2-14	318.25	10:41 hr	1.19	0.49	0.36	0.24	-2114.16	0.49	0.24	1.19	0.13	0.29	500
P2-6	MH-INT2-13	MH-INT2-12	319.38	10:49 hr	1.20	0.49	0.36	0.24	-2125.01	0.49	0.24	1.14	0.13	0.29	495
P2-17	MH-INT2-2	MH-INT2-1	319.41	11:34 hr	1.20	0.49	0.36	0.24	-2125.50	0.49	0.24	1.20	0.13	0.29	352
06-190_06-180	06-190	06-180	69.85	09:18 hr	1.05	0.24	0.44	0.24	-465.14	0.24	0.24	0.99	0.13	0.16	368
P2-15	MH-INT2-4	MH-INT2-3	319.41	11:28 hr	1.20	0.49	0.36	0.24	-2137.06	0.49	0.24	1.20	0.13	0.29	464
18-620_18-630	18-620	18-630	31.47	09:06 hr	1.07	0.16	0.56	0.24	-210.87	0.16	0.24	1.07	0.13	0.12	171
P2-12	MH-INT2-7	MH-INT2-6	319.41	11:17 hr	1.20	0.49	0.36	0.24	-2140.89	0.49	0.24	0.77	0.13	0.29	206
05-470_05-480	05-470	05-480	54.91	09:05 hr	1.19	0.20	0.56	0.24	-368.63	0.21	0.25	0.30	0.13	0.15	38
P2-16	MH-INT2-3	MH-INT2-2	319.41	11:31 hr	1.21	0.49	0.36	0.24	-2144.80	0.49	0.24	1.18	0.13	0.29	500
P2-9	MH-INT2-10	MH-INT2-9	319.36	10:57 hr	1.21	0.49	0.36	0.24	-2144.85	0.49	0.24	1.12	0.13	0.29	500
18-610_18-620	18-610	18-620	31.48	09:06 hr	1.07	0.16	0.56	0.24	-211.53	0.16	0.24	1.04	0.13	0.12	320
P2-5	MH-INT2-14	MH-INT2-13	318.25	10:45 hr	1.20	0.49	0.36	0.24	-2143.18	0.49	0.24	1.15	0.13	0.29	488
P2-2	MH-INT3-15	MH-INT2-16	318.27	10:34 hr	1.20	0.49	0.36	0.24	-2146.39	0.49	0.24	1.17	0.13	0.29	154
P0	MH-101	HWY81WW	47.32	09:06 hr	1.03	0.20	0.48	0.24	-319.23	0.20	0.24	1.03	0.13	0.14	65
40-020_40-010	40-020	40-010	315.75	09:30 hr	3.06	0.30	1.17	0.24	-2134.95	0.30	0.24	3.06	0.13	0.33	303
40-030_40-020	40-030	40-020	315.75	09:29 hr	3.07	0.30	1.17	0.24	-2143.35	0.30	0.24	2.84	0.13	0.33	418
41-130_41-140	41-130	41-140	59.57	09:03 hr	1.31	0.20	0.61	0.24	-407.80	0.21	0.25	0.24	0.13	0.16	365
10-510_10-500	10-510	10-500	227.29	57:17 hr	1.55	0.36	0.54	0.24	-1568.27	0.41	0.27	0.29	0.13	0.26	423
02-230_02-220	02-230	02-220	731.46	12:03 hr	2.22	0.54	0.63	0.24	-5055.45	0.54	0.24	2.18	0.13	0.43	516
40-010_51-090	40-010	51-090	315.84	09:31 hr	3.11	0.30	1.19	0.24	-2185.02	0.51	0.40	0.57	0.13	0.33	403
11-040_38-160	11-040	38-160	899.72	59:28 hr	2.21	0.60	0.60	0.24	-6228.18	0.65	0.26	0.40	0.13	0.46	127
02-010_05-470	02-010	05-470	52.95	09:05 hr	1.17	0.20	0.55	0.24	-366.72	0.20	0.24	0.22	0.13	0.15	309
P2-18	MH-INT2-1	P3-18	319.41	11:37 hr	1.24	0.48	0.38	0.24	-2235.14	0.51	0.25	0.55	0.13	0.29	489
02-190_02-180	02-190	02-180	729.97	12:06 hr	2.23	0.54	0.64	0.24	-5110.70	0.56	0.25	0.40	0.13	0.43	285
03-360_03-310	03-360	03-310	380.61	93:29 hr	2.63	0.36	0.92	0.24	-2681.61	0.36	0.24	2.03	0.12	0.34	446
02-220_02-190	02-220	02-190	729.19	12:05 hr	2.24	0.54	0.64	0.24	-5142.44	0.54	0.24	2.20	0.12	0.43	214
06-110_06-010	06-110	06-010	122.27	09:49 hr	1.22	0.30	0.47	0.24	-863.81	0.34	0.27	0.22	0.12	0.20	382
09-150_09-140	09-150	09-140	69.83	09:14 hr	1.09	0.24	0.47	0.24	-493.60	0.24	0.24	1.09	0.12	0.16	130
06-120_06-110	06-120	06-110	121.62	09:44 hr	1.23	0.29	0.47	0.24	-876.97	0.30	0.24	1.11	0.12	0.20	381
15-240_15-230	15-240	15-230	1359.26	59:52 hr	2.40	0.70	0.60	0.23	-9934.26	0.70	0.23	2.40	0.12	0.54	565
19-160_19-150	19-160	19-150	6.18	55:04 hr	0.22	0.16	0.12	0.23	-45.39	0.16	0.23	0.22	0.12	0.05	131
15-230_15-220	15-230	15-220	1359.26	59:55 hr	2.41	0.70	0.60	0.23	-10001.69	0.80	0.27	0.43	0.12	0.54	565
17-020_17-010	17-020	17-010	178.33	57:22 hr	1.27	0.35	0.45	0.23	-1321.47	0.35	0.23	1.27	0.12	0.23	258

Future Wet Weather Flow - Pipe Capacity Results															
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
06-130_06-120	06-130	06-120	117.26	09:41 hr	1.21	0.29	0.47	0.23	-872.85	0.29	0.23	1.01	0.12	0.20	440
37-010_32-130	37-010	32-130	98.30	09:21 hr	1.58	0.23	0.69	0.23	-732.37	1.00	1.00	1.58	0.12	0.19	782
06-210_06-200	06-210	06-200	63.71	09:16 hr	1.03	0.23	0.45	0.23	-475.09	0.23	0.23	1.03	0.12	0.15	319
40-170_40-160	40-170	40-160	57.32	09:16 hr	1.33	0.19	0.64	0.23	-429.09	0.20	0.24	0.23	0.12	0.15	222
25-010_24-220	25-010	24-220	90.94	09:54 hr	1.47	0.23	0.64	0.23	-681.85	0.29	0.29	0.26	0.12	0.18	344
06-200_06-190	06-200	06-190	64.56	09:15 hr	1.05	0.23	0.46	0.23	-487.38	0.24	0.24	0.18	0.12	0.16	101
06-220_06-210	06-220	06-210	62.33	09:12 hr	1.01	0.23	0.44	0.23	-472.78	0.23	0.23	0.97	0.12	0.15	126
19-080_19-070	19-080	19-070	20.58	55:10 hr	0.76	0.15	0.40	0.23	-156.55	0.15	0.23	0.75	0.12	0.10	343
17-030_17-020	17-030	17-020	178.34	57:24 hr	1.30	0.34	0.47	0.23	-1369.36	0.35	0.23	1.09	0.12	0.23	662
09-310_08-150	09-310	08-150	110.93	09:41 hr	1.17	0.29	0.46	0.23	-857.87	0.30	0.24	0.20	0.11	0.19	585
25-020_25-010	25-020	25-010	90.96	09:52 hr	1.50	0.23	0.66	0.23	-703.60	0.23	0.23	1.31	0.11	0.18	45
09-140_09-130	09-140	09-130	70.25	09:12 hr	1.16	0.23	0.51	0.23	-548.35	0.24	0.24	0.20	0.11	0.16	262
41-120_41-130	41-120	41-130	52.96	09:01 hr	1.27	0.19	0.61	0.23	-414.97	0.20	0.23	0.22	0.11	0.15	293
17-010_10-520	17-010	10-520	206.27	57:09 hr	1.53	0.34	0.55	0.23	-1633.38	0.34	0.23	1.53	0.11	0.25	211
10-520_10-510	10-520	10-510	207.00	57:12 hr	1.54	0.34	0.56	0.23	-1643.35	0.35	0.23	0.26	0.11	0.25	444
25-030_25-020	25-030	25-020	90.96	09:52 hr	1.53	0.23	0.67	0.23	-723.09	0.23	0.23	0.26	0.11	0.18	369
40-060_40-050	40-060	40-050	315.29	09:22 hr	3.41	0.28	1.35	0.22	-2533.54	0.30	0.24	0.57	0.11	0.33	420
19-240_19-230	19-240	19-230	124.81	09:33 hr	1.35	0.28	0.54	0.22	-1005.01	0.28	0.22	1.35	0.11	0.20	397
19-230_19-220	19-230	19-220	124.78	09:30 hr	1.35	0.28	0.54	0.22	-1005.08	0.28	0.22	1.35	0.11	0.20	397
19-220_19-210	19-220	19-210	124.78	09:33 hr	1.35	0.28	0.54	0.22	-1005.19	0.28	0.22	1.35	0.11	0.20	397
02-040_02-010	02-040	02-010	46.14	09:02 hr	1.13	0.19	0.55	0.22	-373.98	0.19	0.23	0.19	0.11	0.14	347
P3	MH-103A	MH-103	45.38	09:01 hr	1.14	0.18	0.56	0.22	-384.28	0.18	0.22	1.14	0.11	0.14	293
35-300_35-050	35-300	35-050	228.77	09:01 hr	1.79	0.33	0.66	0.22	-1961.47	0.33	0.22	1.79	0.10	0.26	182
01-590_01-580	01-590	01-580	38.23	09:12 hr	1.53	0.14	0.84	0.22	-332.64	0.23	0.35	0.24	0.10	0.13	95
28-050_28-040	28-050	28-040	82.02	09:17 hr	1.46	0.22	0.66	0.22	-719.63	0.22	0.22	1.46	0.10	0.18	416
28-040_28-030	28-040	28-030	82.01	09:20 hr	1.47	0.22	0.66	0.22	-721.40	0.22	0.22	1.46	0.10	0.18	374
33-050_33-040	33-050	33-040	55.48	09:07 hr	1.00	0.21	0.46	0.21	-495.46	0.23	0.23	1.00	0.10	0.14	220
03-100_03-090	03-100	03-090	362.96	93:24 hr	2.99	0.32	1.11	0.21	-3370.64	0.32	0.21	2.65	0.10	0.33	164
35-040_35-030	35-040	35-030	228.77	09:07 hr	1.88	0.32	0.71	0.21	-2128.35	0.32	0.21	1.88	0.10	0.26	390
03-310_03-050	03-310	03-050	381.19	93:32 hr	2.31	0.37	0.80	0.21	-3565.23	0.37	0.21	2.20	0.10	0.33	418
03-090_03-080	03-090	03-080	362.48	93:26 hr	3.00	0.31	1.11	0.21	-3390.53	0.31	0.21	2.75	0.10	0.33	322
40-110_40-100	40-110	40-100	228.73	09:15 hr	1.89	0.31	0.71	0.21	-2139.71	0.31	0.21	1.89	0.10	0.26	351
35-030_35-020	35-030	35-020	228.72	09:09 hr	1.89	0.31	0.71	0.21	-2146.58	0.36	0.24	0.29	0.10	0.26	380
35-050_35-040	35-050	35-040	228.76	09:03 hr	1.92	0.31	0.73	0.21	-2200.35	0.31	0.21	1.77	0.09	0.26	371
03-110_03-100	03-110	03-100	363.03	93:24 hr	3.06	0.31	1.14	0.21	-3500.42	0.31	0.21	2.33	0.09	0.33	289
17-230_17-220	17-230	17-220	145.21	57:09 hr	1.23	0.31	0.47	0.21	-1413.24	0.31	0.21	1.23	0.09	0.21	368
03-080_03-070	03-080	03-070	362.39	93:26 hr	3.09	0.31	1.16	0.21	-3563.57	0.31	0.21	2.85	0.09	0.33	174
40-180_40-170	40-180	40-170	56.99	09:12 hr	1.58	0.17	0.80	0.21	-560.53	0.18	0.22	0.23	0.09	0.15	257
17-220_17-210	17-220	17-210	145.50	57:09 hr	1.24	0.31	0.47	0.20	-1437.03	0.31	0.20	1.24	0.09	0.21	339
06-140_06-130	06-140	06-130	92.10	09:40 hr	1.14	0.26	0.47	0.20	-911.63	0.27	0.22	0.17	0.09	0.17	445
17-210_17-030	17-210	17-030	145.51	57:12 hr	1.26	0.31	0.48	0.20	-1456.34	0.32	0.22	0.18	0.09	0.21	192
05-510_06-220	05-510	06-220	62.31	09:10 hr	1.21	0.20	0.57	0.20	-624.25	0.22	0.22	0.18	0.09	0.15	224
28-052	28-052	28-050	81.98	09:11 hr	1.60	0.20	0.75	0.20	-825.29	0.21	0.21	0.23	0.09	0.18	234
01-610_01-600	01-610	01-600	37.82	09:12 hr	1.67	0.13	0.96	0.20	-384.20	0.13	0.20	1.67	0.09	0.13	161
06-150_06-140	06-150	06-140	89.81	09:34 hr	1.13	0.25	0.47	0.20	-914.07	0.25	0.20	1.03	0.09	0.17	436
P1	MH-102	MH-101	46.88	09:06 hr	1.33	0.17	0.68	0.20	-479.15	0.17	0.20	1.33	0.09	0.14	227
140	102	100	66.83	09:23 hr	1.32	0.20	0.62	0.20	-684.45	0.20	0.20	1.32	0.09	0.16	460
146	112	110	66.78	09:10 hr	1.32	0.20	0.62	0.20	-684.05	0.20	0.20	1.32	0.09	0.16	114
142	104	102	66.83	09:19 hr	1.32	0.20	0.62	0.20	-685.65	0.20	0.20	1.32	0.09	0.16	454
40-190_40-180	40-190	40-180	56.68	09:09 hr	1.61	0.17	0.83	0.20	-582.17	0.17	0.20	0.23	0.09	0.15	150
25-060_25-050	25-060	25-050	70.88	09:44 hr	1.40	0.20	0.66	0.20	-730.74	0.20	0.20	1.40	0.09	0.16	352
25-050_25-030	25-050	25-030	70.85	09:46 hr	1.41	0.20	0.66	0.20	-734.96	0.21	0.21	0.20	0.09	0.16	309
35-270_40-190	35-270	40-190	50.66	09:10 hr	1.45	0.17	0.75	0.20	-527.28	0.17	0.20	0.21	0.09	0.14	306
33-270_33-050	33-270	33-050	48.10	09:07 hr	0.96	0.20	0.45	0.20	-501.54	0.21	0.21	0.14	0.09	0.13	196
06-160_06-150	06-160	06-150	88.03	09:33 hr	1.13	0.25	0.48	0.20	-924.30	0.25	0.20	1.04	0.09	0.17	437
35-010_40-110	35-010	40-110	228.74	09:13 hr	2.04	0.30	0.79	0.20	-2417.08	0.31	0.20	0.29	0.09	0.26	306
P1-1	MH-EXT1-1	26-090	163.32	10:36 hr	1.48	0.30	0.57	0.20	-1762.69	0.34	0.23	0.21	0.08	0.22	77
154	122	120	66.83	09:04 hr	3.08	0.13	1.79	0.20	-725.98	0.13	0.20	3.08	0.08	0.18	271
33-280_33-270	33-280	33-270	46.45	09:06 hr	0.96	0.20	0.46	0.20	-510.17	0.20	0.20	0.13	0.08	0.13	407
36-050_36-040	36-050	36-040	570.81	34:13 hr	1.89	0.49	0.56	0.20	-6283.36	2.50	1.00	1.77	0.08	0.37	247
03-130_03-120	03-130	03-120	334.99	93:20 hr	6.93	0.19	3.26	0.19	-3702.55	0.20	0.20	0.64	0.08	0.36	348
03-140_03-130	03-140	03-130	334.12	93:20 hr	6.95	0.19	3.27	0.19	-3720.57	0.19	0.19	5.85	0.08	0.36	201
19-090_19-080	19-090	19-080	20.61	55:08 hr	0.97	0.13	0.57	0.19	-230.73	0.14	0.21	0.13	0.08	0.10	374
28-058	28-058	28-055	81.97	09:07 hr	1.72	0.19	0.83	0.19	-924.29	0.19	0.19	1.72	0.08	0.18	114
37-020_37-010	37-020	37-010	98.28	09:12 hr	2.06	0.19	0.99	0.19	-1109.95	1.00	1.00	0.28	0.08	0.19	384
28-100_28-090	28-100	28-090	82.03	09:03 hr	1.73	0.19	0.83	0.19	-930.42	0.19	0.19	1.73	0.08	0.18	379

Future Wet Weather Flow - Pipe Capacity Results															
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
10-540_10-230	10-540	10-230	388.63	93:37 hr	2.67	0.34	0.97	0.19	-4409.32	0.34	0.19	2.60	0.08	0.33	155
28-055	28-055	28-054	81.98	09:09 hr	1.73	0.19	0.83	0.19	-936.31	0.19	0.19	1.73	0.08	0.18	243
10-530_10-630	10-530	10-630	421.88	93:42 hr	2.92	0.34	1.06	0.19	-4841.70	0.34	0.19	2.78	0.08	0.35	417
P2-1	MH-INT3-1	MH-INT3-15	183.24	10:32 hr	0.97	0.38	0.33	0.19	-2105.82	0.48	0.24	0.13	0.08	0.22	30
19-010_17-250	19-010	17-250	142.94	56:58 hr	1.35	0.29	0.53	0.19	-1645.13	0.29	0.19	1.35	0.08	0.21	391
03-120_03-110	03-120	03-110	358.55	93:22 hr	3.39	0.29	1.32	0.19	-4129.10	0.29	0.19	0.31	0.08	0.33	393
28-054	28-054	28-052	81.97	09:10 hr	1.74	0.19	0.84	0.19	-944.35	0.20	0.20	0.23	0.08	0.18	146
P2	MH-103	MH-102	45.36	09:03 hr	1.39	0.16	0.74	0.19	-523.46	0.16	0.20	0.18	0.08	0.14	305
17-250_17-240	17-250	17-240	145.20	57:01 hr	1.37	0.29	0.54	0.19	-1676.23	0.29	0.19	1.37	0.08	0.21	350
10-230_10-530	10-230	10-530	421.88	93:40 hr	2.94	0.33	1.07	0.19	-4896.49	0.33	0.19	2.83	0.08	0.35	424
156	124	122	66.79	09:02 hr	3.21	0.13	1.90	0.19	-775.47	0.13	0.19	3.21	0.08	0.18	361
36-040_36-030	36-040	36-030	548.76	34:18 hr	1.88	0.48	0.57	0.19	-6388.06	0.48	0.19	1.74	0.08	0.36	489
17-240_17-230	17-240	17-230	145.20	57:03 hr	1.38	0.29	0.55	0.19	-1694.18	0.30	0.20	0.18	0.08	0.21	410
28-090_28-080	28-090	28-080	81.96	09:03 hr	1.76	0.19	0.85	0.19	-960.96	0.19	0.19	1.76	0.08	0.18	359
10-630_10-500	10-630	10-500	421.77	93:44 hr	2.96	0.33	1.08	0.19	-4947.78	0.38	0.22	0.32	0.08	0.35	414
40-070_40-060	40-070	40-060	288.50	09:19 hr	3.98	0.24	1.73	0.19	-3389.84	0.26	0.21	0.52	0.08	0.31	420
36-030_36-020	36-030	36-020	535.88	34:22 hr	1.85	0.47	0.56	0.19	-6312.97	0.47	0.19	1.68	0.08	0.35	494
36-020_14-070	36-020	14-070	540.83	34:22 hr	1.87	0.47	0.57	0.19	-6403.69	0.47	0.19	1.69	0.08	0.36	106
P1-14	MH-EXT1-14	MH-EXT1-13	163.32	10:04 hr	1.57	0.28	0.62	0.19	-1937.81	0.28	0.19	1.57	0.08	0.22	373
P1-3	MH-EXT1-3	MH-EXT1-2	163.32	10:31 hr	1.58	0.28	0.63	0.19	-1955.03	0.28	0.19	1.58	0.08	0.22	277
P1-7	MH-EXT1-7	MH-EXT1-6	163.35	10:27 hr	1.58	0.28	0.63	0.19	-1959.17	0.28	0.19	1.58	0.08	0.22	529
P1-13	MH-EXT1-13	MH-EXT1-12	163.32	10:07 hr	1.59	0.28	0.63	0.19	-1960.85	0.28	0.19	1.59	0.08	0.22	398
P1-11	MH-EXT1-11	MH-EXT1-10	163.34	10:14 hr	1.59	0.28	0.63	0.19	-1961.81	0.28	0.19	1.59	0.08	0.22	275
P1-5	MH-EXT1-5	MH-EXT1-4	163.31	10:24 hr	1.59	0.28	0.63	0.19	-1962.75	0.28	0.19	1.59	0.08	0.22	111
P1-4	MH-EXT1-4	MH-EXT1-3	163.31	10:29 hr	1.59	0.28	0.63	0.19	-1963.42	0.28	0.19	1.52	0.08	0.22	456
P1-6	MH-EXT1-6	MH-EXT1-5	163.33	10:26 hr	1.59	0.28	0.63	0.19	-1964.01	0.28	0.19	1.53	0.08	0.22	315
P1-12	MH-EXT1-12	MH-EXT1-11	163.32	10:10 hr	1.59	0.28	0.63	0.19	-1966.24	0.28	0.19	1.55	0.08	0.22	400
P1-9	MH-EXT1-9	MH-EXT1-8	163.35	10:19 hr	1.59	0.28	0.63	0.19	-1967.97	0.28	0.19	1.59	0.08	0.22	207
P1-2	MH-EXT1-2	MH-EXT1-1	163.32	10:35 hr	1.59	0.28	0.63	0.19	-1969.72	0.29	0.19	0.21	0.08	0.22	469
P1-8	MH-EXT1-8	MH-EXT1-7	163.32	10:17 hr	1.59	0.28	0.63	0.19	-1971.72	0.28	0.19	1.55	0.08	0.22	206
28-060_28-050	28-060	28-058	81.96	09:06 hr	1.80	0.19	0.88	0.19	-991.14	0.42	0.42	0.23	0.08	0.18	100
P3-7	MH-INT3-7	MH-INT3-6	183.26	10:16 hr	1.01	0.37	0.35	0.19	-2229.28	0.37	0.19	1.01	0.08	0.22	535
P1-10	MH-EXT1-10	MH-EXT1-9	163.32	10:15 hr	1.60	0.28	0.64	0.19	-1991.20	0.28	0.19	1.37	0.08	0.22	322
P3-8	MH-INT3-8	MH-INT3-7	183.22	10:03 hr	1.02	0.37	0.35	0.19	-2252.31	0.37	0.19	1.00	0.08	0.22	525
56	12	10	142.47	09:44 hr	1.40	0.28	0.56	0.19	-1751.64	0.28	0.19	1.40	0.08	0.21	100
P3-3	MH-INT3-3	MH-INT3-2	183.24	10:28 hr	1.02	0.37	0.35	0.19	-2257.68	0.37	0.19	1.02	0.08	0.22	562
19-020_19-010	19-020	19-010	142.95	56:58 hr	1.41	0.28	0.57	0.19	-1761.61	0.28	0.19	0.18	0.08	0.21	376
P3-10	MH-INT3-10	MH-INT3-9	183.21	09:52 hr	1.02	0.37	0.35	0.19	-2259.83	0.37	0.19	1.02	0.08	0.22	496
37-030_37-020	37-030	37-020	97.22	09:10 hr	2.16	0.19	1.06	0.19	-1199.44	1.00	1.00	0.27	0.08	0.19	466
01-620_01-610	01-620	01-610	37.20	09:11 hr	1.86	0.12	1.12	0.19	-459.05	0.13	0.19	0.24	0.08	0.13	395
19-070_19-060	19-070	19-060	136.04	56:01 hr	3.03	0.19	1.49	0.19	-1679.66	0.25	0.25	0.39	0.07	0.23	140
P3-2	MH-INT3-2	MH-INT3-1	183.24	10:33 hr	1.02	0.37	0.35	0.19	-2263.71	0.42	0.21	0.13	0.07	0.22	585
P3-9	MH-INT3-9	MH-INT3-8	183.22	09:58 hr	1.02	0.37	0.35	0.19	-2263.92	0.37	0.19	1.01	0.07	0.22	520
P3-4	MH-INT3-4	MH-INT3-3	183.22	10:19 hr	1.02	0.37	0.36	0.18	-2279.74	0.37	0.18	0.99	0.07	0.22	552
P3-6	MH-INT3-6	MH-INT3-5	183.22	10:11 hr	1.02	0.37	0.36	0.18	-2281.89	0.37	0.18	1.02	0.07	0.22	333
P3-5	MH-INT3-5	MH-INT3-4	183.22	10:14 hr	1.02	0.37	0.36	0.18	-2281.97	0.37	0.18	1.02	0.07	0.22	333
19-030_19-020	19-030	19-020	140.67	56:49 hr	1.40	0.28	0.56	0.18	-1760.06	0.28	0.18	1.38	0.07	0.21	377
40-080_40-070	40-080	40-070	274.08	09:17 hr	3.95	0.23	1.74	0.18	-3446.31	0.23	0.19	0.50	0.07	0.30	412
02-470_YMCALS	02-470	YMCAWW	36.93	09:09 hr	1.20	0.15	0.65	0.18	-464.38	0.15	0.18	1.20	0.07	0.12	97
158	126	124	66.84	09:02 hr	3.39	0.12	2.05	0.18	-843.11	0.12	0.18	3.39	0.07	0.18	405
10-550_10-540	10-550	10-540	388.81	93:37 hr	2.90	0.32	1.08	0.18	-5009.90	0.32	0.18	0.33	0.07	0.33	276
P3-13	MH-INT3-13	MH-INT3-12	159.00	09:33 hr	0.91	0.36	0.32	0.18	-2055.61	0.36	0.18	0.91	0.07	0.20	95
02-240_02-235	02-240	02-235	724.08	11:58 hr	3.34	0.40	1.11	0.18	-9622.82	0.48	0.21	0.39	0.07	0.43	31
02-440_02-470	02-440	02-470	34.32	09:13 hr	1.15	0.15	0.63	0.18	-456.55	0.15	0.18	0.14	0.07	0.12	520
P1-17	MH-EXT1-17	MH-EXT1-16	148.85	10:00 hr	1.55	0.27	0.63	0.18	-1980.25	0.27	0.18	1.55	0.07	0.21	448
P1-18	MH-EXT1-18	MH-EXT1-17	148.85	09:56 hr	1.55	0.27	0.63	0.18	-1981.86	0.27	0.18	1.53	0.07	0.21	451
02-450_02-440	02-450	02-440	34.29	09:04 hr	1.16	0.15	0.63	0.18	-459.10	0.15	0.18	1.12	0.07	0.12	535
30-020_30-010	30-020	30-010	69.64	09:35 hr	1.64	0.18	0.82	0.18	-938.82	0.18	0.18	1.64	0.07	0.16	402
07-460_27-140	07-460	27-140	383.67	57:45 hr	2.27	0.35	0.80	0.18	-5207.52	0.37	0.18	2.24	0.07	0.32	252
40-100_40-090	40-100	40-090	228.71	09:15 hr	2.41	0.27	0.99	0.18	-3110.09	0.27	0.18	2.41	0.07	0.26	150
07-360_07-460	07-360	07-460	385.65	57:43 hr	2.29	0.35	0.81	0.18	-5252.12	0.42	0.21	2.26	0.07	0.32	163
OM-4	OM-5	OMAHA_LS	922.29	60:30 hr	3.51	0.44	1.11	0.18	-12592.78	0.44	0.18	3.51	0.07	0.47	39
14-070_14-060	14-070	14-060	532.27	34:27 hr	1.42	0.53	0.41	0.18	-7371.30	0.53	0.18	1.25	0.07	0.34	418
10-570_10-560	10-570	10-560	387.87	93:36 hr	3.05	0.31	1.16	0.18	-5405.51	0.31	0.18	2.95	0.07	0.33	453
14-040_14-030	14-040	14-030	516.79	34:37 hr	1.40	0.52	0.41	0.17	-7344.77	0.52	0.17	1.34	0.07	0.33	467
14-050_14-040	14-050	14-040	521.79	34:33 hr	1.42	0.52	0.42	0.17	-7468.44	0.52	0.17	1.38	0.07	0.33	480

Future Wet Weather Flow - Pipe Capacity Results															
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
14-060_14-050	14-060	14-050	526.67	34:29 hr	1.44	0.52	0.42	0.17	-7553.67	0.52	0.17	1.29	0.07	0.34	290
P3-11	MH-INT3-11	MH-INT3-10	159.03	09:42 hr	0.98	0.34	0.35	0.17	-2297.73	0.36	0.18	0.11	0.06	0.20	464
P3-12	MH-INT3-12	MH-INT3-11	159.04	09:39 hr	0.98	0.34	0.35	0.17	-2303.70	0.34	0.17	0.98	0.06	0.20	334
14-030_14-020	14-030	14-020	511.76	34:41 hr	1.40	0.52	0.41	0.17	-7414.37	0.52	0.17	1.30	0.06	0.33	445
P1-19	MH-EXT1-19	MH-EXT1-18	148.85	09:52 hr	1.66	0.26	0.69	0.17	-2206.20	0.26	0.17	0.19	0.06	0.21	278
40-090_40-080	40-090	40-080	228.73	09:16 hr	2.57	0.25	1.08	0.17	-3442.22	0.35	0.23	0.29	0.06	0.26	134
30-060_30-020	30-060	30-020	66.77	09:32 hr	1.72	0.17	0.89	0.17	-1029.95	0.17	0.17	0.19	0.06	0.16	340
35-220_35-230	35-220	35-230	41.28	09:05 hr	1.55	0.14	0.88	0.17	-646.82	0.14	0.17	1.54	0.06	0.13	281
35-230_35-270	35-230	35-270	47.61	09:06 hr	1.80	0.14	1.02	0.17	-753.96	0.15	0.18	0.19	0.06	0.14	319
50	78	MH-EXT1-19	142.45	09:49 hr	1.66	0.25	0.71	0.17	-2259.77	0.25	0.17	0.18	0.06	0.21	290
02-370_02-380	02-370	02-380	717.48	11:58 hr	8.37	0.25	3.56	0.17	-11396.59	0.25	0.17	8.27	0.06	0.47	15
150	116	114	66.84	09:10 hr	1.76	0.16	0.92	0.16	-1066.89	0.16	0.16	1.76	0.06	0.16	400
05-130_05-100	05-130	05-100	32.93	09:08 hr	0.88	0.16	0.46	0.16	-539.83	0.35	0.35	0.09	0.06	0.11	439
47-010_20-480	47-010	20-480	64.59	09:33 hr	1.11	0.20	0.52	0.16	-1059.45	0.20	0.16	1.11	0.06	0.15	114
05-140_05-130	05-140	05-130	32.95	09:06 hr	0.88	0.16	0.46	0.16	-541.00	0.16	0.16	0.88	0.06	0.11	437
19-250_19-240	19-250	19-240	64.65	09:54 hr	1.12	0.20	0.53	0.16	-1070.39	0.24	0.19	0.12	0.06	0.15	348
32-130_32-120	32-130	32-120	98.29	09:22 hr	1.70	0.20	0.80	0.16	-1636.22	1.25	1.00	1.70	0.06	0.18	323
32-120_32-110	32-120	32-110	99.34	09:23 hr	1.73	0.20	0.81	0.16	-1658.81	1.25	1.00	1.72	0.06	0.18	317
30-010_25-070	30-010	25-070	69.81	09:38 hr	1.91	0.16	1.01	0.16	-1178.69	0.16	0.16	1.91	0.06	0.16	391
20-480_19-250	20-480	19-250	64.65	09:51 hr	1.13	0.20	0.54	0.16	-1093.47	0.20	0.16	1.13	0.06	0.15	145
52	74	78	142.50	09:51 hr	1.74	0.24	0.75	0.16	-2421.81	0.24	0.16	0.18	0.06	0.21	163
25-070_25-060	25-070	25-060	69.81	09:40 hr	1.92	0.16	1.02	0.16	-1191.95	0.16	0.16	1.92	0.06	0.16	413
03-070_03-360	03-070	03-360	377.99	93:26 hr	4.68	0.24	2.01	0.16	-6565.24	0.26	0.18	1.43	0.05	0.34	21
54	10	74	142.50	09:49 hr	1.77	0.24	0.77	0.16	-2498.09	0.24	0.16	0.18	0.05	0.21	535
28-030_28-020	28-030	28-020	82.02	09:21 hr	2.30	0.16	1.23	0.16	-1440.58	0.23	0.23	0.23	0.05	0.18	144
27-140_27-130	27-140	27-130	371.87	57:49 hr	1.67	0.39	0.56	0.16	-6538.05	0.39	0.16	1.66	0.05	0.29	521
134	96	132	66.78	09:26 hr	1.88	0.16	1.00	0.16	-1175.81	0.16	0.16	1.88	0.05	0.16	318
138	100	98	66.79	09:24 hr	1.88	0.16	1.01	0.16	-1179.04	0.16	0.16	1.88	0.05	0.16	424
35-110_35-150	35-110	35-150	27.98	09:03 hr	1.14	0.13	0.67	0.16	-498.46	0.13	0.16	1.14	0.05	0.11	302
47-030_47-020	47-030	47-020	60.73	09:47 hr	1.10	0.20	0.53	0.16	-1082.11	0.20	0.16	1.10	0.05	0.14	324
27-130_36-090	27-130	36-090	368.37	57:53 hr	1.67	0.39	0.57	0.16	-6567.31	0.39	0.16	1.66	0.05	0.29	510
36-080_36-070	36-080	36-070	364.51	58:02 hr	1.65	0.39	0.56	0.16	-6506.63	0.39	0.16	1.65	0.05	0.29	491
36-090_36-080	36-090	36-080	365.27	57:58 hr	1.66	0.39	0.56	0.16	-6540.39	0.39	0.16	1.66	0.05	0.29	493
32-160_32-140	32-160	32-140	58.05	09:10 hr	1.06	0.20	0.51	0.16	-1044.06	0.20	0.16	1.06	0.05	0.14	111
47-050_47-040	47-050	47-040	59.97	09:38 hr	1.09	0.19	0.53	0.16	-1079.25	0.19	0.16	1.09	0.05	0.14	339
47-040_47-030	47-040	47-030	60.52	09:29 hr	1.10	0.19	0.53	0.16	-1089.19	0.20	0.16	1.03	0.05	0.14	339
47-020_47-010	47-020	47-010	60.72	09:45 hr	1.11	0.19	0.53	0.16	-1093.28	0.20	0.16	0.11	0.05	0.14	235
19-100_19-090	19-100	19-090	20.60	55:04 hr	1.32	0.10	0.87	0.16	-371.02	0.12	0.17	0.13	0.05	0.10	391
10-580_10-570	10-580	10-570	387.61	93:33 hr	3.62	0.27	1.46	0.16	-7010.19	0.27	0.16	0.31	0.05	0.33	468
36-070_36-050	36-070	36-050	363.13	58:03 hr	1.67	0.39	0.57	0.16	-6598.32	2.50	1.00	1.66	0.05	0.29	246
58	86	12	142.50	09:46 hr	1.82	0.23	0.80	0.16	-2595.81	0.26	0.17	0.18	0.05	0.21	155
47-060_47-050	47-060	47-050	59.93	09:28 hr	1.11	0.19	0.53	0.15	-1096.90	0.19	0.16	1.05	0.05	0.14	341
32-290_32-170	32-290	32-170	39.43	09:08 hr	1.15	0.15	0.62	0.15	-729.54	0.16	0.16	0.11	0.05	0.12	191
60	14	86	131.33	09:44 hr	1.70	0.23	0.75	0.15	-2430.53	0.23	0.15	1.37	0.05	0.20	436
144	110	104	66.78	09:13 hr	1.94	0.15	1.05	0.15	-1236.55	0.15	0.15	1.94	0.05	0.16	454
20-160_19-180	20-160	19-180	26.85	55:00 hr	1.77	0.10	1.18	0.15	-504.98	0.10	0.15	1.77	0.05	0.11	274
32-140_32-090	32-140	32-090	58.05	09:12 hr	1.10	0.19	0.53	0.15	-1103.36	0.19	0.15	1.10	0.05	0.14	207
17-280_17-010	17-280	17-010	27.80	09:02 hr	1.19	0.13	0.71	0.15	-529.99	0.13	0.15	1.19	0.05	0.11	525
100	44	42	40.58	09:20 hr	1.21	0.15	0.66	0.15	-778.84	0.15	0.15	1.21	0.05	0.12	498
32-310_32-290	32-310	32-290	38.36	09:06 hr	1.14	0.15	0.62	0.15	-737.35	0.15	0.15	0.11	0.05	0.12	474
09-160_09-150	09-160	09-150	26.43	09:13 hr	0.79	0.15	0.43	0.15	-513.27	0.19	0.19	0.07	0.05	0.10	371
18-600_18-610	18-600	18-610	30.71	09:01 hr	2.08	0.10	1.40	0.15	-599.81	0.13	0.20	0.20	0.05	0.12	300
28-080_28-070	28-080	28-070	81.99	09:06 hr	2.48	0.15	1.36	0.15	-1615.98	0.15	0.15	2.48	0.05	0.18	362
39-040_32-310	39-040	32-310	37.31	09:02 hr	1.13	0.15	0.62	0.15	-739.57	0.15	0.15	1.11	0.05	0.12	362
37-040_37-030	37-040	37-030	56.35	09:07 hr	1.72	0.15	0.95	0.15	-1123.79	0.17	0.17	0.16	0.05	0.14	428
80	28	26	69.91	09:51 hr	1.37	0.19	0.67	0.15	-1394.19	0.19	0.15	1.37	0.05	0.15	244
32-110_PARKHILLLS	32-110	PARKHILLWW	99.36	09:27 hr	1.94	0.19	0.96	0.15	-1982.24	1.25	1.00	1.94	0.05	0.18	222
WWTP-002_WWTP-003	WWTP-002	WWTP-003	5643.21	35:59 hr	8.53	0.67	2.21	0.15	-112877.70	0.67	0.15	8.40	0.05	1.00	3
19-120_19-070	19-120	19-070	114.19	57:00 hr	3.57	0.15	1.98	0.15	-2354.41	0.17	0.17	0.32	0.05	0.21	243
03-050_10-580	03-050	10-580	386.97	93:32 hr	3.98	0.25	1.66	0.15	-8069.55	0.25	0.15	2.65	0.05	0.33	90
01-630_01-620	01-630	01-620	35.53	09:07 hr	2.52	0.10	1.72	0.15	-741.83	0.11	0.17	0.23	0.05	0.13	411
160	128	126	66.81	08:59 hr	4.78	0.10	3.27	0.14	-1416.03	0.10	0.14	4.78	0.05	0.18	186
09-170_09-160	09-170	09-160	24.45	09:09 hr	0.78	0.14	0.44	0.14	-519.49	0.15	0.15	0.07	0.04	0.09	469
05-240_05-140	05-240	05-140	25.72	09:05 hr	0.82	0.14	0.46	0.14	-551.47	0.15	0.15	0.07	0.04	0.10	347
05-280_05-240	05-280	05-240	14.19	08:59 hr	0.46	0.14	0.26	0.14	-308.08	0.14	0.14	0.45	0.04	0.07	347
47-070_47-060	47-070	47-060	49.96	09:24 hr	1.04	0.18	0.52	0.14	-1090.32	0.19	0.15	0.09	0.04	0.13	338

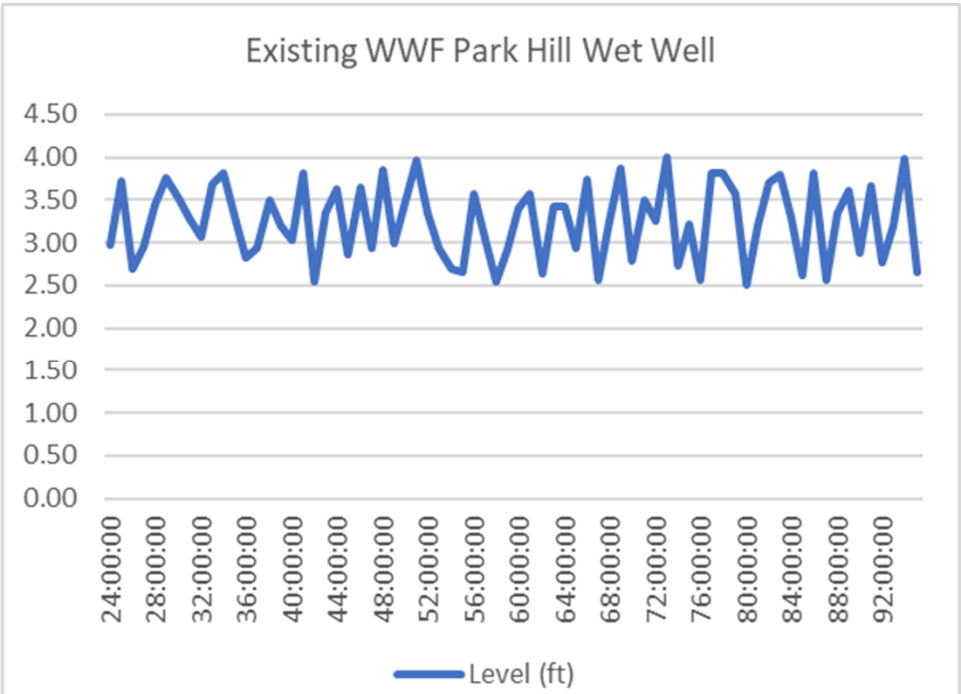
Future Wet Weather Flow - Pipe Capacity Results															
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
40-280_40-130	40-280	40-130	88.08	09:26 hr	4.23	0.12	2.63	0.14	-2000.43	0.27	0.33	0.93	0.04	0.19	56
148	114	112	66.78	09:09 hr	2.24	0.14	1.28	0.14	-1536.55	0.14	0.14	2.24	0.04	0.16	361
94	38	68	45.00	09:33 hr	1.52	0.14	0.87	0.14	-1041.07	0.14	0.14	1.52	0.04	0.13	421
33-040_21-080	33-040	21-080	155.01	09:45 hr	1.71	0.24	0.74	0.14	-3588.10	0.53	0.31	0.14	0.04	0.21	548
92	68	36	45.00	09:37 hr	1.52	0.14	0.87	0.14	-1042.41	0.14	0.14	0.13	0.04	0.13	500
96	40	38	45.00	09:32 hr	1.52	0.14	0.87	0.14	-1043.04	0.14	0.14	1.44	0.04	0.13	445
98	42	40	45.03	09:35 hr	1.53	0.14	0.87	0.14	-1052.83	0.14	0.14	1.46	0.04	0.13	288
33-290_33-280	33-290	33-280	22.54	09:03 hr	0.77	0.14	0.44	0.14	-532.46	0.17	0.17	0.06	0.04	0.09	434
10-560_10-550	10-560	10-550	388.66	93:36 hr	4.38	0.24	1.89	0.14	-9295.09	0.26	0.15	0.32	0.04	0.33	107
09-180_09-170	09-180	09-170	21.63	09:11 hr	0.75	0.14	0.43	0.14	-518.75	0.14	0.14	0.06	0.04	0.09	467
32-170_32-160	32-170	32-160	56.09	09:10 hr	1.26	0.17	0.66	0.13	-1384.31	0.18	0.15	0.10	0.04	0.14	159
82	30	28	60.54	09:52 hr	1.37	0.17	0.71	0.13	-1494.33	0.18	0.14	0.11	0.04	0.14	297
86	76	32	60.50	09:36 hr	1.37	0.17	0.71	0.13	-1503.14	0.17	0.13	1.37	0.04	0.14	505
84	32	30	60.50	09:36 hr	1.37	0.17	0.71	0.13	-1503.76	0.17	0.13	1.27	0.04	0.14	214
88	34	76	60.50	09:32 hr	1.37	0.17	0.71	0.13	-1504.10	0.17	0.13	1.37	0.04	0.14	173
02-380_02-240	02-380	02-240	724.54	11:58 hr	8.58	0.23	3.79	0.13	-18656.51	0.31	0.18	0.65	0.04	0.46	41
24-320_24-300	24-320	24-300	66.27	09:01 hr	2.41	0.13	1.41	0.13	-1712.69	0.29	0.29	0.19	0.04	0.16	409
37-230_37-220	37-230	37-220	33.22	09:03 hr	1.21	0.13	0.71	0.13	-858.73	0.13	0.13	1.21	0.04	0.11	255
WH-P-8	WH-MH-6	WH-MH-5	24.18	09:29 hr	0.57	0.16	0.30	0.13	-632.51	0.16	0.13	0.57	0.04	0.09	500
37-240_37-230	37-240	37-230	32.90	09:00 hr	1.21	0.13	0.71	0.13	-862.14	0.13	0.13	1.18	0.04	0.11	318
02-460_02-450	02-460	02-450	14.17	09:04 hr	0.75	0.11	0.48	0.13	-371.44	0.13	0.15	0.06	0.04	0.08	883
18-590_18-600	18-590	18-600	30.72	09:00 hr	2.56	0.09	1.85	0.13	-817.07	0.09	0.14	0.20	0.04	0.12	217
P9	MH-302	MH-301	15.10	09:18 hr	0.82	0.11	0.53	0.13	-412.08	0.11	0.13	0.82	0.04	0.08	400
10-050_09-180	10-050	09-180	18.88	09:03 hr	0.71	0.13	0.42	0.13	-515.87	0.13	0.13	0.05	0.04	0.08	692
128	90	88	66.84	09:32 hr	2.53	0.13	1.50	0.13	-1829.82	0.13	0.13	2.52	0.04	0.16	318
P8	MH-301	HWY81WW	15.08	09:21 hr	0.82	0.11	0.53	0.13	-413.03	0.11	0.13	0.82	0.04	0.08	598
P10	MH-303	MH-302	15.11	09:15 hr	0.82	0.11	0.54	0.13	-413.87	0.11	0.13	0.06	0.04	0.08	500
P11	MH-304	MH-303	15.11	09:12 hr	0.82	0.11	0.54	0.13	-414.07	0.11	0.13	0.82	0.04	0.08	496
35-060_35-110	35-060	35-110	19.94	08:58 hr	1.09	0.11	0.71	0.13	-551.28	0.12	0.14	0.08	0.03	0.09	268
152	120	116	66.77	09:04 hr	2.56	0.13	1.52	0.13	-1863.44	0.13	0.13	2.55	0.03	0.16	454
162	132	90	66.84	09:31 hr	2.59	0.13	1.55	0.13	-1895.05	0.13	0.13	2.58	0.03	0.16	368
136	98	96	66.82	09:26 hr	2.59	0.13	1.55	0.13	-1899.38	0.13	0.13	2.59	0.03	0.16	258
14-020_14-010	14-020	14-010	510.75	34:43 hr	2.20	0.38	0.75	0.13	-14521.77	0.88	0.29	0.12	0.03	0.33	439
WH-P-5	WH-MH-9	WH-MH-8	18.88	09:15 hr	0.74	0.13	0.45	0.13	-547.78	0.13	0.13	0.05	0.03	0.08	66
01-650_01-640	01-650	01-640	32.36	09:05 hr	2.86	0.08	2.11	0.13	-940.14	0.08	0.13	2.86	0.03	0.12	78
194	160	138	10.80	09:02 hr	1.00	0.08	0.74	0.12	-332.95	0.08	0.13	0.07	0.03	0.07	468
64	80	16	75.82	09:44 hr	1.38	0.18	0.69	0.12	-2345.03	0.18	0.12	1.38	0.03	0.15	522
72	22	20	75.81	09:33 hr	1.39	0.18	0.70	0.12	-2371.84	0.18	0.12	1.39	0.03	0.15	127
74	24	22	75.81	09:33 hr	1.40	0.18	0.70	0.12	-2375.72	0.18	0.12	1.27	0.03	0.15	472
66	18	80	75.82	09:41 hr	1.40	0.18	0.70	0.12	-2376.84	0.18	0.12	1.24	0.03	0.15	342
70	20	84	75.83	09:39 hr	1.40	0.18	0.70	0.12	-2383.47	0.18	0.12	1.40	0.03	0.15	366
68	84	18	75.82	09:39 hr	1.40	0.18	0.70	0.12	-2385.21	0.18	0.12	1.39	0.03	0.15	343
P12	MH-305	MH-304	15.11	09:08 hr	0.92	0.10	0.62	0.12	-490.36	0.10	0.12	0.92	0.03	0.08	403
P14	MH-307	MH-306	15.10	08:59 hr	0.92	0.10	0.62	0.12	-489.98	0.10	0.12	0.92	0.03	0.08	389
P1-15	MH-EXT1-15	MH-EXT1-14	163.34	10:03 hr	3.09	0.18	1.57	0.12	-5341.38	0.23	0.15	0.21	0.03	0.22	102
P13	MH-306	MH-305	15.08	09:01 hr	0.93	0.10	0.63	0.12	-494.97	0.10	0.12	0.90	0.03	0.08	407
51-020_51-030	51-020	51-030	34.70	09:12 hr	0.95	0.15	0.53	0.12	-1144.45	0.15	0.12	0.95	0.03	0.11	274
19-140_19-130	19-140	19-130	6.20	55:11 hr	0.60	0.08	0.46	0.12	-206.66	0.08	0.12	0.60	0.03	0.05	329
WH-P-4	WH-MH-10	WH-MH-9	18.85	09:11 hr	0.82	0.12	0.51	0.12	-633.81	0.12	0.12	0.05	0.03	0.08	218
76	82	24	70.72	09:44 hr	1.37	0.18	0.70	0.12	-2380.84	0.18	0.12	0.09	0.03	0.15	472
62	16	14	75.83	09:51 hr	1.47	0.17	0.75	0.12	-2563.60	0.20	0.14	0.10	0.03	0.15	109
78	26	82	70.72	09:41 hr	1.37	0.17	0.70	0.12	-2391.13	0.17	0.12	1.26	0.03	0.15	358
90	36	34	44.98	09:34 hr	1.26	0.15	0.70	0.12	-1520.94	0.16	0.13	0.08	0.03	0.12	210
P1-16	MH-EXT1-16	MH-EXT1-15	148.89	10:04 hr	2.89	0.17	1.47	0.12	-5047.78	0.18	0.12	2.45	0.03	0.21	106
18-630_01-650	18-630	01-650	32.34	09:04 hr	3.19	0.08	2.44	0.12	-1102.34	0.08	0.12	0.21	0.03	0.12	205
WH-P-3	WH-MH-11	WH-MH-10	18.86	09:10 hr	0.83	0.12	0.52	0.12	-650.69	0.12	0.12	0.73	0.03	0.08	413
WH-P-1	WH-MH-13	WH-MH-12	18.89	09:08 hr	0.84	0.12	0.53	0.12	-653.08	0.12	0.12	0.84	0.03	0.08	415
WH-P-2	WH-MH-12	WH-MH-11	18.86	09:06 hr	0.84	0.11	0.53	0.11	-662.31	0.11	0.11	0.81	0.03	0.08	412
28-070_28-060	28-070	28-060	81.99	09:06 hr	3.69	0.11	2.33	0.11	-2902.65	0.11	0.11	3.68	0.03	0.18	355
01-640_01-630	01-640	01-630	32.79	09:04 hr	3.33	0.08	2.57	0.11	-1163.94	0.09	0.13	0.21	0.03	0.12	89
19-170_19-160	19-170	19-160	6.19	55:04 hr	0.63	0.08	0.49	0.11	-221.07	0.12	0.17	0.04	0.03	0.05	349
35-150_35-220	35-150	35-220	35.27	09:07 hr	2.30	0.09	1.60	0.11	-1264.03	0.12	0.14	0.14	0.03	0.12	301
34-120_34-110	34-120	34-110	13.77	09:05 hr	0.63	0.11	0.40	0.11	-493.85	0.11	0.11	0.62	0.03	0.07	399
19-150_19-140	19-150	19-140	6.18	55:06 hr	0.63	0.08	0.49	0.11	-222.36	0.08	0.11	0.04	0.03	0.05	279
126	88	130	66.80	09:31 hr	3.04	0.11	1.93	0.11	-2406.69	0.13	0.13	2.49	0.03	0.16	300
WH-P-13	WH-MH-1	MH-INT3-10	24.18	09:51 hr	0.72	0.14	0.41	0.11	-897.68	0.14	0.11	0.72	0.03	0.09	471
19-180_19-100	19-180	19-100	20.60	55:01 hr	2.18	0.07	1.71	0.11	-777.35	0.09	0.13	0.13	0.03	0.10	311
WH-P-6	WH-MH-8	WH-MH-7	24.23	09:28 hr	0.73	0.14	0.42	0.11	-915.33	0.14	0.11	0.73	0.03	0.09	460
19-180_19-170	19-180	19-170	6.16	54:59 hr	0.66	0.07	0.52	0.11	-234.66	0.07	0.11	0.04	0.03	0.05	299
14-300_34-120	14-300	34-120	13.77	09:03 hr	0.66	0.11	0.42	0.11	-533.34	0.11	0.11	0.04	0.03	0.07	395
WH-P-12	WH-MH-2	WH-MH-1	24.18	09:47 hr	0.74	0.14	0.43	0.11	-938.55	0.14	0.11	0.61	0.03	0.09	507
02-350_02-320	02-350	02-320	4.94	08:42 hr	0.35	0.09	0.25	0.11	-198.05	0.50	0.60	0.02	0.02	0.04	260
WH-P-11	WH-MH-3	WH-MH-2	24.24	09:53 hr	0.77	0.13	0.45	0.11	-999.30	0.13	0.11	0.65	0.02	0.09	503
WH-P-10	WH-MH-4	WH-MH-3	24.24	09:47 hr	0.79	0.13	0.47	0.10	-1034.36	0.13	0.11	0.68	0.02	0.09	498
11-600_11-590	11-600	11-590	9.53	09:11 hr	0.49	0.10	0.33	0.10	-413.07	0.24	0.24	0.03	0.02	0.06	504
WH-P-9	WH-MH-5	WH-MH-4	24.18	09:33 hr	0.80	0.13	0.48	0.10	-1057.47	0.13	0.10	0.71	0.02	0.09	499
37-050_37-040	37-050	37-040	38.09	09:06 hr	1.99	0.10	1.32	0.10	-1675.31	0.13	0.13	0.11	0.02	0.12	281
51-030_51-040	51-030	OM-20	36.37	09:16 hr	1.25	0.13	0.75	0.10	-1669.15	0.34	0.27	0.85	0.02	0.11	575

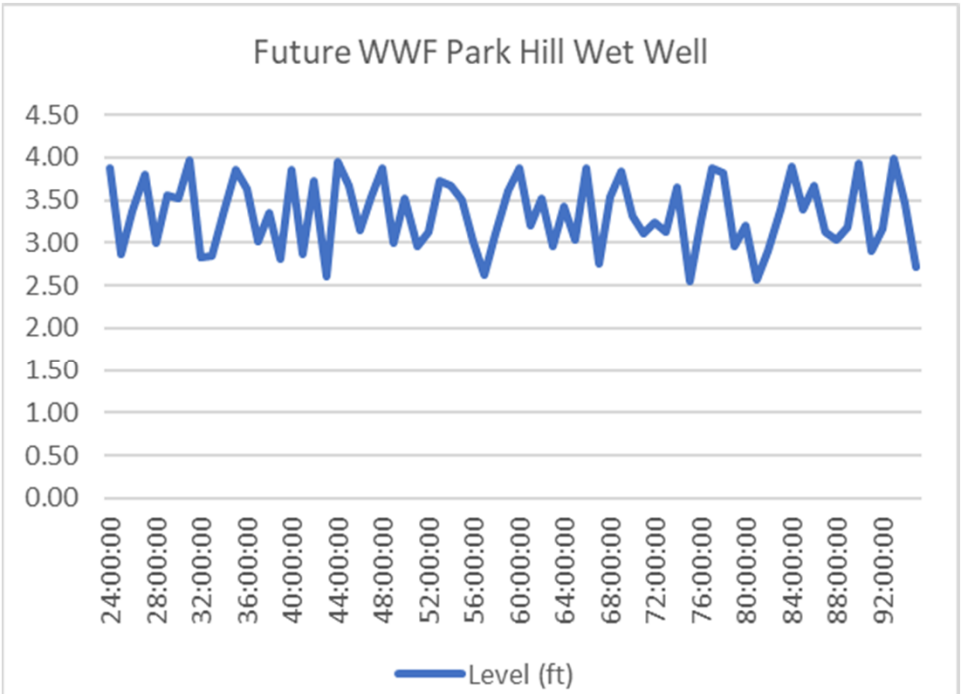
Future Wet Weather Flow - Pipe Capacity Results															
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
WH-P-7	WH-MH-7	WH-MH-6	24.23	09:32 hr	0.84	0.13	0.50	0.10	-1119.83	0.14	0.12	0.04	0.02	0.09	500
182	154	144	10.76	08:57 hr	0.85	0.08	0.63	0.10	-510.01	0.10	0.12	0.04	0.02	0.07	466
INUDST-1	INDUST-1	WH-MH-8	5.29	09:14 hr	0.66	0.07	0.54	0.10	-252.05	0.67	1.00	0.03	0.02	0.05	3126
09-500_04-210	09-500	04-210	20.37	08:59 hr	1.64	0.08	1.22	0.10	-991.46	0.15	0.18	0.08	0.02	0.09	408
11-610_11-600	11-610	11-600	7.50	08:54 hr	0.43	0.10	0.29	0.10	-377.58	0.10	0.10	0.02	0.02	0.05	503
174	144	146	21.59	09:12 hr	0.80	0.12	0.49	0.10	-1106.87	0.12	0.10	0.80	0.02	0.08	365
176	146	148	21.54	09:08 hr	0.80	0.12	0.49	0.10	-1106.92	0.12	0.10	0.80	0.02	0.08	365
178	148	150	21.59	09:17 hr	0.80	0.12	0.50	0.10	-1113.80	0.12	0.10	0.80	0.02	0.08	177
180	150	51-020	21.57	09:14 hr	0.81	0.12	0.50	0.10	-1122.67	0.14	0.11	0.04	0.02	0.08	71
122	72	70	11.60	09:02 hr	1.54	0.06	1.30	0.09	-608.42	0.06	0.09	1.54	0.02	0.07	450
P3-14	19-210	MH-INT3-13	159.03	09:34 hr	2.35	0.19	1.15	0.09	-8381.96	0.19	0.09	2.35	0.02	0.20	651
47-080_47-070	47-080	47-070	20.23	09:27 hr	0.78	0.12	0.49	0.09	-1099.76	0.14	0.11	0.04	0.02	0.08	168
37-210_37-200	37-210	37-200	38.04	09:02 hr	2.30	0.09	1.61	0.09	-2075.66	0.09	0.09	2.30	0.02	0.12	189
3	07-360-JDM	07-350	23.25	08:57 hr	0.90	0.12	0.56	0.09	-1269.16	0.54	0.43	0.04	0.02	0.09	192
47-100_47-090	47-100	47-090	20.09	09:25 hr	0.78	0.12	0.49	0.09	-1099.04	0.12	0.09	0.78	0.02	0.08	229
4	02-300	02-180	156.10	09:52 hr	6.10	0.12	3.83	0.09	-8635.24	0.35	0.28	0.28	0.02	0.23	46
47-090_47-080	47-090	47-080	20.08	09:26 hr	0.79	0.12	0.49	0.09	-1114.10	0.12	0.09	0.04	0.02	0.08	230
37-200_37-050	37-200	37-050	38.09	09:05 hr	2.39	0.09	1.70	0.09	-2198.14	0.10	0.10	0.11	0.02	0.12	185
06-300_06-130	06-300	06-130	14.68	09:04 hr	0.62	0.11	0.40	0.09	-904.19	0.20	0.16	0.03	0.02	0.07	430
09-510_09-500	09-510	09-500	15.24	08:57 hr	1.47	0.07	1.17	0.09	-967.45	0.08	0.09	0.06	0.02	0.08	470
47-110_47-100	47-110	47-100	16.65	09:29 hr	0.74	0.11	0.49	0.08	-1118.52	0.11	0.09	0.03	0.01	0.07	223
37-220_37-210	37-220	37-210	35.68	09:05 hr	2.55	0.08	1.90	0.08	-2490.86	0.09	0.09	0.10	0.01	0.11	140
35-310_35-330	35-310	35-330	20.70	09:05 hr	1.53	0.08	1.15	0.08	-1509.70	0.08	0.08	1.53	0.01	0.09	657
35-320_35-310	35-320	35-310	20.69	09:00 hr	1.53	0.08	1.15	0.08	-1514.88	0.08	0.08	1.50	0.01	0.09	808
47-130_47-110	47-130	47-110	15.08	09:18 hr	0.72	0.10	0.48	0.08	-1111.68	0.10	0.08	0.03	0.01	0.07	233
55-010_47-130	55-010	47-130	14.81	09:20 hr	0.72	0.10	0.48	0.08	-1117.53	0.10	0.08	0.03	0.01	0.07	336
55-060_55-040	55-060	55-040	13.16	09:06 hr	0.65	0.10	0.44	0.08	-1020.86	0.10	0.08	0.65	0.01	0.07	237
39-140_39-130	39-140	39-130	8.27	08:54 hr	0.64	0.08	0.49	0.08	-642.56	0.08	0.08	0.64	0.01	0.05	583
55-040_55-030	55-040	55-030	13.12	09:06 hr	0.65	0.10	0.44	0.08	-1024.72	0.10	0.08	0.65	0.01	0.07	463
55-080_55-070	55-080	55-070	13.13	08:57 hr	0.65	0.10	0.44	0.08	-1026.25	0.10	0.08	0.65	0.01	0.07	375
55-020_55-010	55-020	55-010	13.12	09:13 hr	0.65	0.10	0.44	0.08	-1028.75	0.10	0.08	0.02	0.01	0.07	452
55-030_55-020	55-030	55-020	13.12	09:09 hr	0.65	0.10	0.44	0.08	-1029.02	0.10	0.08	0.65	0.01	0.07	451
55-070_55-060	55-070	55-060	13.12	08:59 hr	0.65	0.10	0.45	0.08	-1030.50	0.10	0.08	0.63	0.01	0.07	326
120	70	66	11.54	08:54 hr	2.03	0.05	1.90	0.08	-912.33	0.06	0.09	0.07	0.01	0.07	228
07-190_07-200	07-190	07-200	3.47	08:58 hr	0.39	0.07	0.33	0.08	-275.15	0.81	0.97	0.36	0.01	0.04	363
39-030_39-040	39-030	39-040	13.26	08:59 hr	1.05	0.08	0.81	0.08	-1078.15	0.11	0.11	0.04	0.01	0.07	149
39-130_39-120	39-130	39-120	9.21	09:03 hr	0.75	0.08	0.58	0.08	-768.50	0.08	0.08	0.75	0.01	0.06	344
08-230_07-340	08-230	07-340	11.44	09:03 hr	0.60	0.09	0.42	0.08	-976.38	0.31	0.25	0.02	0.01	0.06	442
09-010_11-610	09-010	11-610	5.42	08:55 hr	0.46	0.07	0.36	0.07	-478.53	0.09	0.09	0.02	0.01	0.04	505
35-330_35-300	35-330	35-300	20.73	09:07 hr	1.78	0.07	1.41	0.07	-1891.25	0.20	0.20	0.06	0.01	0.09	23
05-080_05-070	05-080	05-070	3.32	09:01 hr	0.41	0.06	0.36	0.07	-303.38	0.06	0.07	0.41	0.01	0.04	434
P35	MH-505	MH-504	0.29	08:04 hr	0.04	0.06	0.03	0.07	-26.73	0.06	0.07	0.04	0.01	0.01	59
106	50	48	11.60	09:24 hr	1.01	0.07	0.80	0.07	-1075.06	0.07	0.07	1.01	0.01	0.07	501
112	60	54	11.59	09:14 hr	1.01	0.07	0.80	0.07	-1075.84	0.07	0.07	1.01	0.01	0.07	500
116	64	62	11.58	09:04 hr	1.01	0.07	0.80	0.07	-1075.58	0.07	0.07	1.01	0.01	0.07	500
108	52	50	11.57	09:17 hr	1.01	0.07	0.80	0.07	-1075.01	0.07	0.07	1.01	0.01	0.07	381
102	46	44	11.57	09:27 hr	1.01	0.07	0.80	0.07	-1076.17	0.11	0.11	0.03	0.01	0.07	502
114	62	60	11.56	09:05 hr	1.01	0.07	0.80	0.07	-1075.98	0.07	0.07	1.01	0.01	0.07	500
110	54	52	11.55	09:12 hr	1.01	0.07	0.80	0.07	-1078.00	0.07	0.07	0.95	0.01	0.07	498
104	48	46	11.53	09:18 hr	1.01	0.07	0.80	0.07	-1076.34	0.07	0.07	1.01	0.01	0.06	502
FP-P-1	FP-MH-1	FP-MH-2	6.70	08:47 hr	0.60	0.07	0.48	0.07	-642.77	0.07	0.07	0.60	0.01	0.05	426
FP-P-2	FP-MH-2	FP-MH-3	6.72	08:55 hr	0.60	0.07	0.48	0.07	-646.64	0.07	0.07	0.60	0.01	0.05	434
39-100_39-030	39-100	39-030	11.74	08:59 hr	1.06	0.07	0.86	0.07	-1152.58	0.07	0.07	0.03	0.01	0.07	150
172	142	144	10.76	09:04 hr	0.64	0.09	0.47	0.07	-1109.07	0.10	0.08	0.02	0.01	0.06	155
170	140	142	10.80	09:10 hr	0.65	0.09	0.47	0.07	-1113.97	0.09	0.07	0.62	0.01	0.06	334
168	138	140	10.74	08:57 hr	0.65	0.09	0.47	0.07	-1110.67	0.09	0.07	0.65	0.01	0.06	336
08-240_08-230	08-240	08-230	9.48	09:00 hr	0.57	0.09	0.42	0.07	-990.55	0.09	0.07	0.02	0.01	0.06	439
118	66	64	11.57	09:00 hr	1.16	0.07	0.96	0.07	-1312.82	0.07	0.07	0.03	0.01	0.07	116
10-190_10-140	10-190	10-140	3.30	08:45 hr	0.49	0.05	0.45	0.07	-388.90	0.05	0.07	0.49	0.01	0.04	158
FP-P-3	FP-MH-3	WH-MH-13	6.77	09:11 hr	0.70	0.06	0.59	0.06	-811.94	0.09	0.09	0.02	0.01	0.05	423
NORPARK	NORPARK	EAST_MICHIGAN	26.91	08:58 hr	1.82	0.08	1.38	0.06	-3303.58	1.25	1.00	1.82	0.01	0.09	26
INDUST2	INDUST-2	MH-INT2-13	1.13	09:48 hr	0.31	0.04	0.35	0.06	-174.27	0.36	0.54	0.01	0.01	0.02	5402
05-070_07-350	05-070	07-350	3.47	09:02 hr	0.44	0.06	0.39	0.06	-547.51	0.29	0.29	0.01	0.01	0.04	449
07-180_07-190	07-180	07-190	1.66	08:58 hr	0.31	0.05	0.31	0.06	-278.29	0.54	0.64	0.01	0.01	0.03	198
05-090_05-080	05-090	05-080	1.79	08:39 hr	0.34	0.05	0.34	0.06	-301.15	0.05	0.06	0.01	0.01	0.03	445
08-260_08-240	08-260	08-240	5.75	09:11 hr	0.49	0.07	0.40	0.05	-992.78	0.08	0.06	0.01	0.01	0.04	441
EASTPASEWALKPIPE	EASTPASEWALKMH	EASTPASEWALKWW	47.35	08:58 hr	4.18	0.07	3.47	0.05	-8534.92	1.25	1.00	0.09	0.01	0.12	5
10-130_10-050	10-130	10-050	6.65	09:03 hr	0.94	0.05	0.88	0.05	-1239.43	0.09	0.09	0.02	0.01	0.05	386
COUNTRY_CLUB_P	COUNTRY_CLUB_DMD	COUNTRY_CLUB	4.07	08:54 hr	1.34	0.03	1.55	0.05	-797.86	0.67	1.00	0.03	0.01	0.04	112
1ST-170_ANDYSWW	1ST-170	ANDYSWW	9.02	08:48 hr	0.84	0.06	0.71	0.05	-1765.53	0.06	0.05	0.84	0.01	0.05	142
15-120_15-110	15-120	15-110	5.13	09:00 hr	0.75	0.05	0.72	0.05	-1016.50	0.37	0.37	0.01	0.01	0.04	352
10-140_10-130	10-140	10-130	6.04	08:58 hr	0.91	0.05	0.88	0.05	-1247.19	0.05	0.05	0.02	0.00	0.05	383
39-110_39-100	39-110	39-100	10.26	09:03 hr	1.67	0.05	1.64	0.05	-2344.43	0.06	0.06	0.03	0.00	0.06	153
08-270_08-260	08-270	08-260	4.04	08:50 hr	0.44	0.06	0.40	0.05	-993.51	0.06	0.05	0.01	0.00	0.04	518
17-290_17-280	17-290	17-280	2.23	08:36 hr	0.55	0.04	0.61	0.05	-554.63	0.08	0.10	0.01	0.00	0.03	530
P27	MH-202	MH-201	1.48	08:26 hr	0.39	0.04	0.44	0.04	-402.98	0.04	0.04	0.39	0.00	0.02	487
39-120_39-110	39-120	39-110	10.22	08:56 hr	1.95	0.04	2.03	0.04	-2958.29	0.05	0.05	0.03	0.00	0.06	362
15-150_15-140	15-150	15-140	2.09	08:40 hr	0.60	0.03	0.69	0.04	-636.80	0.04	0.04	0.01	0.00	0.03	367
05-310_05-280	05-310	05-280	0.89	08:24 hr	0.20	0.04	0.22	0.04	-321.45	0.09	0.09	0.00	0.00	0.02	346
15-140_15-120	15-140	15-120	2.81	08:29 hr	0.63	0.04	0.70	0.04	-1029.86	0.04	0.04	0.01	0.00	0.03	405
03-010_09-510	03-010	09-510	2.41	08:55 hr	0.81	0.03	0.99	0.04	-933.99	0.05	0.06	0.01	0.00	0.03	463
03-150_03-120	03-150	03-120	13.90	08:57 hr	2.21	0.04	2.25	0.04	-5881.26	0.04	0.04	2.21	0.00	0.07	312

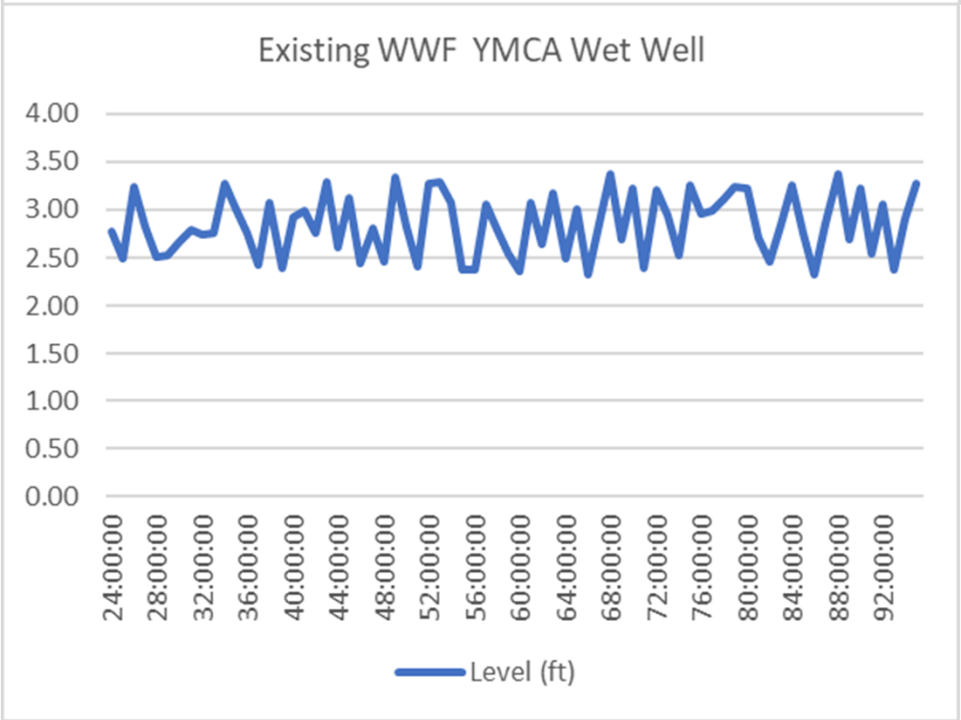
Future Wet Weather Flow - Pipe Capacity Results																
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)	Length (ft)
34-110_34-140	34-110	34-140	13.72	09:01 hr	1.19	0.06	1.04	0.03	-6382.77	0.48	0.27	0.01	0.00	0.06	414
P28	MH-203	MH-202	0.75	08:44 hr	0.32	0.03	0.42	0.03	-404.46	0.03	0.04	0.00	0.00	0.02	485
08-280_08-270	08-280	08-270	1.79	08:40 hr	0.34	0.04	0.37	0.03	-994.44	0.05	0.04	0.00	0.00	0.02	409
P26	MH-201	MH-102	1.48	08:28 hr	0.64	0.03	0.85	0.03	-823.40	0.10	0.12	0.01	0.00	0.02	486
19-130_19-120	19-130	19-120	6.20	55:10 hr	1.88	0.03	2.28	0.03	-3487.90	0.07	0.07	0.02	0.00	0.05	38
9-470_08-280	9-470	08-280	0.88	08:12 hr	0.29	0.03	0.36	0.03	-555.04	0.03	0.03	0.00	0.00	0.02	424
04-010_9-470	6	04-010	0.87	08:02 hr	0.37	0.03	0.50	0.03	-795.10	0.79	0.79	0.00	0.00	0.02	333
P31	MH-501	MH-402	0.43	08:13 hr	0.28	0.02	0.43	0.02	-430.37	0.02	0.02	0.28	0.00	0.01	55
P47	MH-401A	MH-101	0.42	08:17 hr	0.28	0.02	0.43	0.02	-430.22	0.06	0.07	0.19	0.00	0.01	496
P32	MH--502	MH-501	0.41	08:05 hr	0.27	0.02	0.42	0.02	-427.47	0.02	0.02	0.28	0.00	0.01	451
P44	MH-402	MH-401A	0.45	08:44 hr	0.30	0.02	0.47	0.02	-476.92	0.02	0.02	0.00	0.00	0.01	141
P34	MH-504	MH-503	0.24	07:49 hr	0.23	0.02	0.41	0.02	-426.49	0.02	0.02	0.25	0.00	0.01	453
P36	MH-506	MH-505	0.24	07:44 hr	0.23	0.02	0.41	0.02	-427.18	0.04	0.05	0.00	0.00	0.01	416
P33	MH-503	MH--502	0.24	07:52 hr	0.23	0.02	0.41	0.02	-427.77	0.02	0.02	0.00	0.00	0.01	450
12-410_12-300	12-410	12-300	0.14	07:56 hr	0.10	0.02	0.17	0.02	-283.34	0.29	0.29	0.00	0.00	0.01	192
P4	MH-104	MH-103A	0.15	08:57 hr	0.20	0.01	0.39	0.01	-431.15	0.10	0.12	0.00	0.00	0.01	181
15-170_15-150	15-170	15-150	0.14	07:56 hr	0.26	0.01	0.57	0.01	-640.99	0.02	0.03	0.00	0.00	0.01	175
P5	MH-105	MH-104	0.09	04:39 hr	0.17	0.01	0.39	0.01	-421.89	0.01	0.01	0.20	0.00	0.01	566
P6	MH-107	MH-105	0.09	04:33 hr	0.17	0.01	0.39	0.01	-429.73	0.01	0.01	0.20	0.00	0.01	534
P7	MH-108	MH-107	0.08	04:27 hr	0.17	0.01	0.39	0.01	-429.62	0.01	0.01	0.20	0.00	0.01	534
12-370_12-410	12-370	12-410	0.00	00:00 hr	0.00	0.00	0.00	0.00	-270.69	0.24	0.24	0.00	0.00	0.00	105
1ST-070_1ST-060	1ST-070	1ST-060	0.00	00:00 hr	0.00	0.00	0.00	0.00	-17.20	0.00	0.00	0.00	0.00	0.00	1157
02-360_02235	02-360	02-235	0.00	00:00 hr	0.00	0.00	0.00	0.00	-6191.66	0.28	0.19	0.00	0.00	0.00	142
19-050_19-040	19-050	19-040	0.00	00:00 hr	0.00	0.00	0.00	0.00	-1136.32	0.00	0.00	0.00	0.00	0.00	425
19-200_19-050	19-200	19-050	0.00	00:00 hr	0.00	0.00	0.00	0.00	-1120.48	0.00	0.00	0.00	0.00	0.00	101
19-040_19-030	19-040	19-030	0.00	00:00 hr	0.00	0.00	0.00	0.00	-1129.53	0.14	0.11	0.00	0.00	0.00	424
1ST-060_1ST-050	1ST-060	1ST-050	0.00	00:00 hr	0.00	0.00	0.00	0.00	-17.20	0.00	0.00	0.00	0.00	0.00	1157
1ST-160_1ST-170	1ST-160	1ST-170	0.00	00:00 hr	0.00	0.00	0.00	0.00	-31.18	0.83	1.00	0.00	0.00	0.00	1243
19-210_19-200	19-210	19-200	0.00	00:00 hr	0.00	0.00	0.00	0.00	-1138.85	0.00	0.00	0.00	0.00	0.00	397
1ST-150_1ST-160	1ST-150	1ST-160	0.00	00:00 hr	0.00	0.00	0.00	0.00	-31.18	0.00	0.00	0.00	0.00	0.00	1185
P43	MH-702	MH-701	0.00	00:00 hr	0.00	0.00	0.00	0.00	-224.10	0.00	0.00	0.00	0.00	0.00	275
P42	MH-701	MH-102	0.00	00:00 hr	0.00	0.00	0.00	0.00	-274.89	0.00	0.00	0.00	0.00	0.00	191
1ST-140_VICTORYWW	1ST-140	VICTORYWW	0.00	00:00 hr	0.00	0.00	0.00	0.00	-17.20	0.67	1.00	0.00	0.00	0.00	317
1ST-130_1ST-140	1ST-130	1ST-140	0.00	00:00 hr	0.00	0.00	0.00	0.00	-17.20	0.00	0.00	0.00	0.00	0.00	3947
164	134	136	0.00	00:00 hr	0.00	0.00	0.00	0.00	-1125.16	0.00	0.00	0.00	0.00	0.00	514
166	136	138	0.00	00:00 hr	0.00	0.00	0.00	0.00	-1125.89	0.04	0.03	0.00	0.00	0.00	540
1ST-100_1ST-050	1ST-100	1ST-050	0.00	00:00 hr	0.00	0.00	0.00	0.00	-17.20	0.00	0.00	0.00	0.00	0.00	691
1ST-110_1ST-100	1ST-110	1ST-100	0.00	00:00 hr	0.00	0.00	0.00	0.00	-17.20	0.00	0.00	0.00	0.00	0.00	716
P23	MH-407	MH-406	0.00	00:00 hr	0.00	0.00	0.00	0.00	-427.07	0.00	0.00	0.00	0.00	0.00	500
P22	MH-406	MH-405	0.00	00:00 hr	0.00	0.00	0.00	0.00	-426.59	0.00	0.00	0.00	0.00	0.00	510
P21	MH-405	MH-404A	0.00	00:00 hr	0.00	0.00	0.00	0.00	-587.46	0.00	0.00	0.00	0.00	0.00	68
P20	MH-404A	MH-404	0.00	00:00 hr	0.00	0.00	0.00	0.00	-427.34	0.00	0.00	0.00	0.00	0.00	476
P19	MH-404	MH-403	0.00	00:00 hr	0.00	0.00	0.00	0.00	-444.75	0.00	0.00	0.00	0.00	0.00	443
P18	MH-403	MH-401A	0.00	00:00 hr	0.00	0.00	0.00	0.00	-432.80	0.00	0.00	0.00	0.00	0.00	448
184	152	154	0.00	00:00 hr	0.00	0.00	0.00	0.00	-344.98	0.04	0.06	0.00	0.00	0.00	164
186	156	154	0.00	00:00 hr	0.00	0.00	0.00	0.00	-343.93	0.04	0.06	0.00	0.00	0.00	335
190	8	160	0.00	00:00 hr	0.00	0.00	0.00	0.00	-344.32	0.04	0.06	0.00	0.00	0.00	222
192	162	160	0.00	00:00 hr	0.00	0.00	0.00	0.00	-342.56	0.04	0.06	0.00	0.00	0.00	63
WP-P-1	WP-MH-1	35-300	0.00	00:00 hr	0.00	0.00	0.00	0.00	-50.70	0.36	0.36	0.00	0.00	0.00	8296
P30	MH-205	MH-204	0.00	00:00 hr	0.00	0.00	0.00	0.00	-113.22	0.00	0.00	0.00	0.00	0.00	456
P29	MH-204	MH-203	0.00	00:00 hr	0.00	0.00	0.00	0.00	-403.81	0.01	0.02	0.00	0.00	0.00	488
1ST-050_1ST-040	1ST-050	1ST-040	0.00	00:00 hr	0.00	0.00	0.00	0.00	-31.18	0.00	0.00	0.00	0.00	0.00	545
1ST-040_1ST-030	1ST-040	1ST-030	0.00	00:00 hr	0.00	0.00	0.00	0.00	-31.18	0.00	0.00	0.00	0.00	0.00	612
1ST-030_1ST-020	1ST-030	1ST-020	0.00	00:00 hr	0.00	0.00	0.00	0.00	-31.18	0.00	0.00	0.00	0.00	0.00	612
1ST-020_1ST-010	1ST-020	1ST-010	0.00	00:00 hr	0.00	0.00	0.00	0.00	-31.18	0.00	0.00	0.00	0.00	0.00	544
P17	MH-310	MH-309	0.00	00:00 hr	0.00	0.00	0.00	0.00	-339.99	0.00	0.00	0.00	0.00	0.00	505
1ST-010_1STWW	1ST-010	1STWW	0.00	00:00 hr	0.00	0.00	0.00	0.00	-31.18	0.83	1.00	0.00	0.00	0.00	426
P16	MH-309	M-308	0.00	00:00 hr	0.00	0.00	0.00	0.00	-427.62	0.00	0.00	0.00	0.00	0.00	88
P15	M-308	MH-307	0.00	00:00 hr	0.00	0.00	0.00	0.00	-548.12	0.00	0.00	0.00	0.00	0.00	253
02-300_05-310	4	05-310	0.00	00:00 hr	0.00	0.00	0.00	0.00	-341.80	0.02	0.02	0.00	0.00	0.00	308
1ST-120_1ST-110	1ST-120	1ST-110	0.00	00:00 hr	0.00	0.00	0.00	0.00	-17.20	0.00	0.00	0.00	0.00	0.00	797

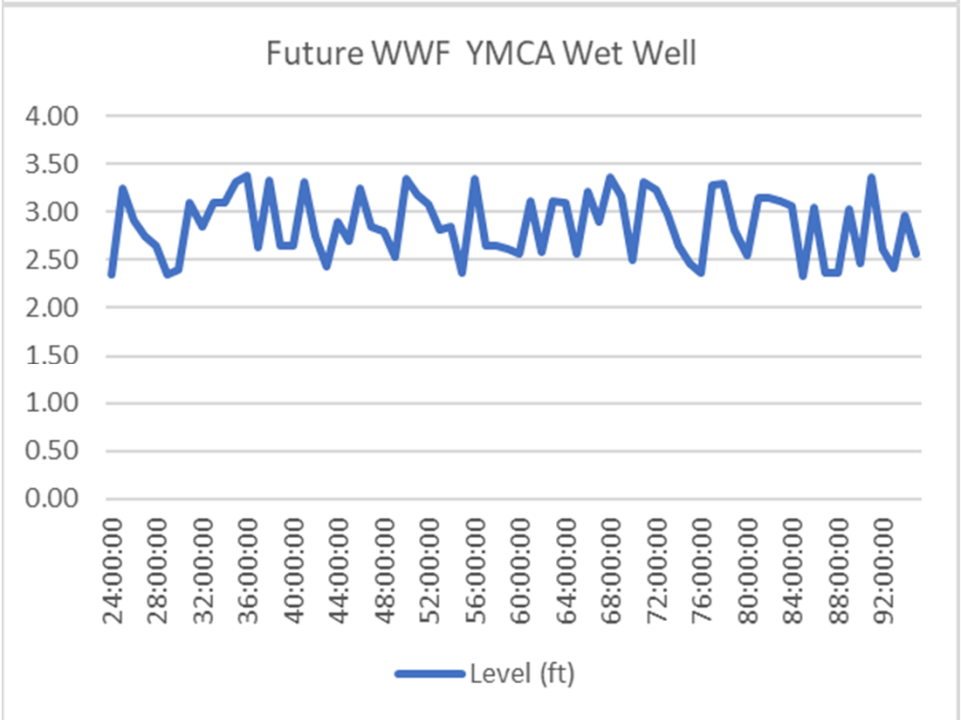
Appendix D. Existing and Future Wet Well Levels

Norfolk Wastewater System - Existing and Future Wet Well Levels – Wet Weather Conditions

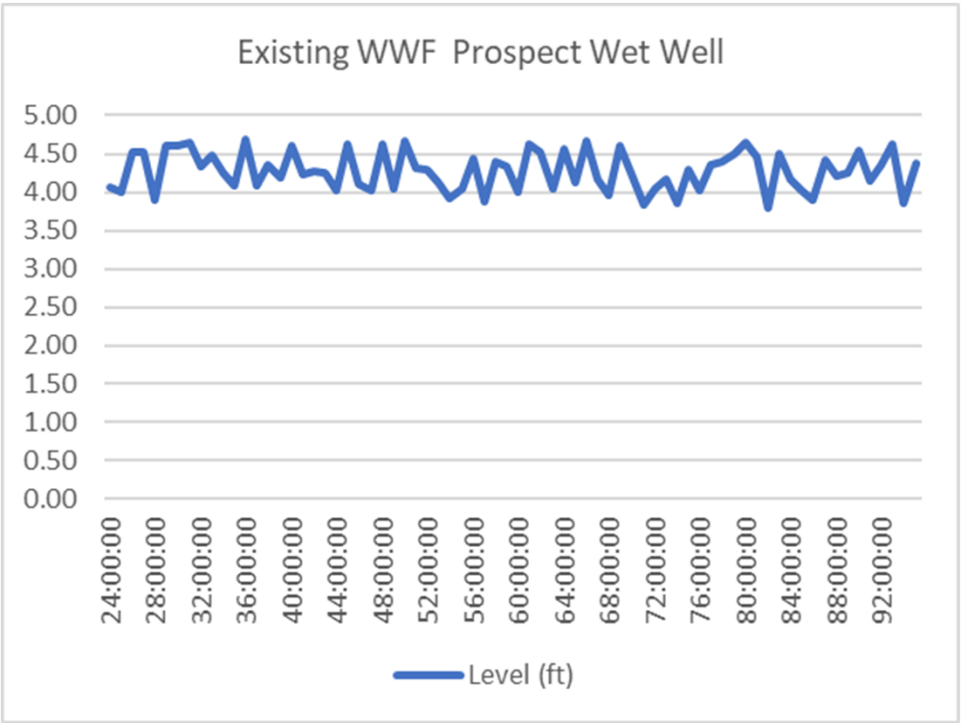


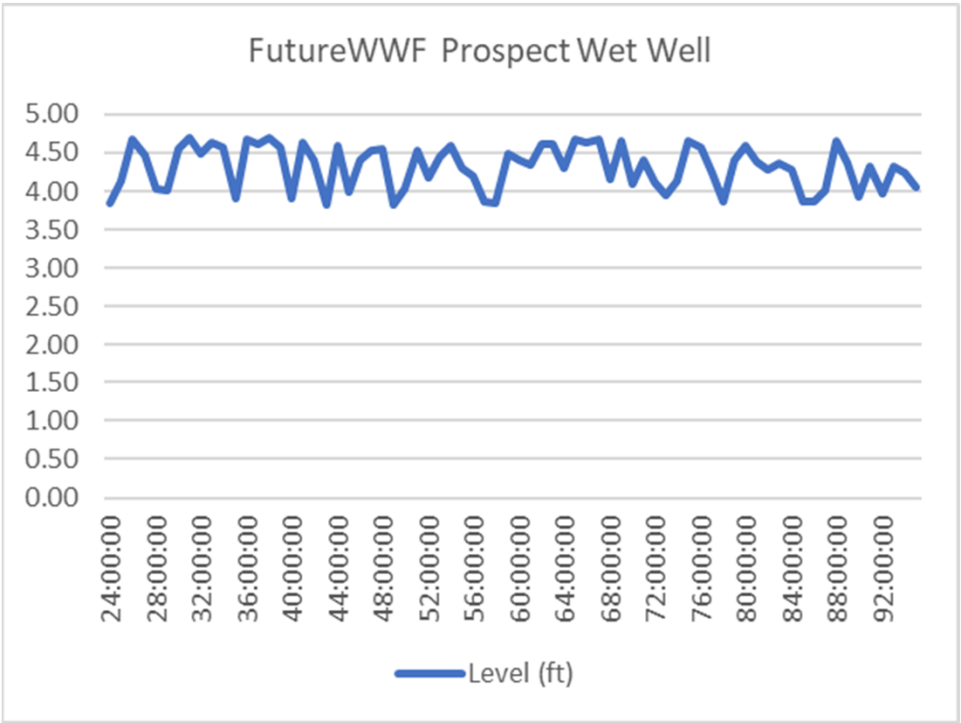


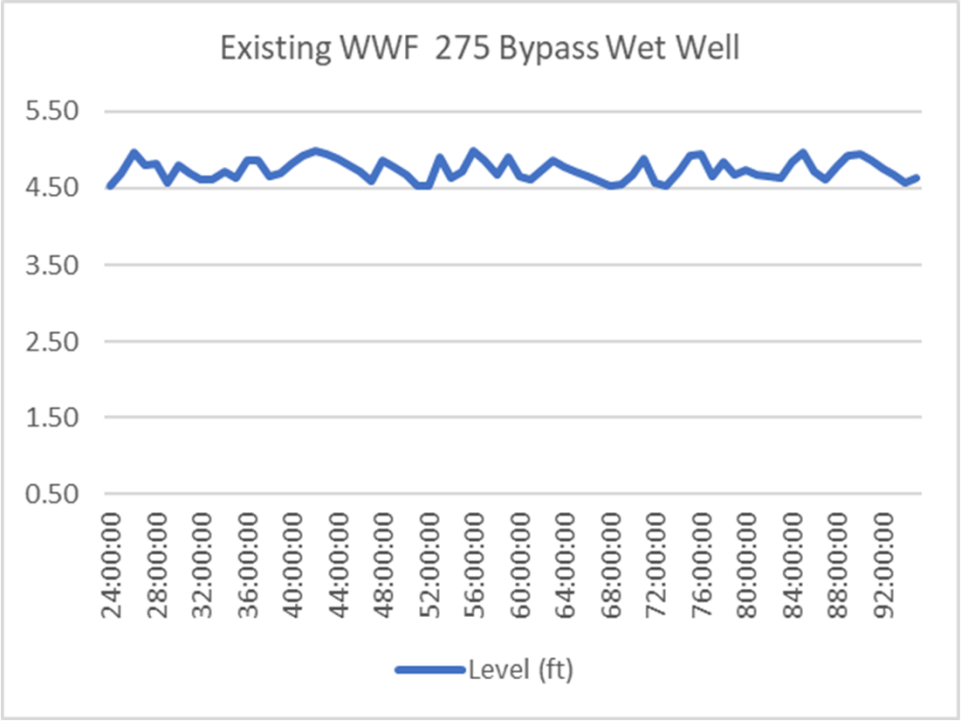


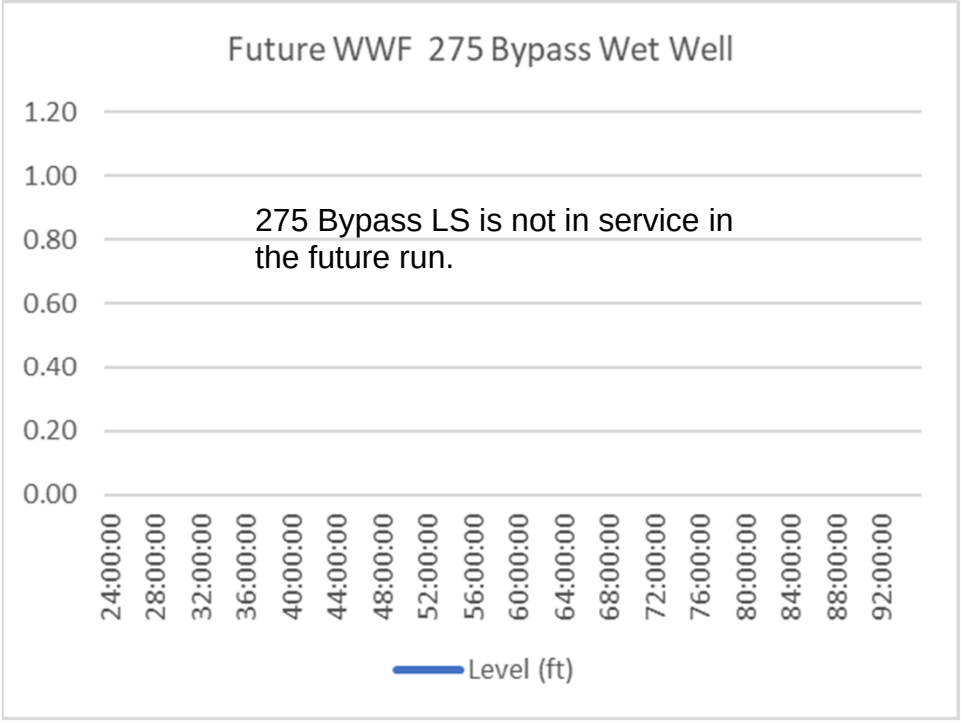


Norfolk Wastewater System - Existing and Future Wet Well Levels – Wet Weather Conditions

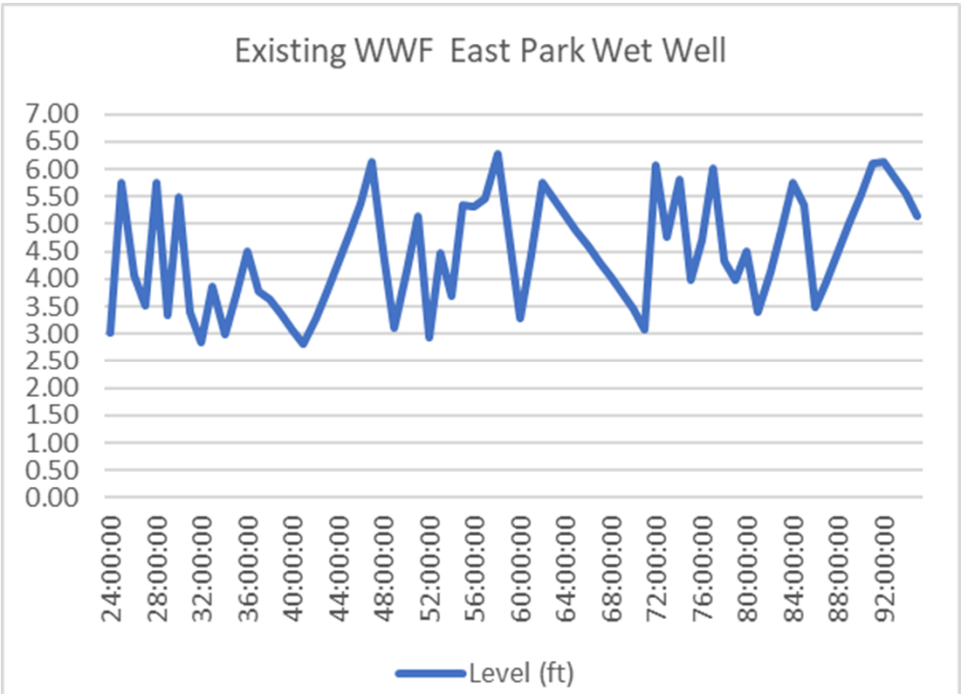


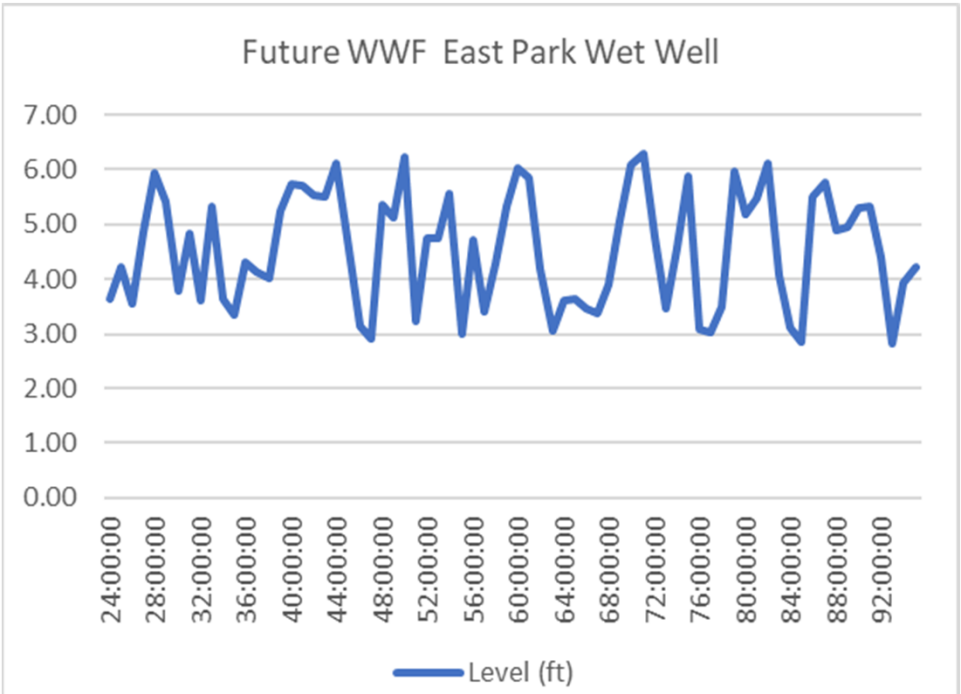


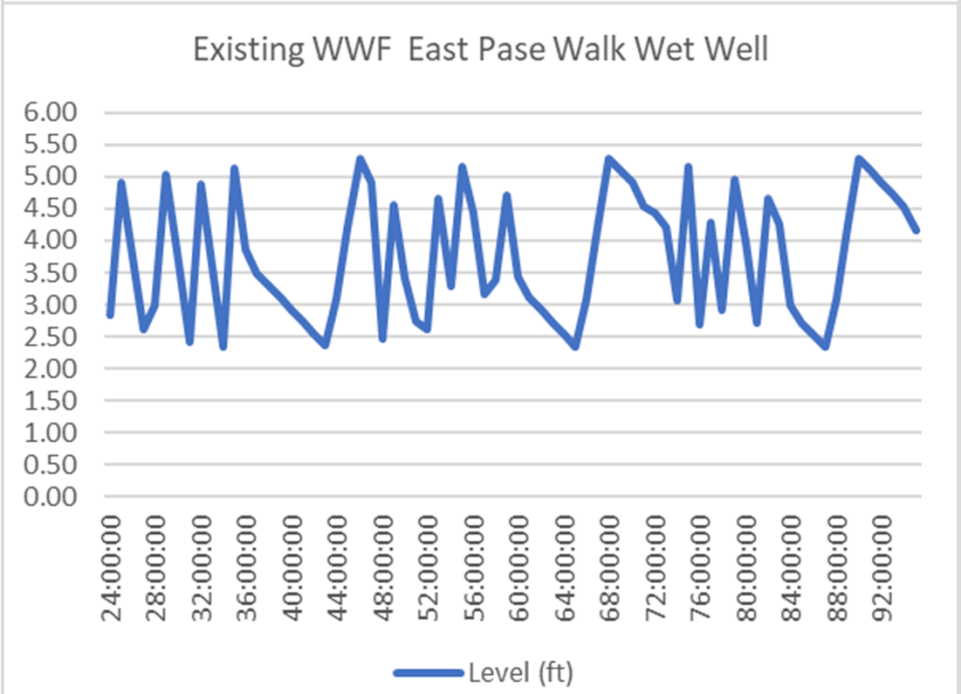


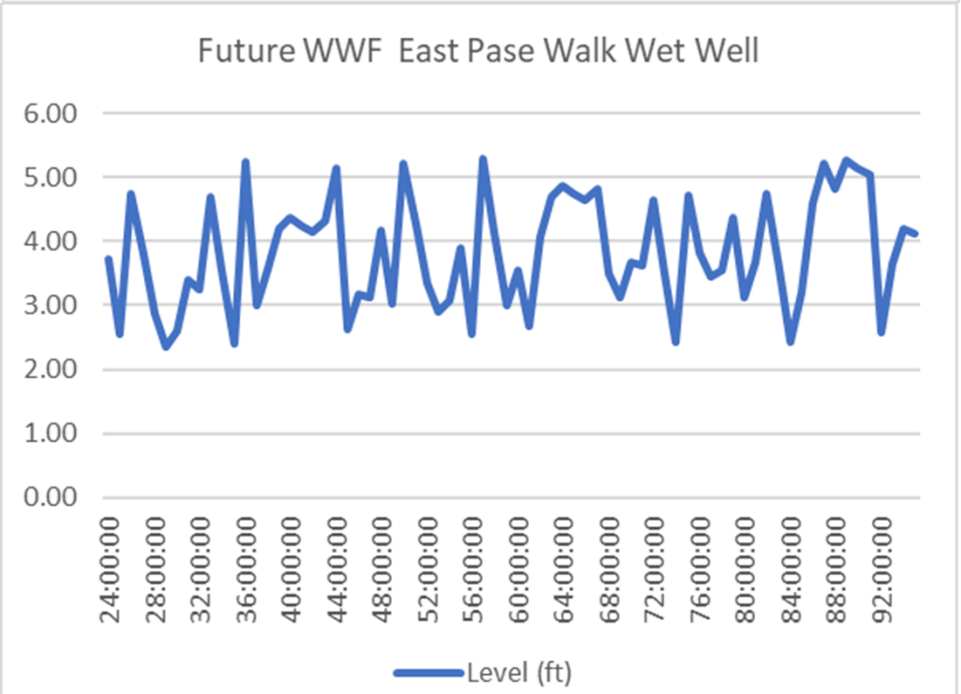


Norfolk Wastewater System - Existing and Future Wet Well Levels – Wet Weather Conditions

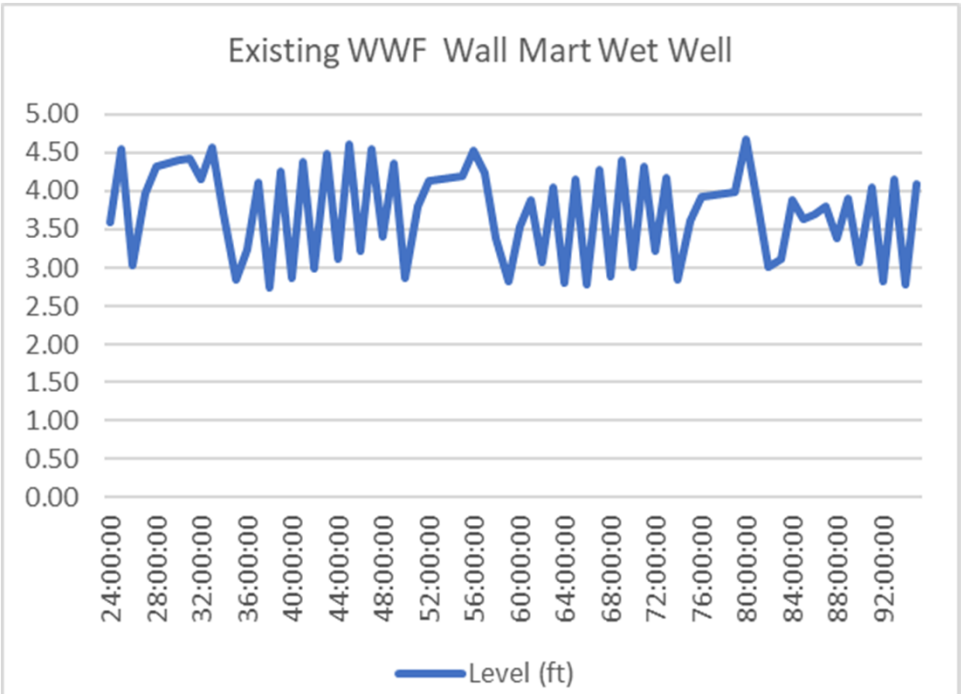


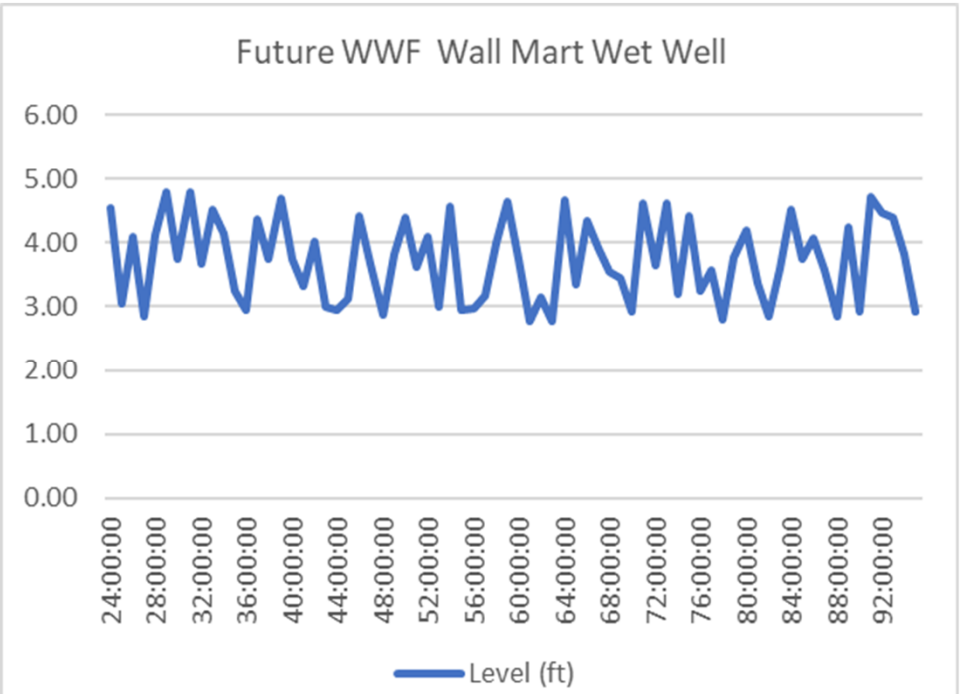


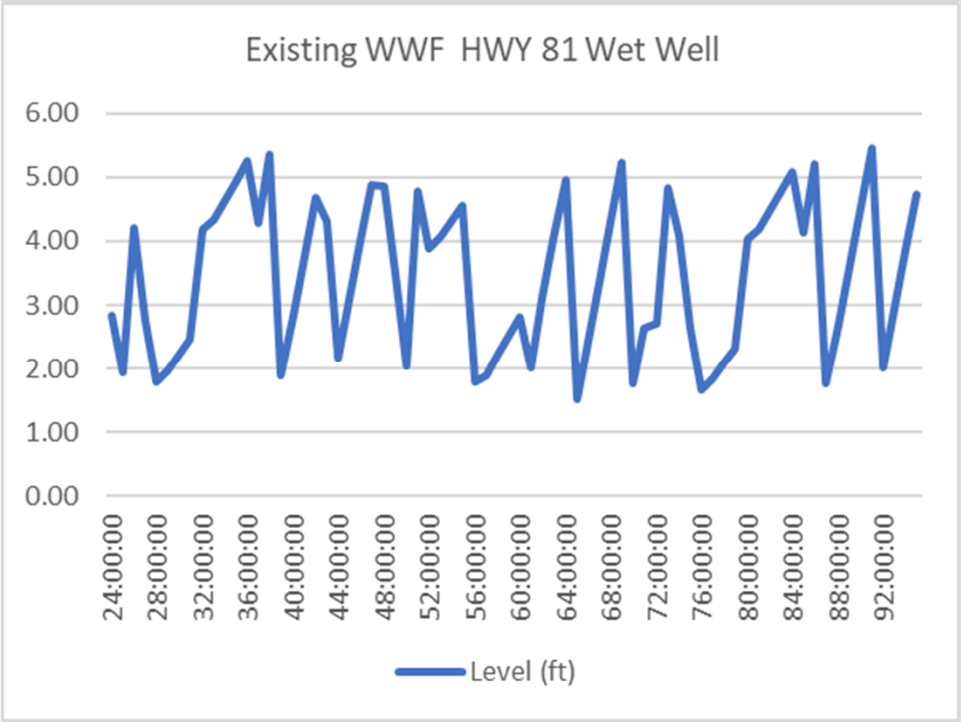


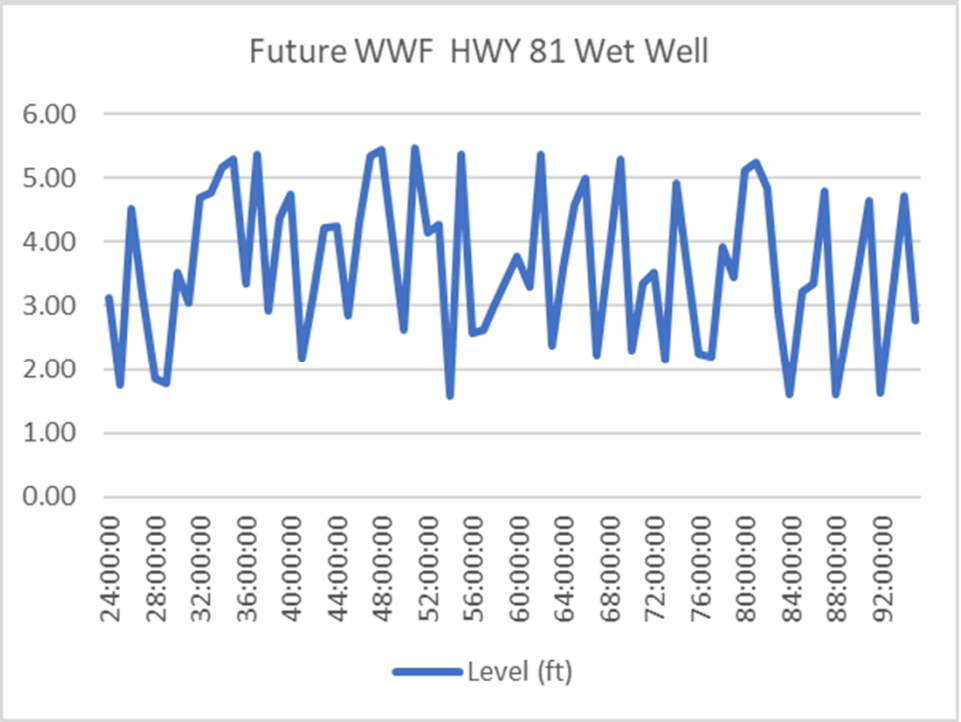


Norfolk Wastewater System - Existing and Future Wet Well Levels – Wet Weather Conditions

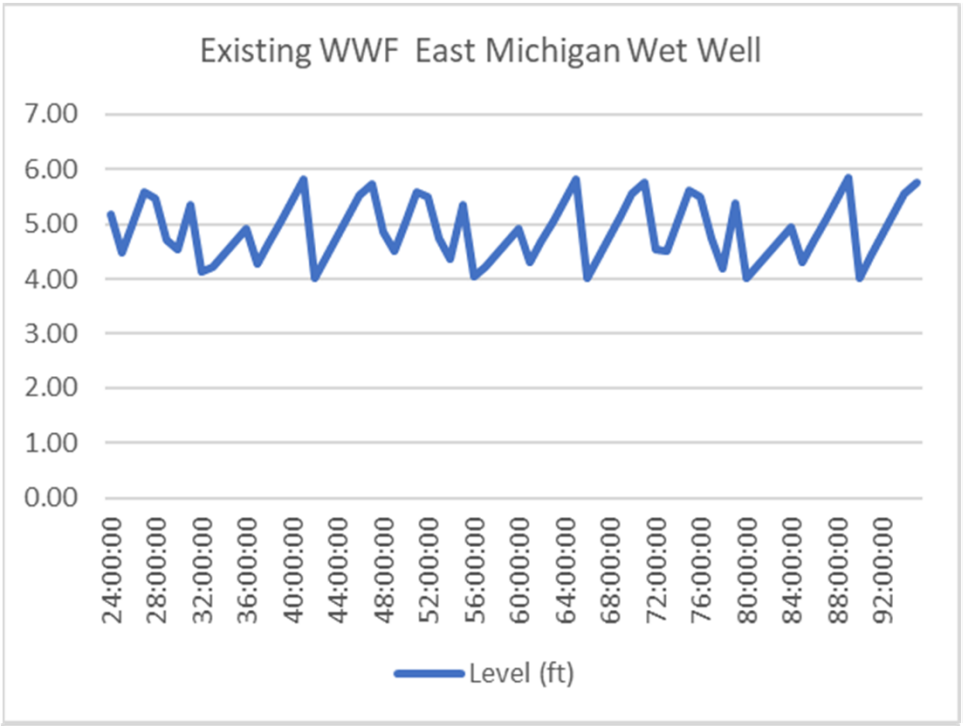


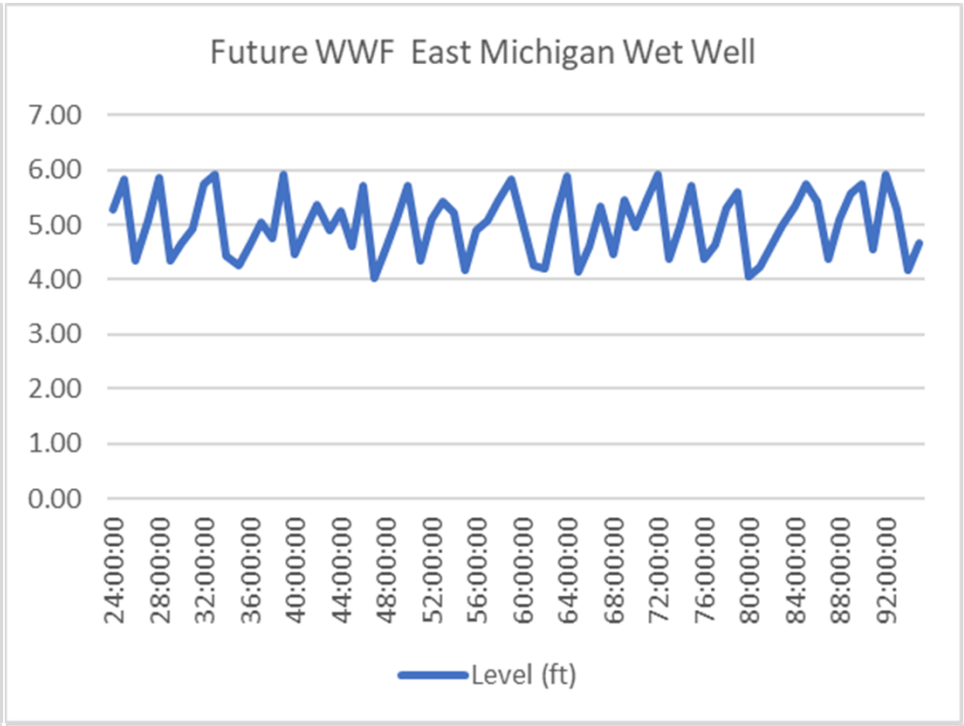


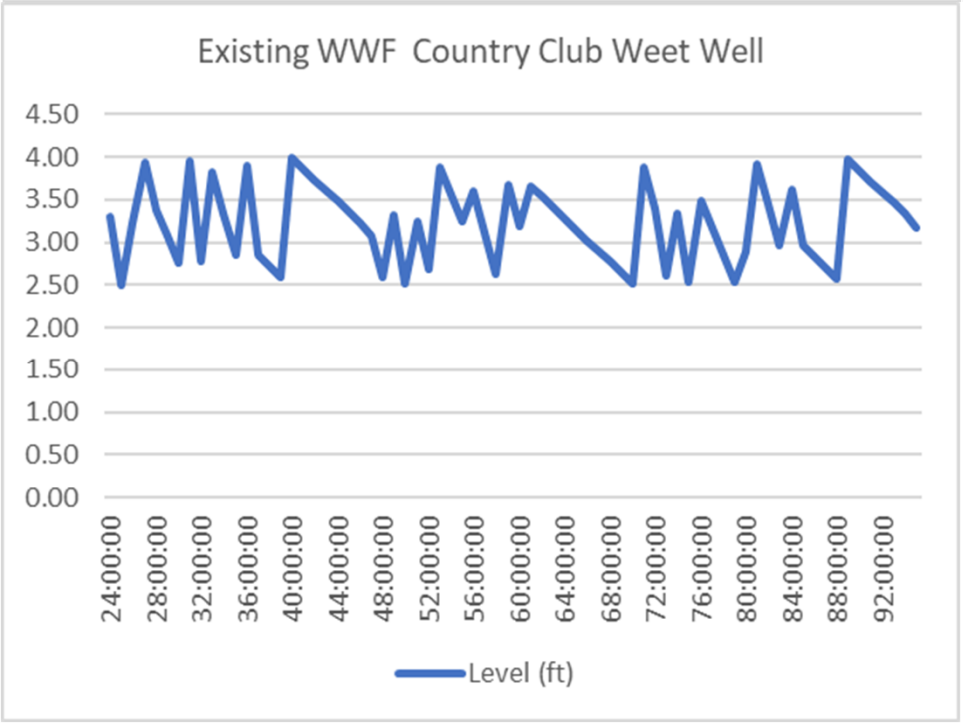


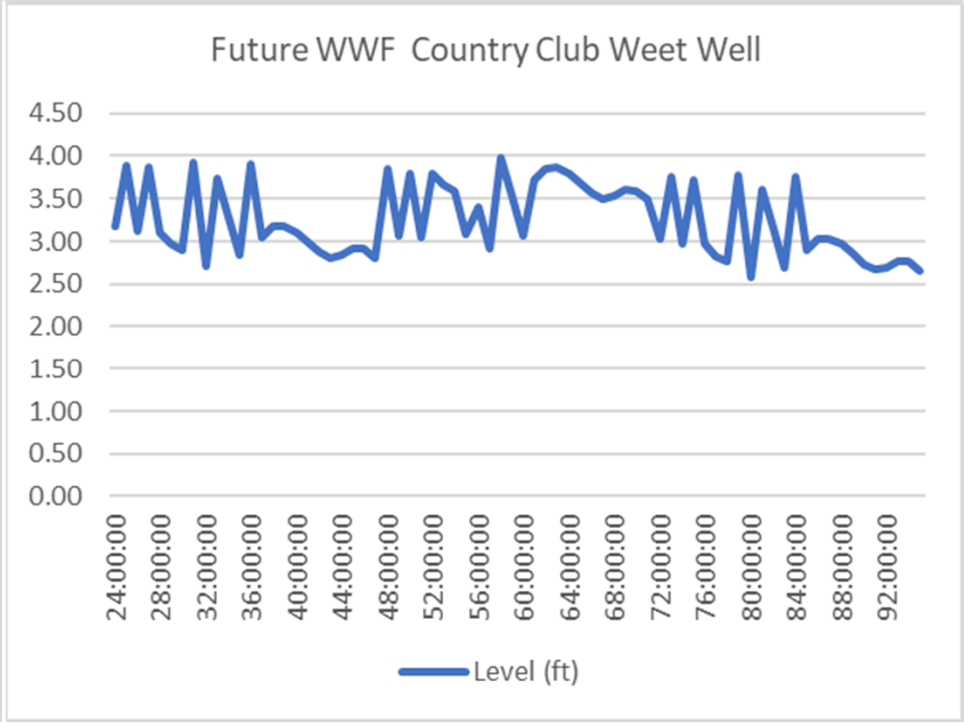


Norfolk Wastewater System - Existing and Future Wet Well Levels – Wet Weather Conditions

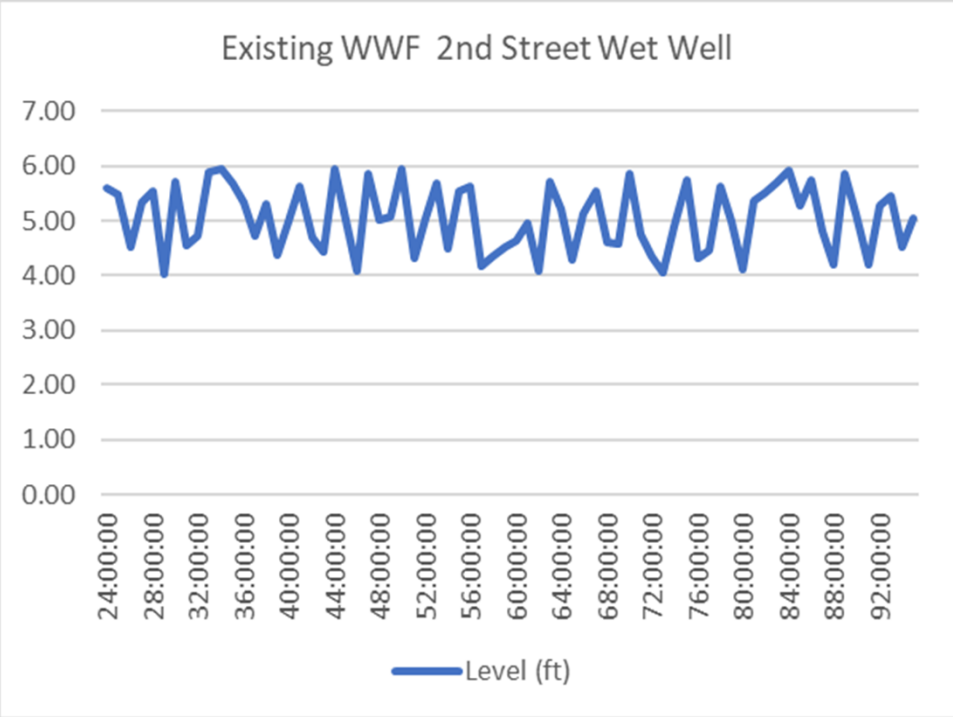


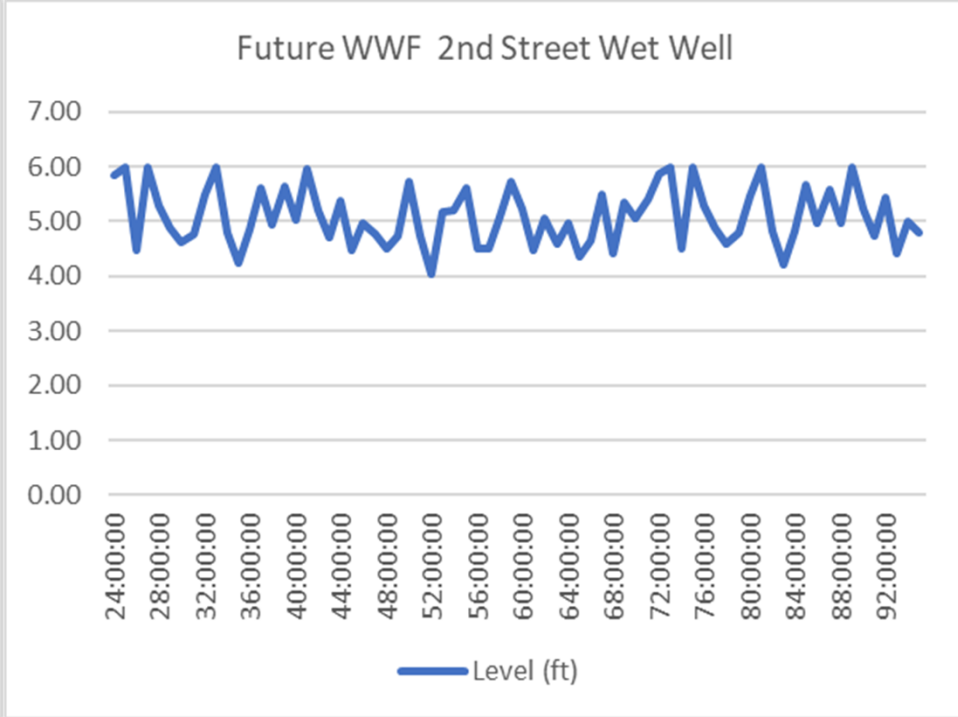


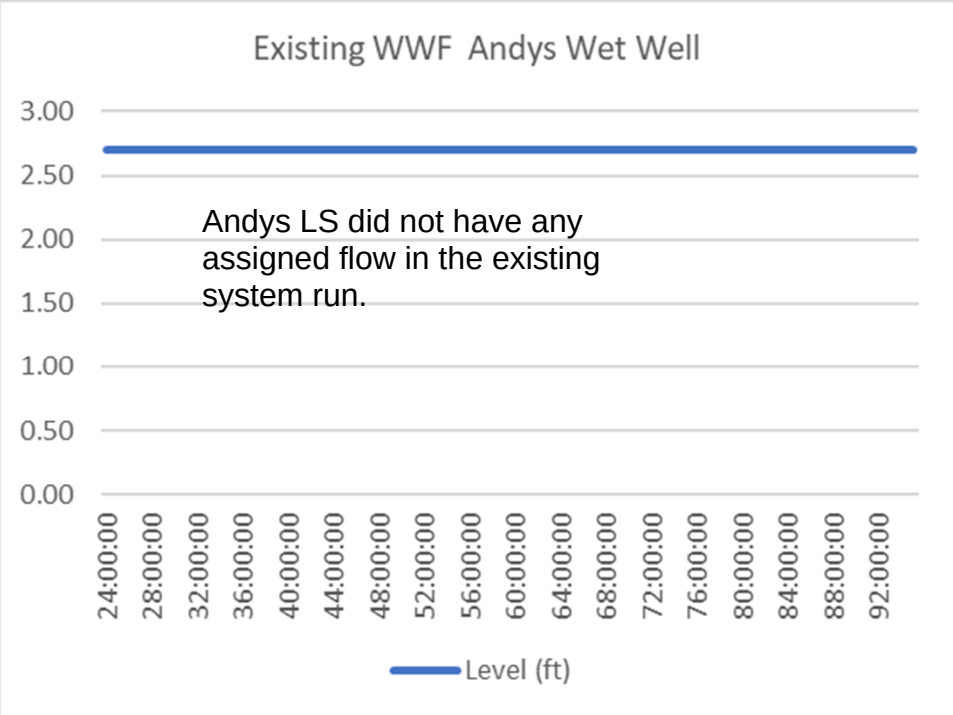


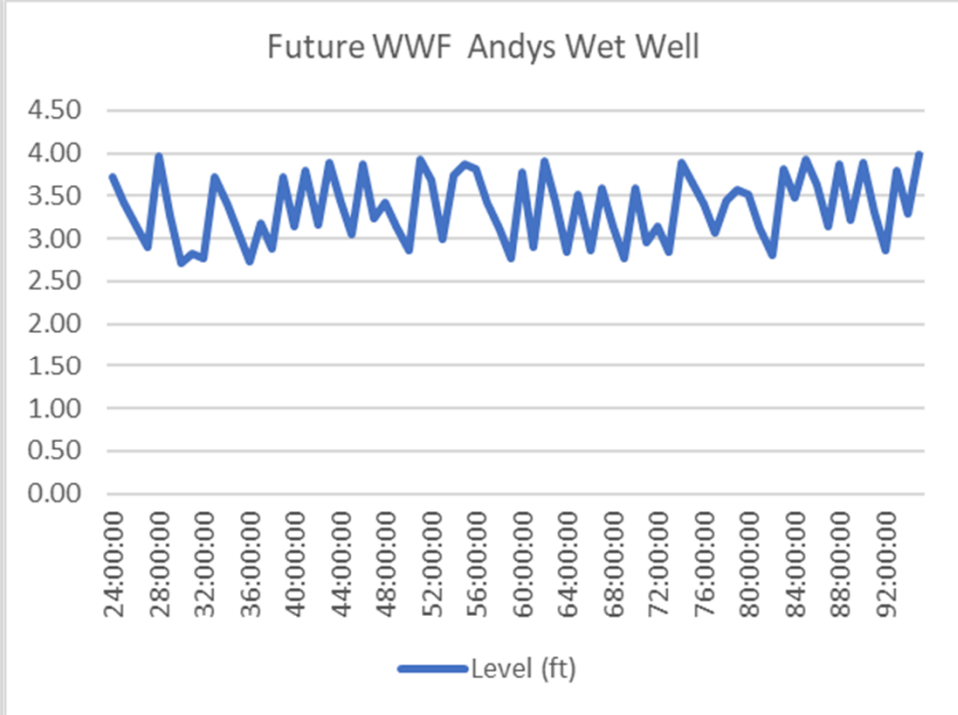


Norfolk Wastewater System - Existing and Future Wet Well Levels – Wet Weather Conditions

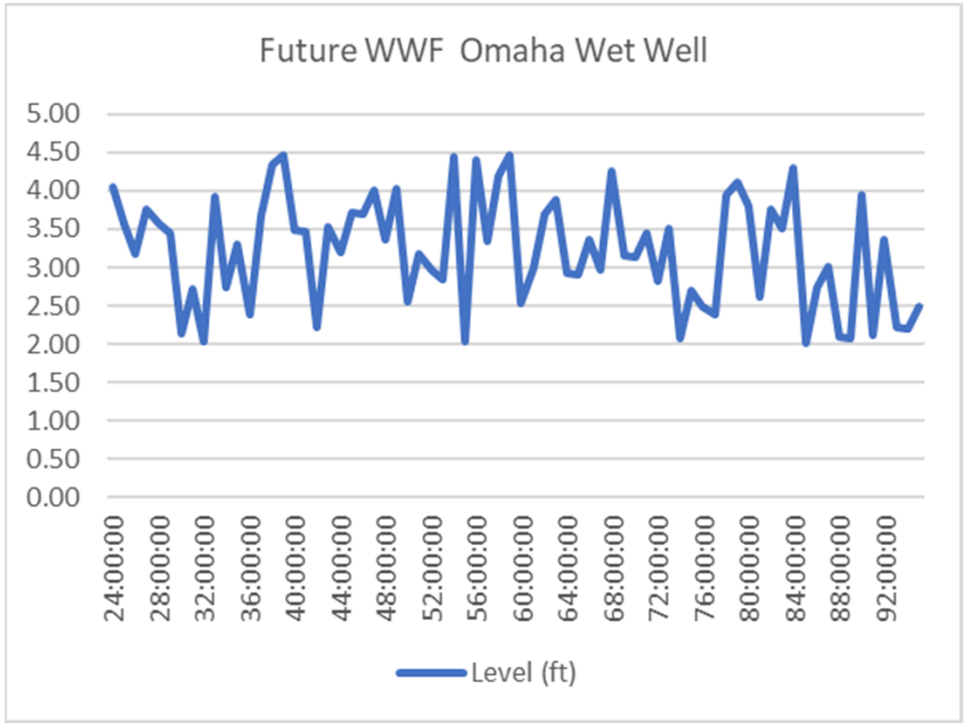








Norfolk Wastewater System - Existing and Future Wet Well Levels – Wet Weather Conditions



Appendix E. CIP and Collection System Map

Mid-Term Project – Based on Olsson Associates Design

PROJECT	July 2017 Estimate	Length (	July 2017 CCI	January 2020 CCI	Total ($)
Omaha Ave Lift Station and Force Main	3,040,000		10789	11,392	**$3,209,906.39**
Omaha Ave Gravity Sewers	2,035,000	8322	10789	11,392	**$2,148,737**
				Total	**$5,358,643**

Long-Term Projects

PROJECT	Components	Length (	Diameter	Unit Cost	Project Cost	Total ($)
1st Street Lift Station, Force Main, and Gravity Sewer Improvements	Lift Station, 0.5 mgd					**$2,208,500**
	Sanitary Sewer, Trenched	4,500	8			
		5,200	10			
	Force Main, directional drilled	1,000	6			
Industrial 1	Sanitary Sewer, Trenched	3,100	12	$201	$622,300	**$622,300**
Industrial 2	Sanitary Sewer, Trenched	5,400	12	$201	$1,084,000	**$1,084,000**
Victory Road Lift Station, Force Main, and Gravity	Lift Station, 0.25 mgd					**$1,191,900**
	Sanitary Sewer, Trenched	4,300	8			
	Force Main, Trenched	4,200	6			

Wastewater Master Plan Update
City of Norfolk, Nebraska
Figure E-1 Norfolk Sewer CIP

- Existing City Limits
- Existing Lift Station
- Existing Force Main
- Existing Gravity Main (< 12 in)
- Existing Gravity Main (>=12 in)
- Recent Gravity Main (2018-2019)
- Abandoned Force Main
- WatchList

Proposed Lift Station
- Mid-Term
- Long-Term

Proposed Gravity Main
- Mid-Term
- Long-Term

Proposed FM
- Mid-Term
- Long-Term

Future Growth Areas
- SF Residential
- MF Residential
- Commercial
- Public
- Office/Services
- Industrial

Norfolk NEBRASKA right at home.

BLACK & VEATCH Building a world of difference.

N W E S

0 0.15 0.3 0.6 Miles