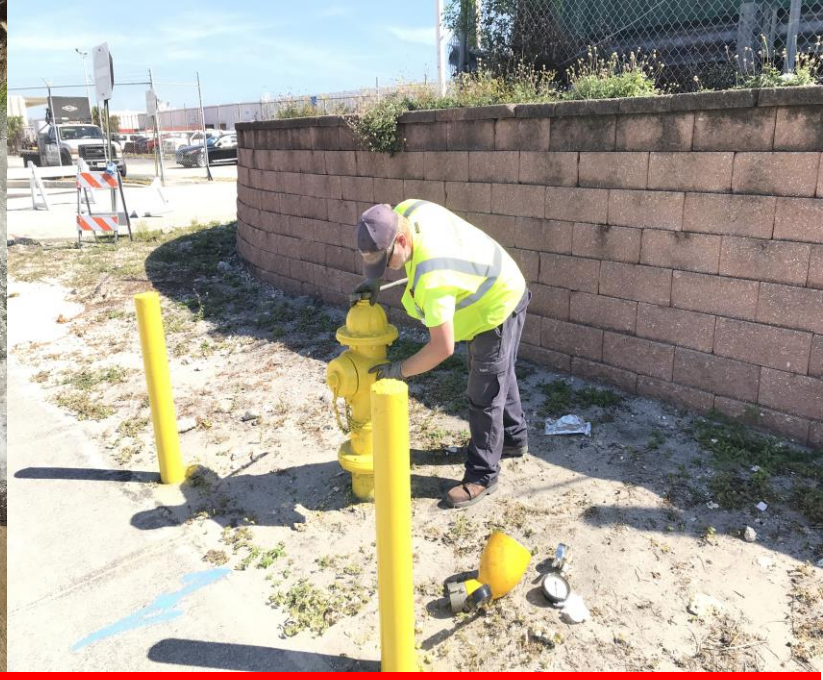


Riviera Beach Utility
Special District

Water Distribution System
East Area Unidirectional Flushing Plan

June 12, 2018

C Solutions Inc.

Hazen

1. Introduction

Consent Order File No. WP-020-16 requires that the Riviera Beach Utility Special District (RBUD) develop a written flushing plan. The RBUD retained C Solutions Inc. and Hazen and Sawyer (Hazen) to prepare a unidirectional flushing (UDF) plan for the RBUD's water distribution system. The following provides a brief overview of each section of this report:

- Section 1: Section 1 provides a brief overview of the RBUD's water system along with a brief explanation of the purpose of UDF and how UDF can improve water quality through the control of nitrification.
- Section 2: Section 2 provides UDF planning goals and an explanation of how the UDF plan is broken down into areas, zones and flushing events.
- Section 3: Section 3 describes the UDF bidding documents that will be prepared to retain a UDF contractor to assist the RBUD and train its staff to perform UDF.
- Section 4: Section 4 describes certain challenges that the RBUD should expect during the performance of UDF and offers suggestions on overcoming these challenges
- Section 5: Section 5 concludes with recommendations for the RBUD staff going forward.
- Attachment A: Attachment A is the UDF plan.

1.1 Location Map

The RBUD owns and operates water supply, treatment, storage and distribution infrastructure. It supplies water to approximately 40,000 people within its service area. Riviera Beach is a coastal community located in Palm Beach County, Florida. The water treatment plant and utility administration facility are located at 600 West Blue Heron Boulevard, Riviera Beach, Florida 33404. Figure 1 illustrates a location map.

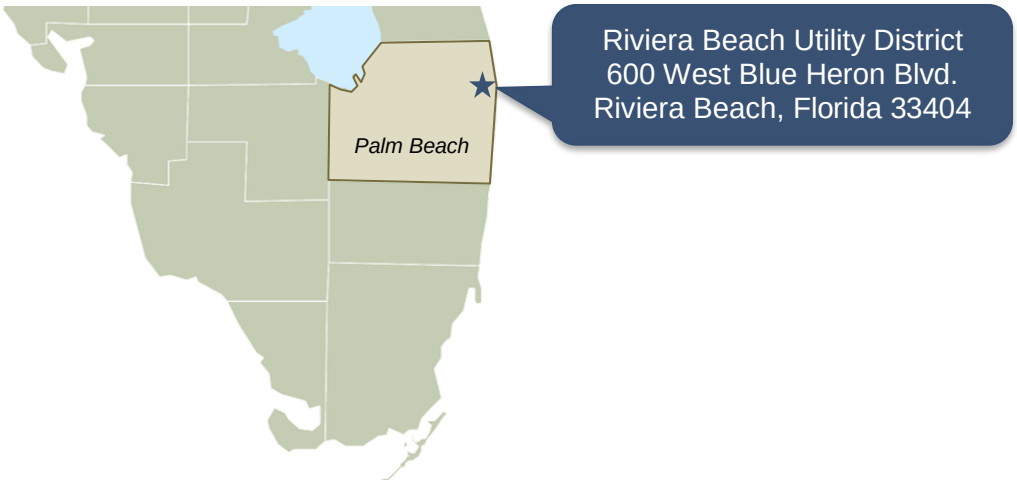


Figure 1: Riviera Beach Utility District Location Map

1.2 Distribution System Map

The RBUD's water distribution system is comprised of about 186 miles of pipe ranging in size from 1 to 30-inches in diameter. Figure 2 presents a simplified illustration of the RBUD's water distribution system.

1.3 What is Unidirectional Flushing?

The CRBUD utilize a chloramine disinfection strategy in its distribution system. Chloramine is used by most South Florida water suppliers to limit the formation of disinfection by-product (DBPs) in the distribution system. UDF is a common practice in South Florida for water systems that use chloramines. It is a routine maintenance to prevent water quality degradation resulting from nitrification. Nitrification is explained in more detail in the following subsection.

UDF is a systematic method of closing valves and opening hydrants to direct water through targeted segments of pipe. Flushing begins near sources such as water plants, trunk mains, and tanks. Closing certain valves in a prescribed sequence creates one-way flow into each segment from other pipes that have been flushed previously. Flowing hydrants – illustrated in Figure 3 – induce velocities high enough to scour sediment and biofilm from the walls of the pipes. Pipes 16-inch and larger cannot be included because flowing from hydrants cannot achieve sufficient scouring velocities.

Figure 3: Hydrant Flushing

1.4 What is Nitrification?

Nitrification is a microbial growth process that occur in water systems that contain chloramines. Nitrification consumes the chloramine disinfectant residual in the water piping. The key to stopping nitrification is to starve the nitrifying bacteria of nitrogen. The most effective way to do this is to temporarily convert the disinfectant from chloramine to free chlorine concurrent with the UDF to convey the free chlorine throughout the pipe network. It is recommended that this UDF plan be performed concurrent to temporarily converting the disinfectant from chloramine to free chlorine.

The Florida Department of Environmental Protection (FDEP) issued a memorandum dated May 10, 2018 that clarified Rule 62-555.822 for the Florida Administrative Code (FAC) that indicated that chlorine burns (i.e., the temporary switch from chloramine to free chlorine) should be kept to a maximum of 21 days.

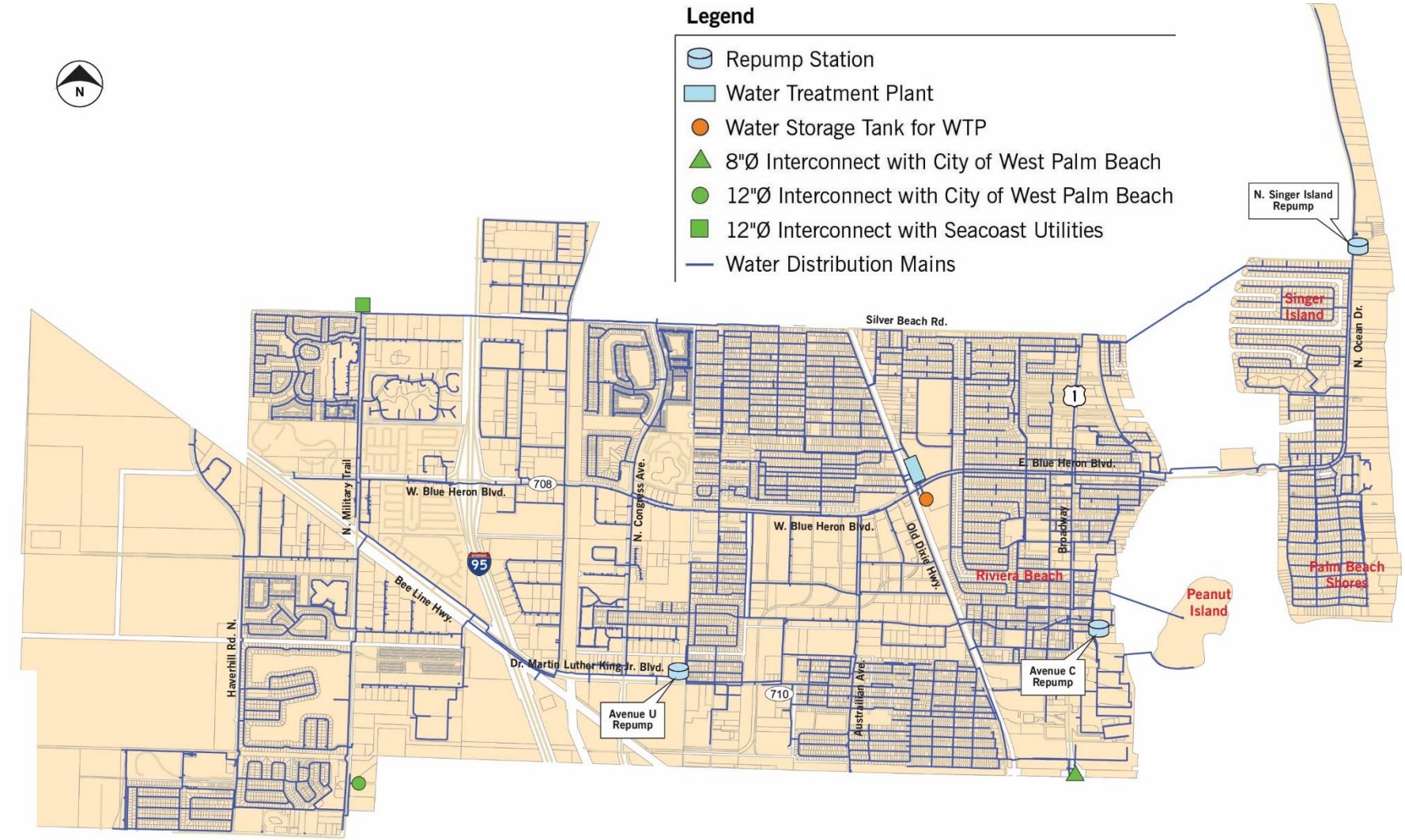


Figure 2: RBUD Water Distribution System

2. UDF Plan Development

2.1 Introduction

This section briefly summarizes key UDF planning goals and report nomenclature.

2.2 Key UDF Planning Goals

The UDF Plan was developed using the WaterGEMS water distribution system hydraulic model prepared for the 2013 Water and Wastewater Master Plan. The goals of the UDF plan development were as follows:

- Minimum velocity = 3 fps (removes sediment)
- Desired velocity = 5 fps (promotes scouring)
- Minimum pressure = 20 psi
- Pipe flushing volume = 3 turnovers
- The UDF Plan is designed to start at the Water Treatment Plant (WTP) work outwards
- UDF must be implemented in a series of sequential steps as described in the flushing journals presented herein
- Pipes 16-inch diameter and larger are not flushable through traditional means of opening fire hydrants without an unacceptable reduction in system water pressure
- The UDF plan only routes water through pipes that were flushed in a prior sequence

2.3 Key Caution During UDF Implementation

While performing each flushing sequence, the flushing crew(s) should use flow measurement devices and flush at a rate equal to the "Predicted Flow" listed for the hydrant in the UDF plan. Flushing at a rate higher than the "Predicted Flow" may cause unacceptably low pressures within the water distribution system.

2.4 Opening Multiple Ports on a Hydrant

Most UDF can be performed by opening a single port on a fire hydrant. For some flushing sequences, opening a single port will not be sufficient to achieve scouring velocity. For these cases, both 2.5-inch ports can be opened to achieve the predicted flow. When both hydrant ports are open, the flow may be measured on one of the ports, then doubled to calculate the total hydrant flow.

2.5 Certain Pipes Cannot be Flushed

Certain pipes are not flushable, as follows:

- Pipes 16-inch diameter and larger
- Small dead-end pipes without hydrants
- Looped pipes that do not include isolation valves where pressures dropped below 20 psi before reaching cleaning velocity

Pipes that are not flushable are colored purple in the journal maps.

2.6 The UDF Plan is Divided into Three Areas

The UDF Plan is divided into three areas based upon geographic region within the distribution system. The three areas are as follows:

- East Area: The East Area includes all piping on the barrier island
- West Area: The West Area includes all piping west of Garden Road
- Central Area: The Central Area includes all piping between the East and West Areas.

Figure 4 illustrates the geographic breakdown of the UDF Plan volumes. Each of these areas can be flushed independent of each other.

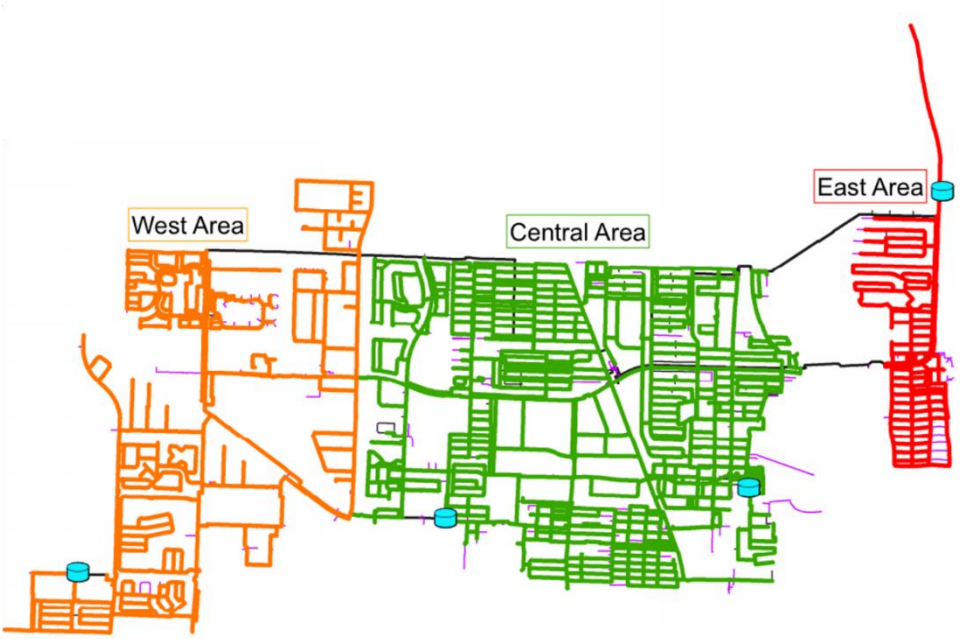


Figure 4: UDF Plan Areas

2.7 Each Area is Divided into Zones

Each area is further divided into a series of zones. For example, the West Area is divided into 11 flushing zones as illustrated in Figure 5. When flushing an area, flushing should begin with Zone 1 and through each zone in numerical order.

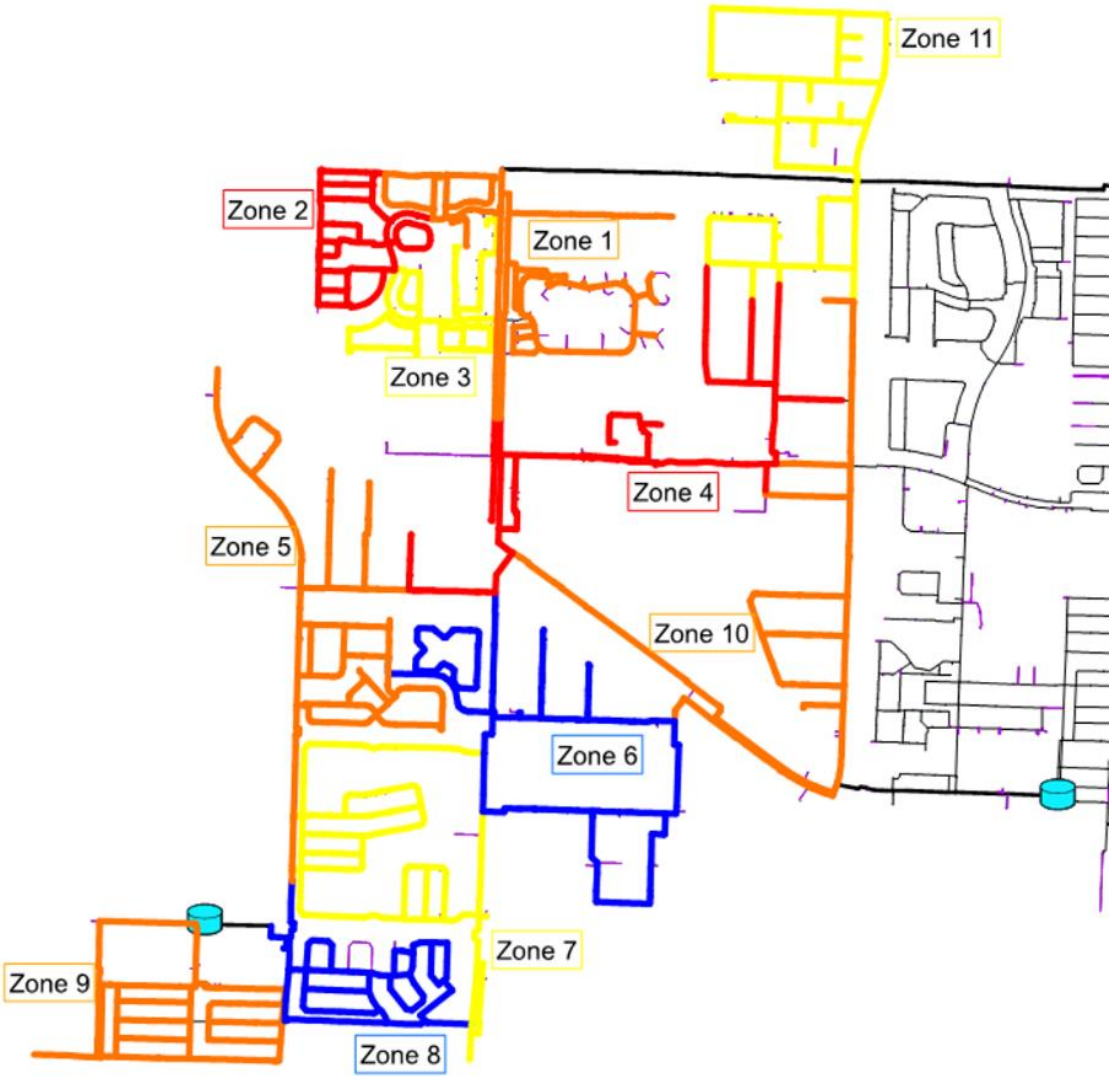


Figure 5: Example of a Zone Map

2.8 Each Zone is Divided into Flushing Events

Each zone is divided into a series of flushing events. During an event, valves are closed, and hydrants opened to flush a certain segment of piping within the zone being flushed. Each event is illustrated in a flushing event map that illustrates the location of the valves and hydrants for the flushing crew to operate. Figure 6 presents an example flushing event map.

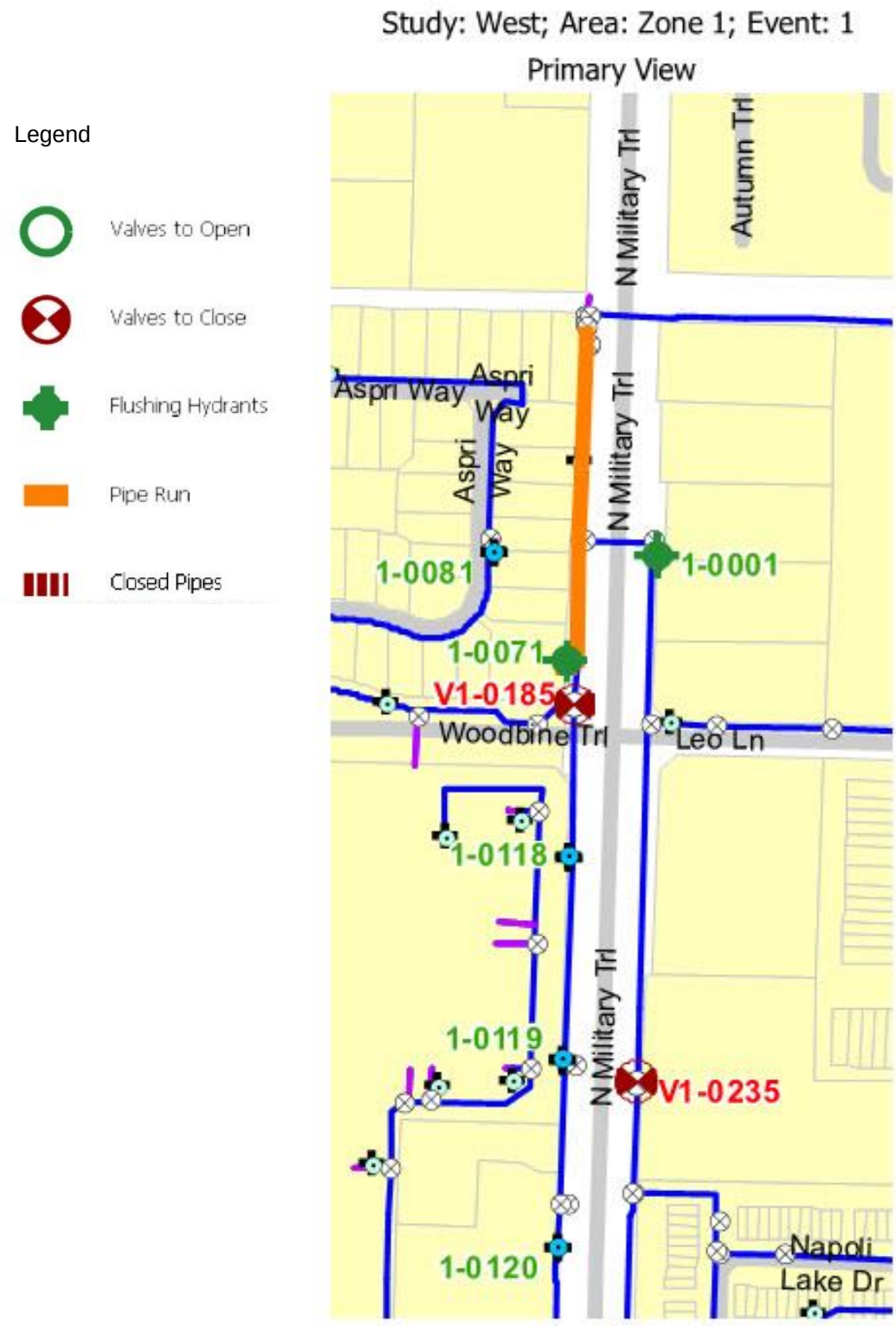


Figure 6: Example Flushing Event Map

2.9 Flushing Event Form

2.9.1 Flush Plan Information on Event Form

The UDF Plan includes a flushing event form that presents the following information:

- Pipes to be flushed
- Valve identification numbers to be opened or closed
- Hydrant identification numbers to be flushed
- Predicted flow rate during flushing
- Predicted pressures while flushing
- Recommended flushing duration
- Recommended flushing volume

2.9.2 Data to Collect During Flushing on Event Form

For each flushing event, the flushing crew should record the following data on the flushing event form:

- Water quality observations
- Notes about the operability of the valves
- Measured flow during flushing in gallons per minute
- Notes regarding hydrant operability
- Measure total chlorine residual at the start of flushing
- Measure total chlorine residual at the end of flushing
- Flushing start and end time

Figure 7 illustrates an example of a flushing event form.

Flushing Field Report

Study: West; Area: Zone 1; Event: 1

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
1-0071				45.9	1,084
1-0001				46.0	1,085

Valve	Operation	Notes
V1-0185	Close ☐	
V1-0235	Close ☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	

Flushing	Minimum	Recommended
Time (min)	2.0	6.1
Volume (gal)	4,383.7	13,151.0

Start Time

End Time

Operator

Date

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Pipe Run to be Cleaned
P-3121, P-2543, P-2552, P-1420, P-0400

Notes 2 hydrants flushing

Figure 7: Example Flushing Event Form

3. UDF Bidding Documents

The RBUD staff require assistance and training to perform its initial UDF. Hence, the first several UDFs should be performed by a contractor with expertise in implementing UDF so that the RBUD staff can gain experience in UDF implementation. Hazen will prepare bidding documents for the RBUD to advertise and receive bids by contractors with expertise in implementing UDF.

Contractors that typically perform this type of work are as follows:

HydroMax USA
Shane Majetich
Water Solutions Director
2500 Drane Field Rd, Suite 204
Lakeland, FL 33811
Phone: (813) 305-6610
Fax: (502) 565-0239

Wachs Water Services
Brad Gresham
Business Development Manager – South Region
Mobile: 678-340-6850
bgresham@wachsws.com

Mueller Service Co.
Andrew Apgar
National Sales Manager
2004 Wood Court, Ste C
Plant City, FL 33563
Phone: (813) 764-8183 x106
aapgar@muellerservicecompany.com

4. Challenges and Recommendations

The UDF plan prepared herein assumed that the existing water distribution system valves and hydrants are operable. The RBUD staff recognize that not all valves in its system are operable. Hence, during the performance of the first UDF, the RBUD will find that certain flushing events will not be able to be performed because of one of the following:

- The valve indicated in the UDF plan to be operated could not be found in the field[1].
- The valve shown in the UDF plan to be operated was found but was not operable.

[1] This might indicate that the valve box was paved over or that the valve was in the RBUD's geographic information system but doesn't exist in the field.

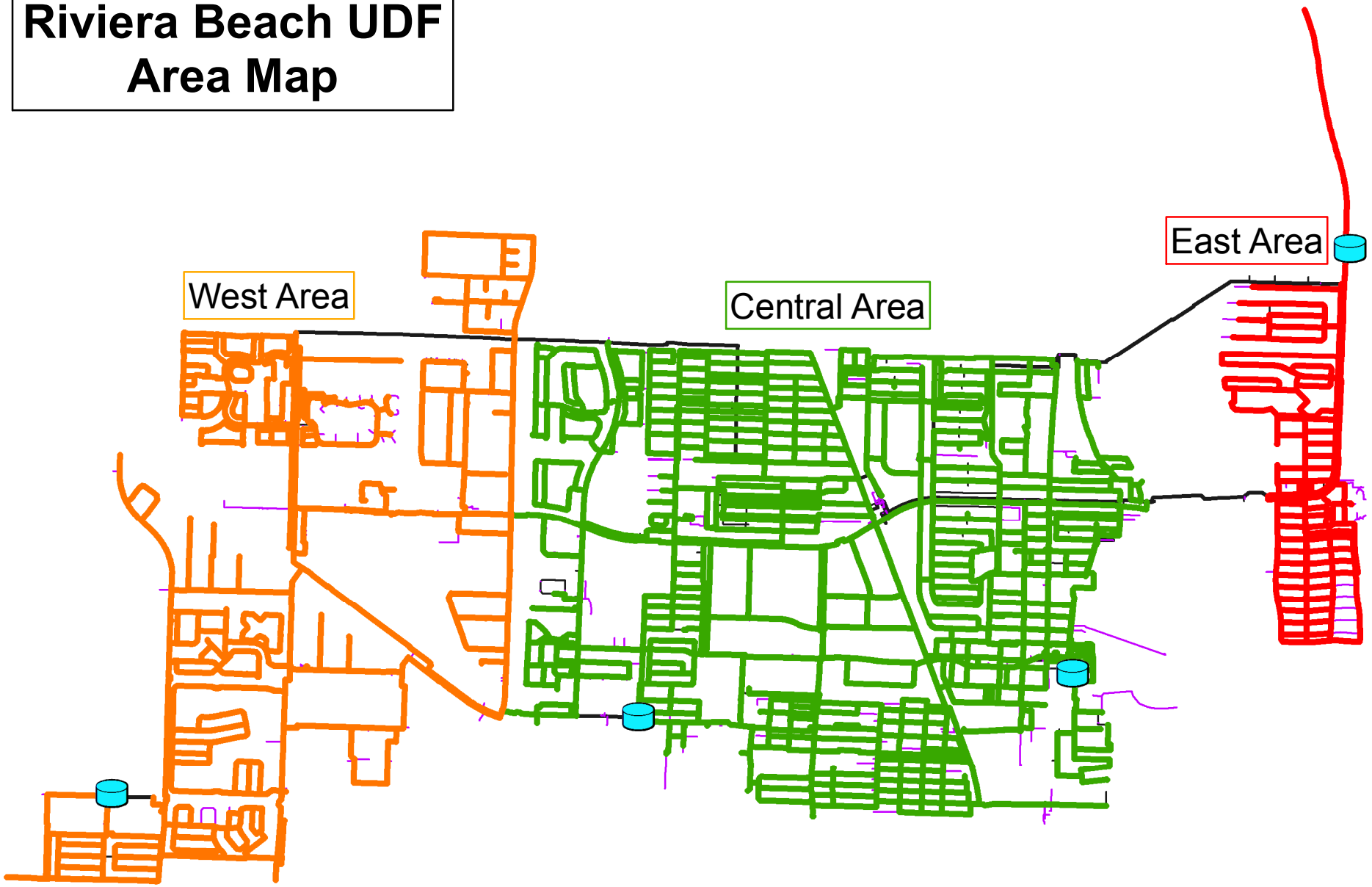
When this challenge occurs, the RBUD staff will need to have its consultant attempt to develop an alternative sequence or "work-around". The current contract with C Solutions Inc. includes "as-needed" assistance to address this issue on a time and materials basis.

The following recommendations are offered to further address this challenge:

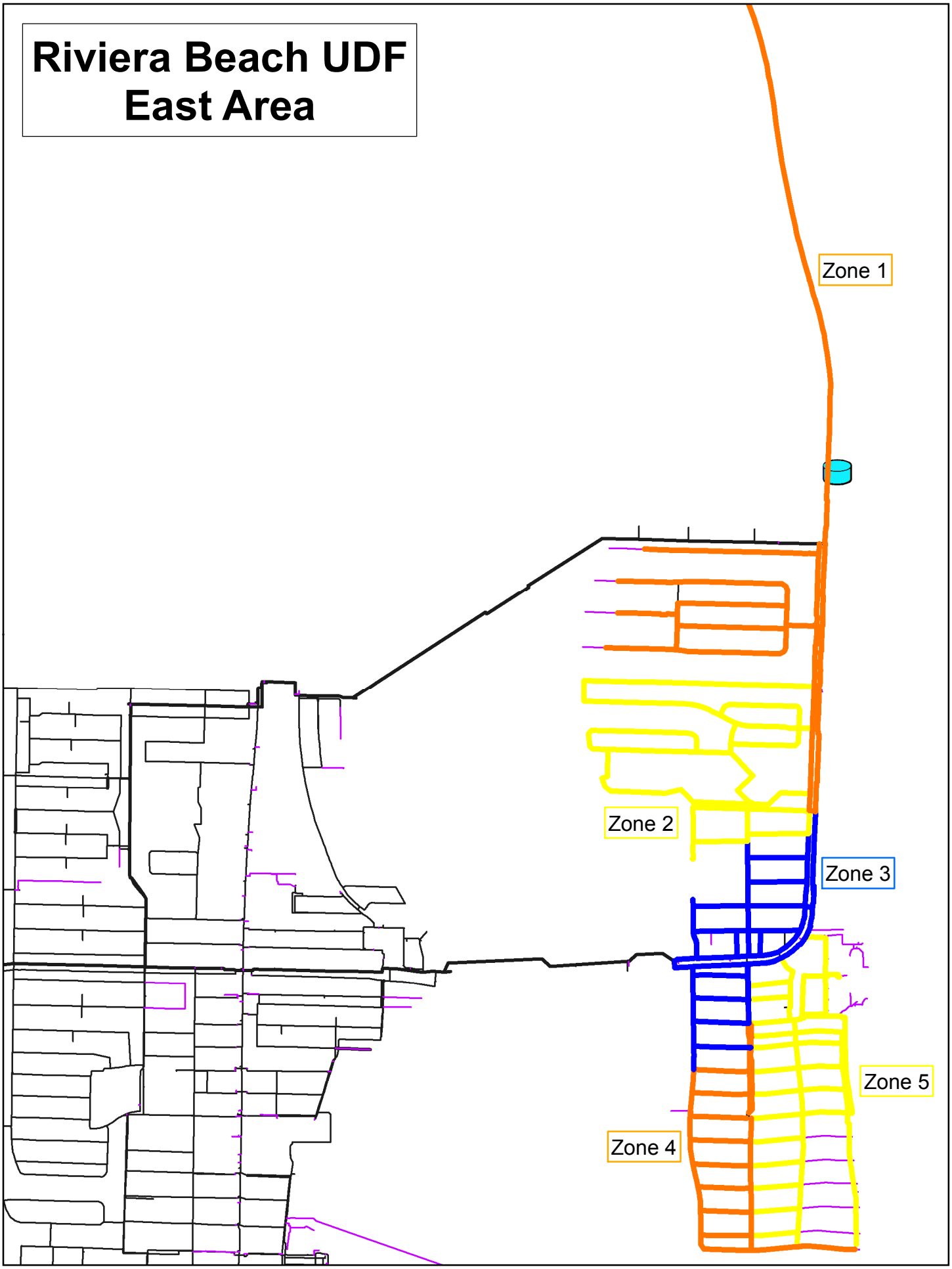
- Hazen will prepare the UDF bidding documents to include stand-by time for the UDF contractor. This will allow time for the City's consultant to run the UDF model to develop an alternative flushing sequence if inoperable valves are found.
- Hazen will prepare the UDF bidding documents to require that the UDF contractor create a database of all valves and hydrants it operates and notes valves and hydrants with maintenance issues.
- It is recommended that the City retain a water distribution system maintenance contractor to implement and valve and hydrant exercise and maintenance plan.

Attachment A
Unidirectional Flushing Plan

Riviera Beach UDF Area Map



Riviera Beach UDF
East Area

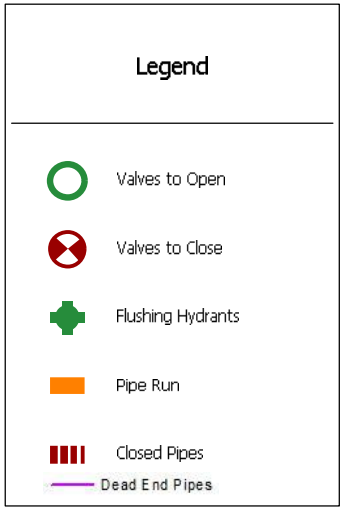


Riviera Beach UDF East Area Summary Table

Zone	No. of Closed Operations	No. of Open Operations	Total no. of valve operations	Total length of pipes flushed (ft)	Total recommended flushing time (min)	Total volume flushed (gal)	No. of Events
Zone 1	11	11	22	26,021	272	209,053	8
Zone 2	14	14	28	18,948	170	121,989	11
Zone 3	20	20	40	22,717	175	243,321	8
Zone 4	19	19	38	19,705	168	160,595	6
Zone 5	14	14	28	21,619	161	178,747	9
Total	**78**	**78**	**156**	**109,010**	**946**	**913,705**	

Flushing Field Report

Study: East

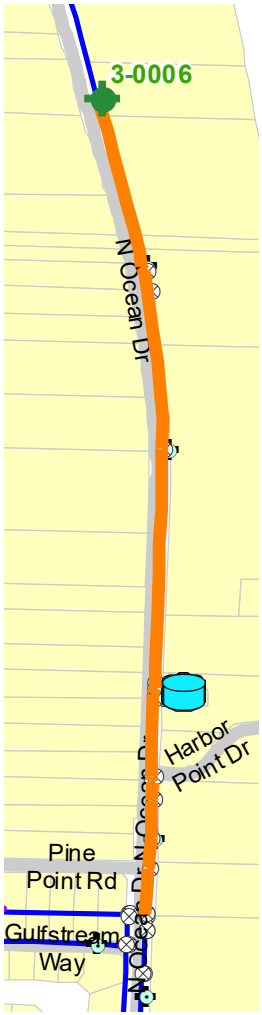


East Area - Zone 1

Flushing Field Report

Study: East; Area: Zone 1; Event: 1

Primary View



Flushing Field Report

Study: East; Area: Zone 1; Event: 1

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0006				51.1	858

Valve	Operation	Notes
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	

Flushing	Minimum	Recommended
Time (min)	12.6	37.9
Volume (gal)	10,832.9	32,498.6

Start Time

End Time

Operator

Date

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

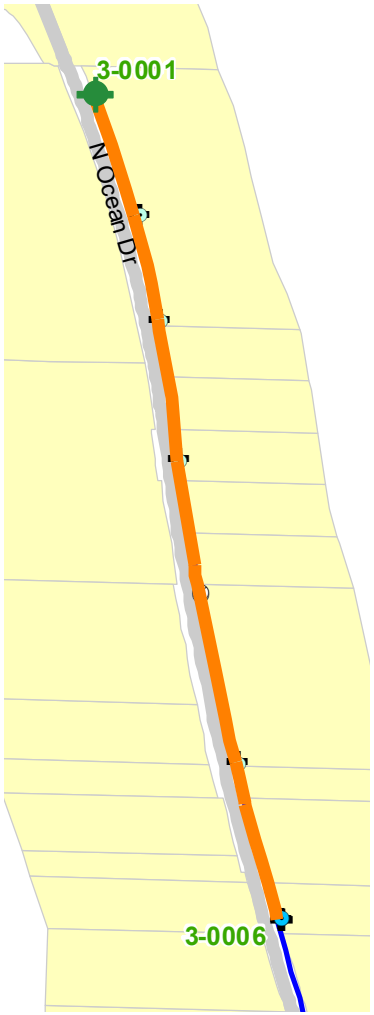
Pipe Run to be Cleaned
P-2474, P-8477, P-8476, P-8475, P-8474, P-1229, P-1228, P-2399(1), P-2399(2),
P-2391(1), P-2391(2), P-1173, P-1590, P-1589, P-2362, P-2360

Notes

Flushing Field Report

Study: East; Area: Zone 1; Event: 2

Primary View



Flushing Field Report

Study: East; Area: Zone 1; Event: 2

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0001				41.3	900

Valve	Operation	Notes
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	

Pipe Run to be Cleaned
P-2359, P-2357, P-2222, P-2221, P-2354, P-2352, P-2350

Flushing	Minimum	Recommended
Time (min)	14.6	43.9
Volume (gal)	13,162.8	39,488.4

Start Time _____

End Time _____

Operator _____

Date

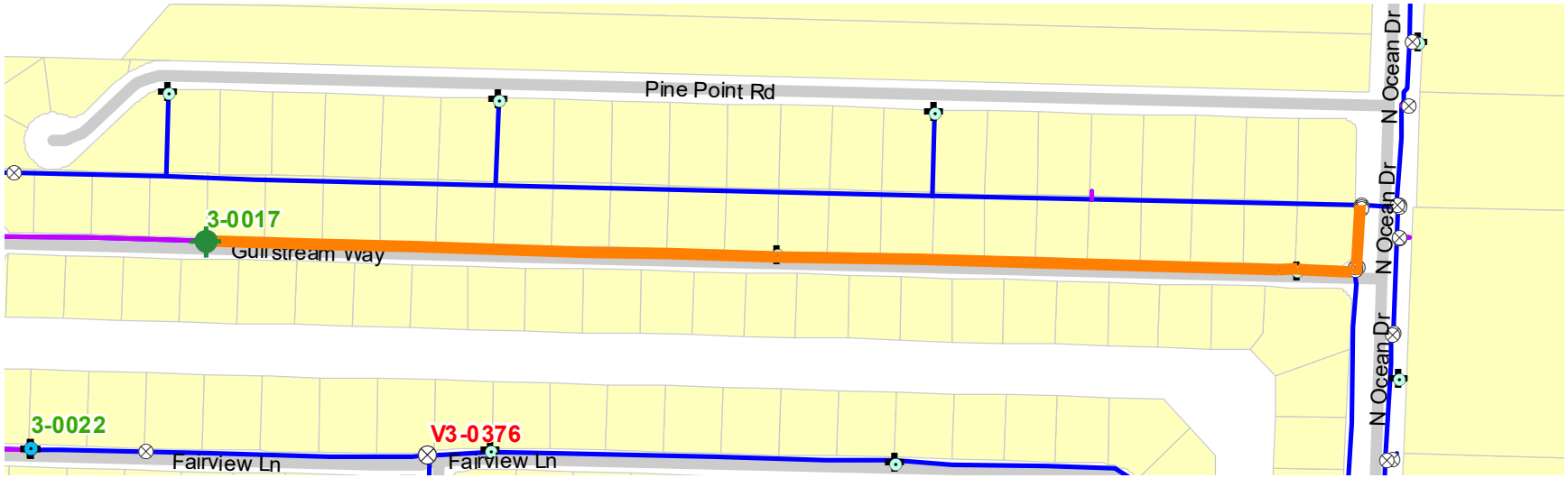
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes _____

Flushing Field Report

Study: East; Area: Zone 1; Event: 3

Primary View



Flushing Field Report

Study: East; Area: Zone 1; Event: 3

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0017				23.7	682

Valve	Operation	Notes
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	

Pipe Run to be Cleaned
P-8443, P-8442, P-2486, P-2484(1), P-2485, P-2481, P-2479

Flushing	Minimum	Recommended
Time (min)	4.7	14.0
Volume (gal)	3,187.1	9,561.3

Start Time

End Time

Operator

Date

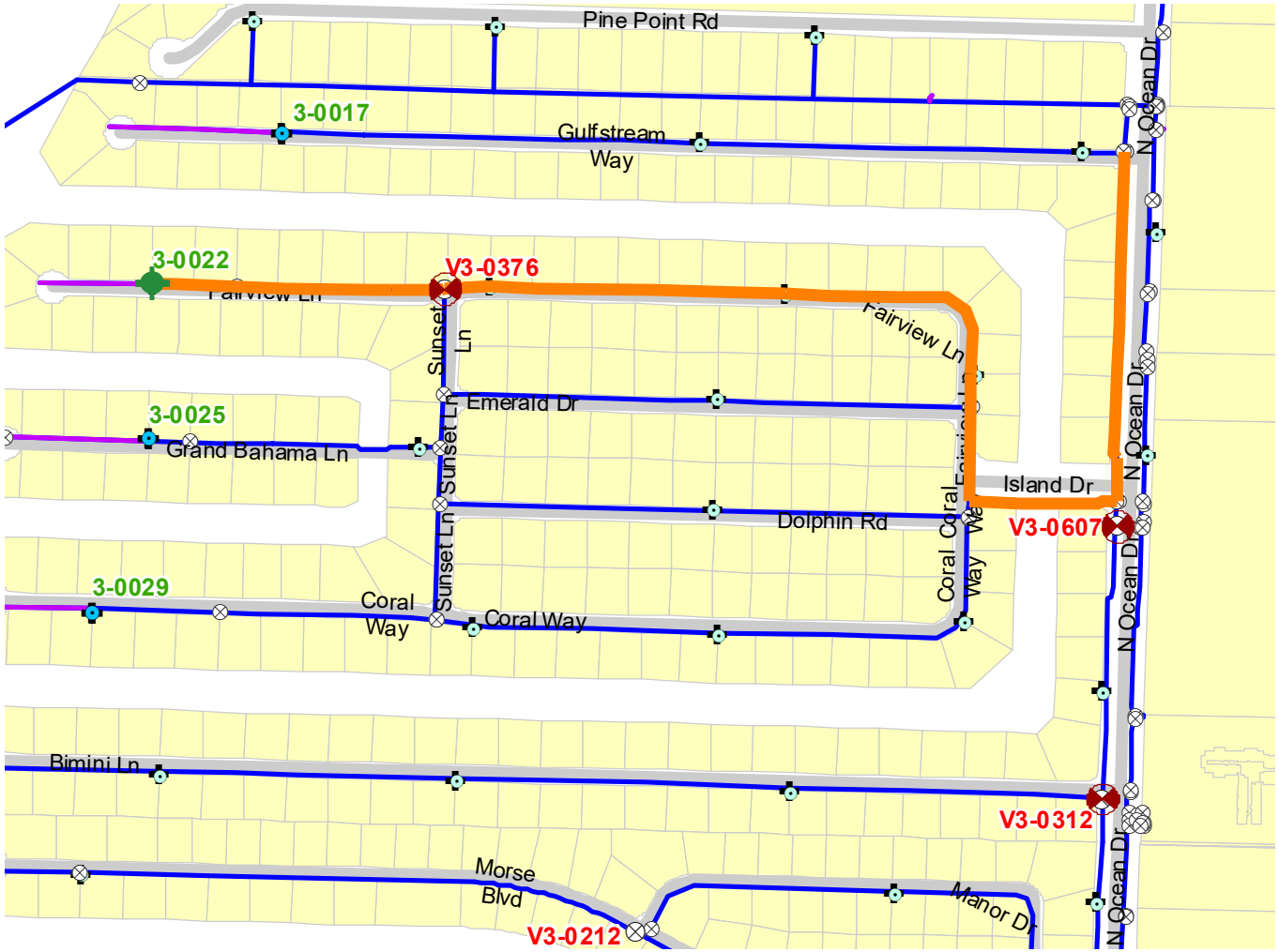
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes

Flushing Field Report

Study: East; Area: Zone 1; Event: 4

Primary View



Flushing Field Report

Study: East; Area: Zone 1; Event: 4

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0022				20.6	567

Valve	Operation	Notes
V3-0607	Close ☐	
V3-0312	Close ☐	
V3-0376	Close ☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	

Flushing	Minimum	Recommended
Time (min)	10.3	30.9
Volume (gal)	5,849.6	17,548.7

Start Time

End Time

Operator

Date

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

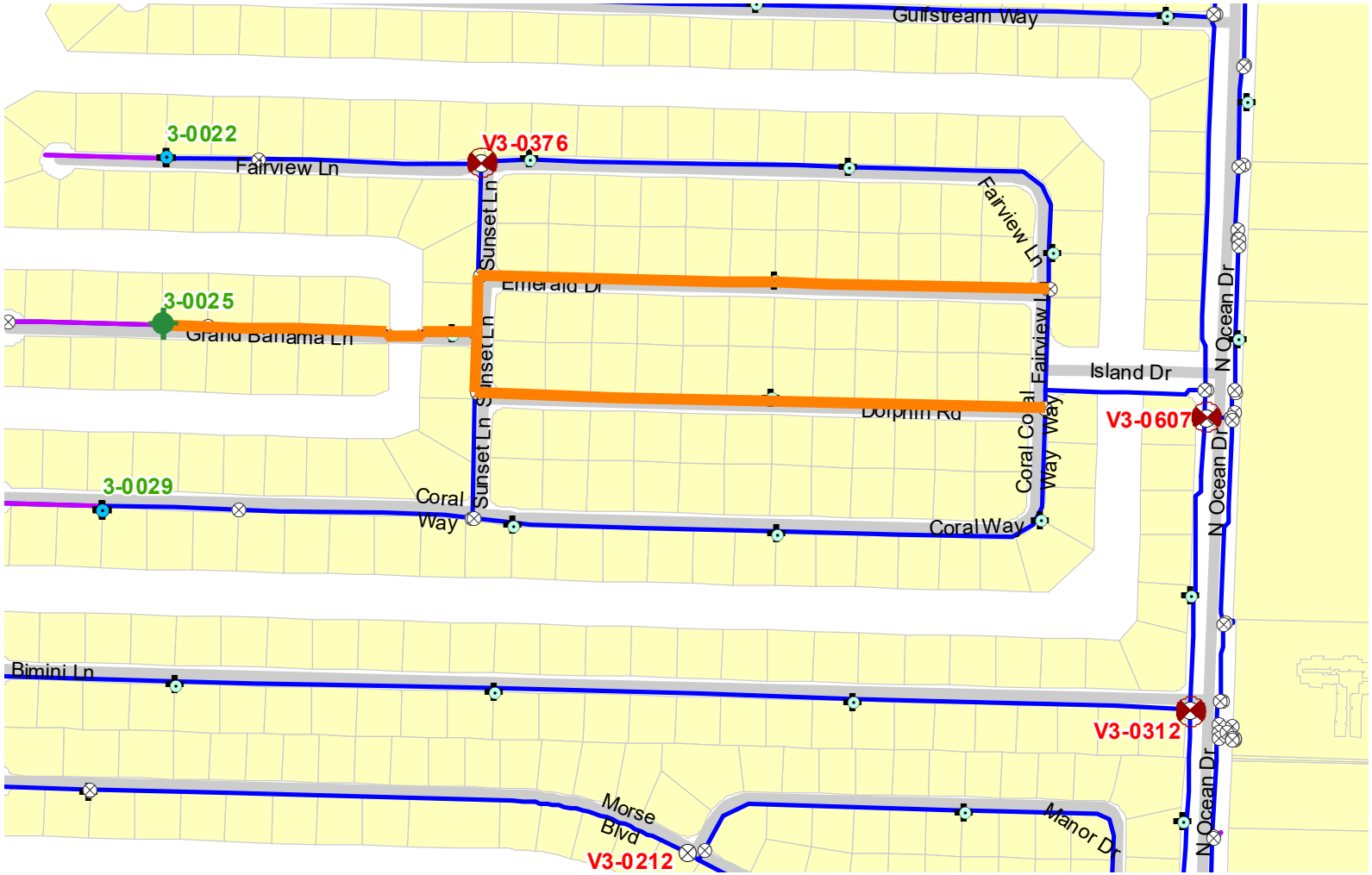
Pipe Run to be Cleaned
P-2873, P-2876, P-2877, P-2874, P-2852, P-2846, P-2839, P-2532, P-2533, P-2838,
P-2535, P-2534

Notes

Flushing Field Report

Study: East; Area: Zone 1; Event: 5

Primary View



Flushing Field Report

Study: East; Area: Zone 1; Event: 5

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0025				24.9	723

Valve	Operation	Notes
V3-0607	Closed (prior) ☐	
V3-0312	Closed (prior) ☐	
V3-0376	Closed (prior) ☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	

Flushing	Minimum	Recommended
Time (min)	15.9	47.6
Volume (gal)	11,466.7	34,400.1

Start Time

End Time

Operator

Date

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

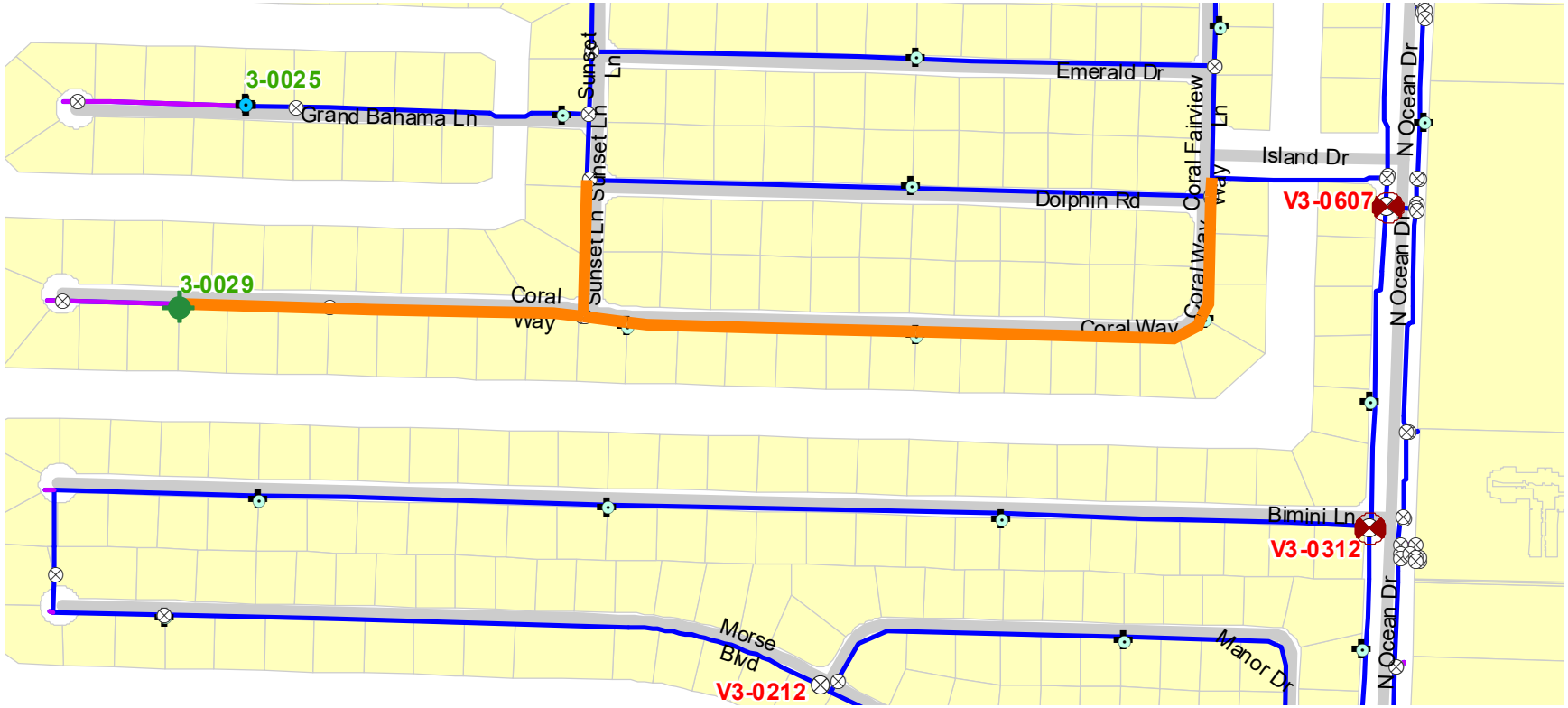
Pipe Run to be Cleaned
P-2853, P-2851, P-2868, P-2869, P-2867, P-2870, P-2866, P-2864, P-2875, P-2879,
P-1378

Notes

Flushing Field Report

Study: East; Area: Zone 1; Event: 6

Primary View



Flushing Field Report

Study: East; Area: Zone 1; Event: 6

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0029				25.2	702

Valve	Operation	Notes
V3-0376	Reopen ☐	
V3-0607	Closed (prior) ☐	
V3-0312	Closed (prior) ☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	

Pipe Run to be Cleaned
P-2880, P-3143, P-2538, P-2536, P-3147, P-3144, P-3145

Flushing	Minimum	Recommended
Time (min)	11.0	33.0
Volume (gal)	7,727.1	23,181.3

Start Time _____

End Time _____

Operator _____

Date

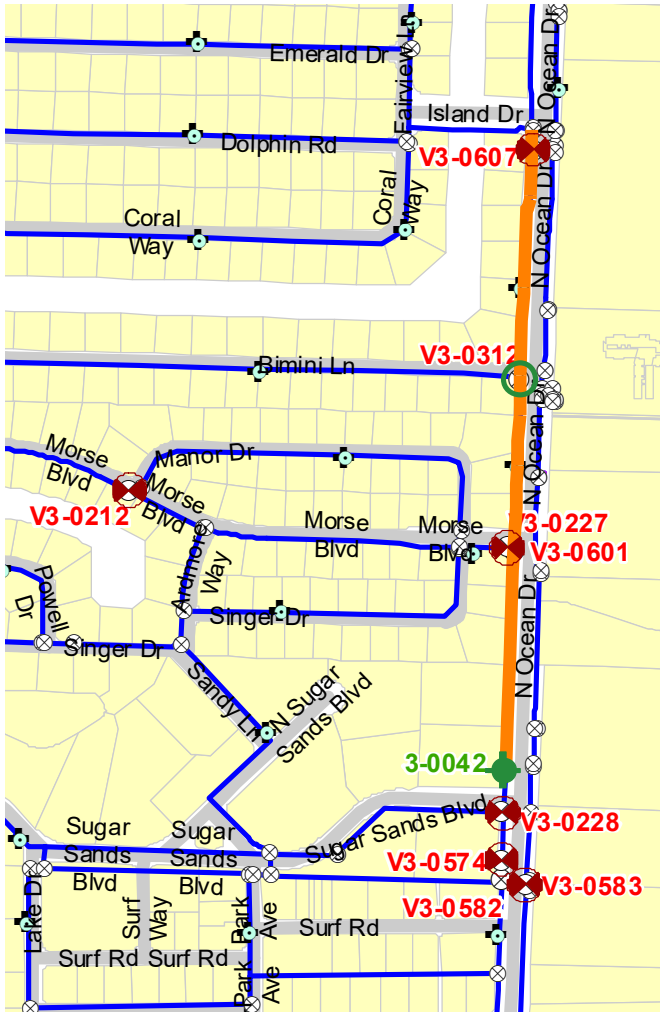
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes _____

Flushing Field Report

Study: East; Area: Zone 1; Event: 7

Primary View



Flushing Field Report

Study: East; Area: Zone 1; Event: 7

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0042				30.7	776

Valve	Operation	Notes
V3-0312	Reopen ☐	
V3-0607	Closed (prior) ☐	
V3-0212	Close ☐	
V3-0227	Close ☐	
V3-0583	Close ☐	
V3-0574	Close ☐	
V3-0228	Close ☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	

Flushing	Minimum	Recommended
Time (min)	9.2	27.6
Volume (gal)	7,147.6	21,442.8

Start Time

End Time

Operator

Date

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

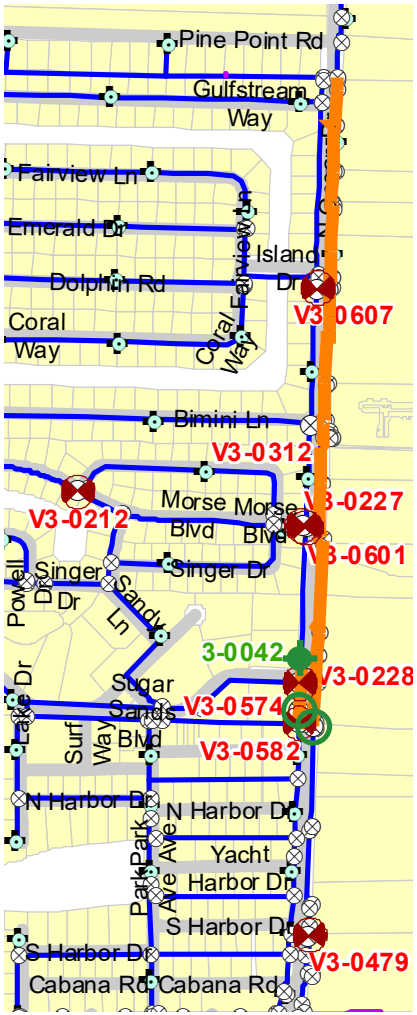
Pipe Run to be Cleaned
P-3125(1), P-3125(2), P-3127, P-2546, P-3205, P-3572, P-2589, P-2910, P-4165

Notes

Flushing Field Report

Study: East; Area: Zone 1; Event: 8

Primary View



Flushing Field Report

Study: East; Area: Zone 1; Event: 8

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0042				36.2	843

Valve	Operation	Notes
V3-0583	Reopen ☐	
V3-0574	Reopen ☐	
V3-0607	Closed (prior) ☐	
V3-0227	Closed (prior) ☐	
V3-0212	Closed (prior) ☐	
V3-0228	Closed (prior) ☐	
V3-0582	Close ☐	
V3-0601	Close ☐	
V3-0479	Close ☐	
	☐	
	☐	
	☐	
	☐	

Flushing	Minimum	Recommended
Time (min)	12.2	36.7
Volume (gal)	10,310.5	30,931.5

Start Time

End Time

Operator

Date

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Pipe Run to be Cleaned
P-4196, P-4283, P-4286, P-4285, P-4280(2)(2), P-4280(2)(1), P-4280(1)(2),
P-4280(1)(1)(2), P-4280(1)(1)(1), P-8829(2), P-8829(1)(1), P-8829(1)(2), P-0167, P-8779, P-8780, P-8737(

Notes

Flushing Field Report

Study: East; Area: Zone 1; Event: 8

Final Actions

Valve	Operation	Notes
V3-0607	Reopen ☐	
V3-0227	Reopen ☐	
V3-0212	Reopen ☐	
V3-0228	Reopen ☐	
V3-0582	Reopen ☐	
V3-0601	Reopen ☐	
V3-0479	Reopen ☐	
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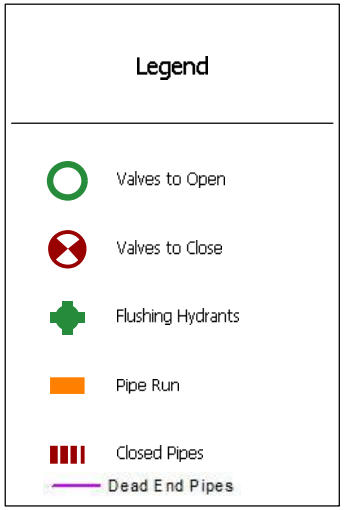
Flushing Field Report

Study: East

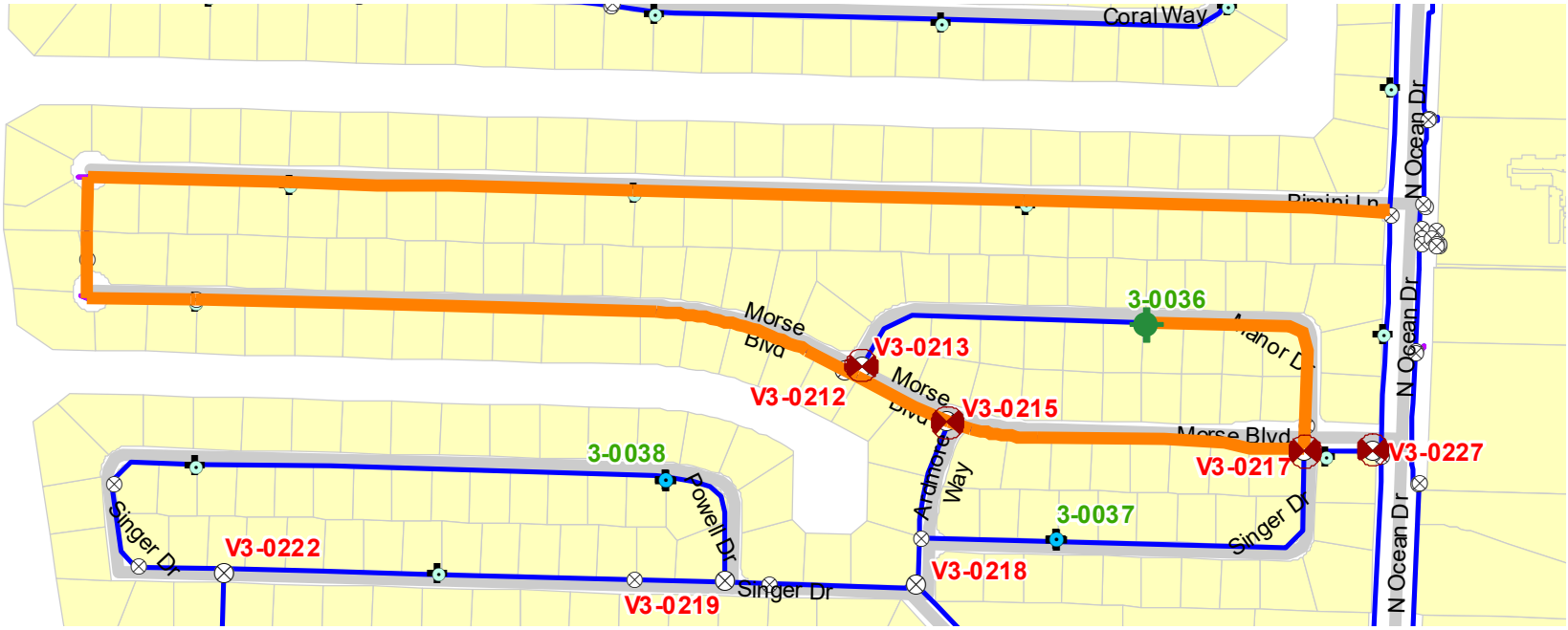


East Area - Zone 2

Flushing Field Report

Study: East; Area: Zone 2; Event: 1

Primary View



Flushing Field Report

Study: East; Area: Zone 2; Event: 1

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0036				20.6	263

Valve	Operation	Notes
V3-0215	Close ☐	
V3-0217	Close ☐	
V3-0227	Close ☐	
V3-0213	Close ☐	
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Flushing	Minimum	Recommended
Time (min)	27.4	82.2
Volume (gal)	7,204.4	21,613.1

Start Time	
End Time	
Operator	
Date	

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Pipe Run to be Cleaned
P-3206, P-3198, P-3186, P-3179, P-3223, P-3647, P-3651, P-1374, P-3650, P-3664,
P-3680, P-2907, P-3724, P-3731, P-2889, P-2906, P-2908

Notes: Recommended flushing time is 30 minutes

Flushing Field Report

Study: East; Area: Zone 2; Event: 2

Primary View

Flushing Field Report

Study: East; Area: Zone 2; Event: 2

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0036				44.4	933

Valve	Operation	Notes
V3-0227	Reopen ☐	
V3-0213	Reopen ☐	
V3-0215	Closed (prior) ☐	
V3-0217	Closed (prior) ☐	
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Pipe Run to be Cleaned
P-0789, P-2570

Flushing	Minimum	Recommended
Time (min)	2.0	5.9
Volume (gal)	1,832.1	5,496.4

Start Time

End Time

Operator

Date

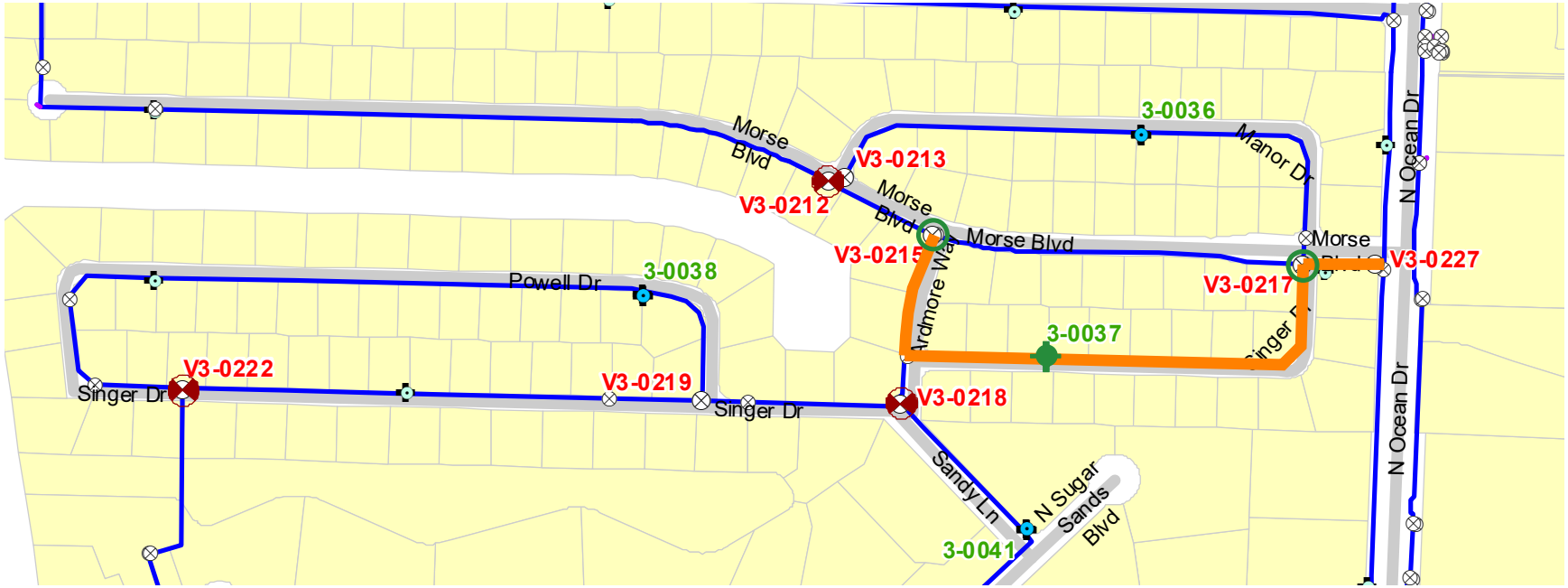
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes

Flushing Field Report

Study: East; Area: Zone 2; Event: 3

Primary View



Flushing Field Report

Study: East; Area: Zone 2; Event: 3

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0037				42.4	521

Valve	Operation	Notes
V3-0215	Reopen ☐	
V3-0217	Reopen ☐	
V3-0218	Close ☐	
V3-0222	Close ☐	
V3-0212	Close ☐	
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Flushing	Minimum	Recommended
Time (min)	3.6	10.7
Volume (gal)	1,862.5	5,587.5

Start Time

End Time

Operator

Date

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

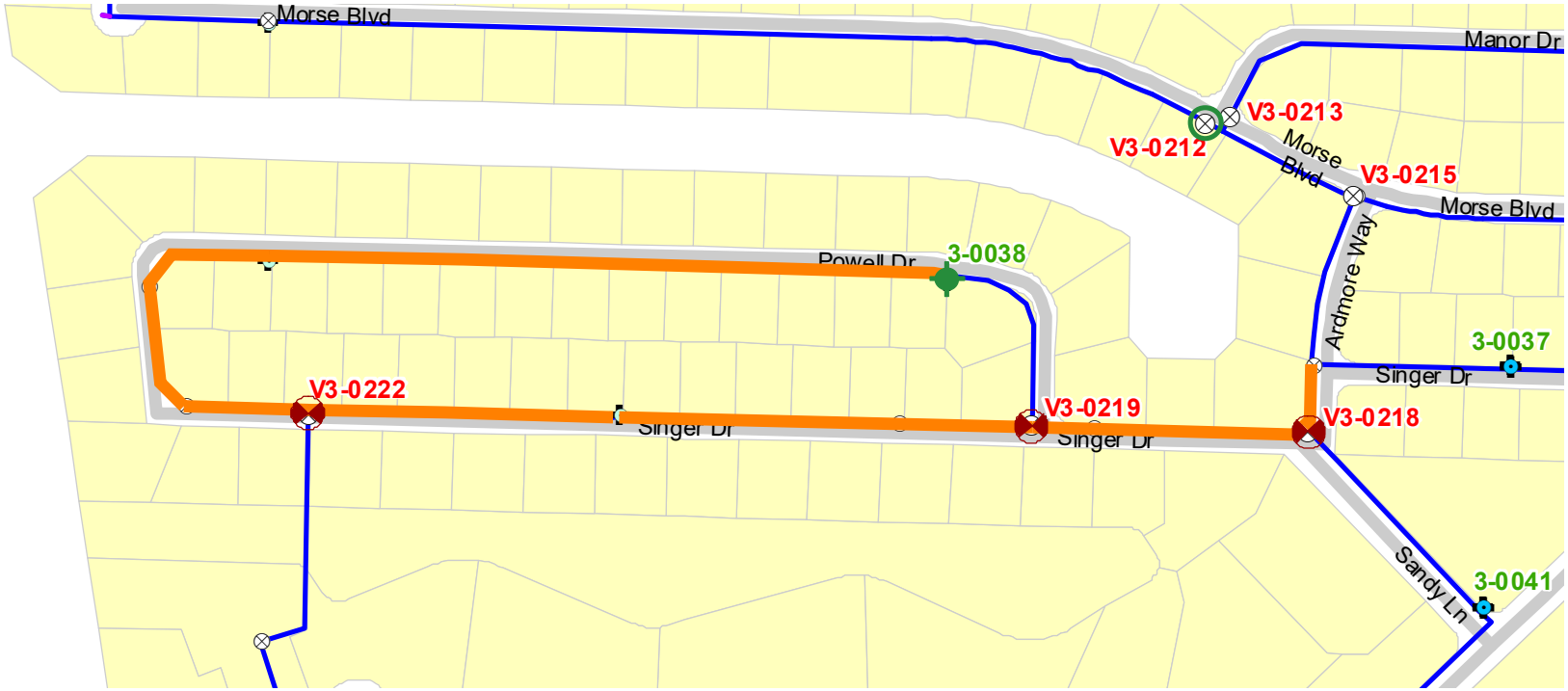
Pipe Run to be Cleaned
P-2922, P-2923, P-2909, P-2911, P-2917

Notes

Flushing Field Report

Study: East; Area: Zone 2; Event: 4

Primary View



Flushing Field Report

Study: East; Area: Zone 2; Event: 4

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0038				22.8	382

Valve	Operation	Notes
V3-0212	Reopen ☐	
V3-0219	Close ☐	
V3-0222	Closed (prior) ☐	
V3-0218	Closed (prior) ☐	
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Pipe Run to be Cleaned
P-3753, P-3749, P-3742, P-3740, P-3737, P-3275, P-3747

Flushing	Minimum	Recommended
Time (min)	11.6	34.9
Volume (gal)	4,450.1	13,350.2

Start Time _____

End Time _____

Operator _____

Date

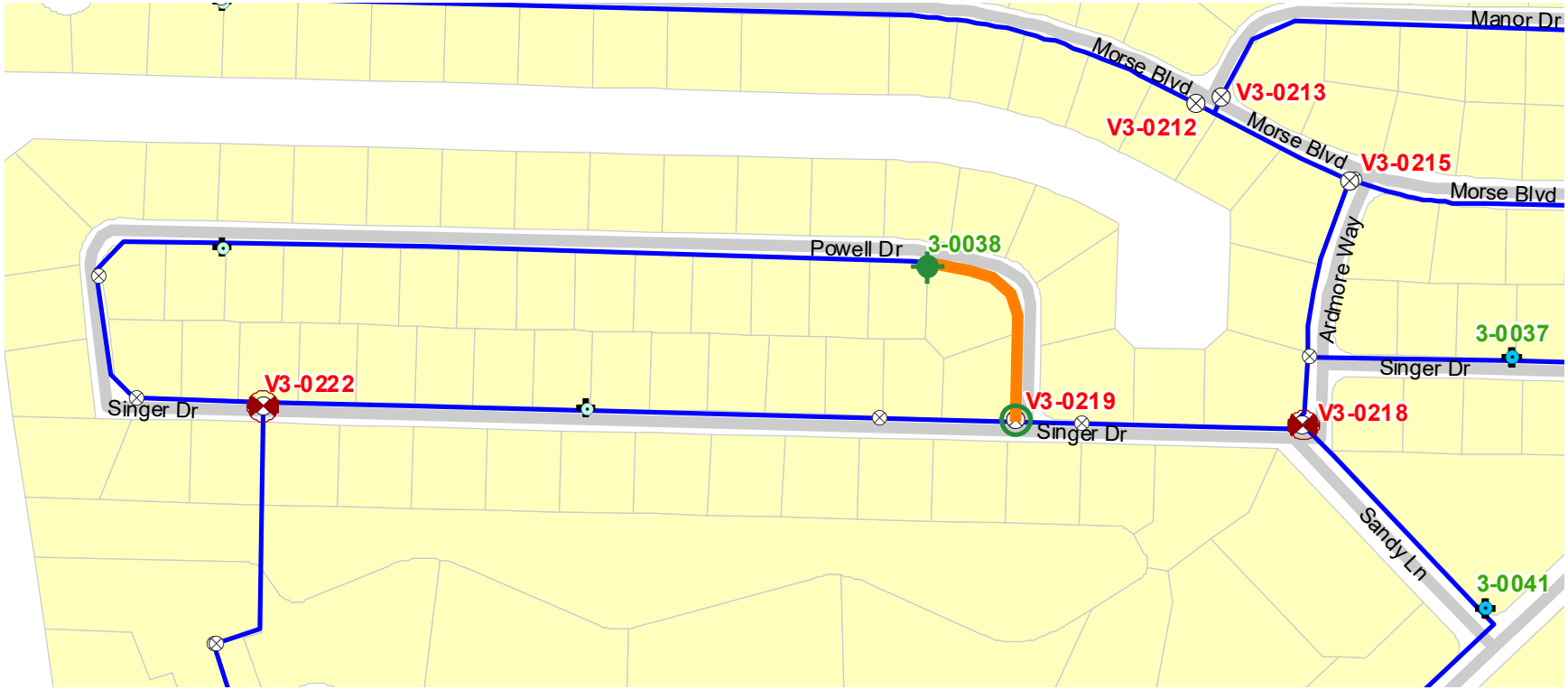
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes _____

Flushing Field Report

Study: East; Area: Zone 2; Event: 5

Primary View



Flushing Field Report

Study: East; Area: Zone 2; Event: 5

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0038				31.7	788

Valve	Operation	Notes
V3-0219	Reopen ☐	
V3-0222	Closed (prior) ☐	
V3-0218	Closed (prior) ☐	
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Pipe Run to be Cleaned
P-3748

Flushing	Minimum	Recommended
Time (min)	0.7	2.0
Volume (gal)	520.7	1,562.2

Start Time	
End Time	
Operator	
Date	

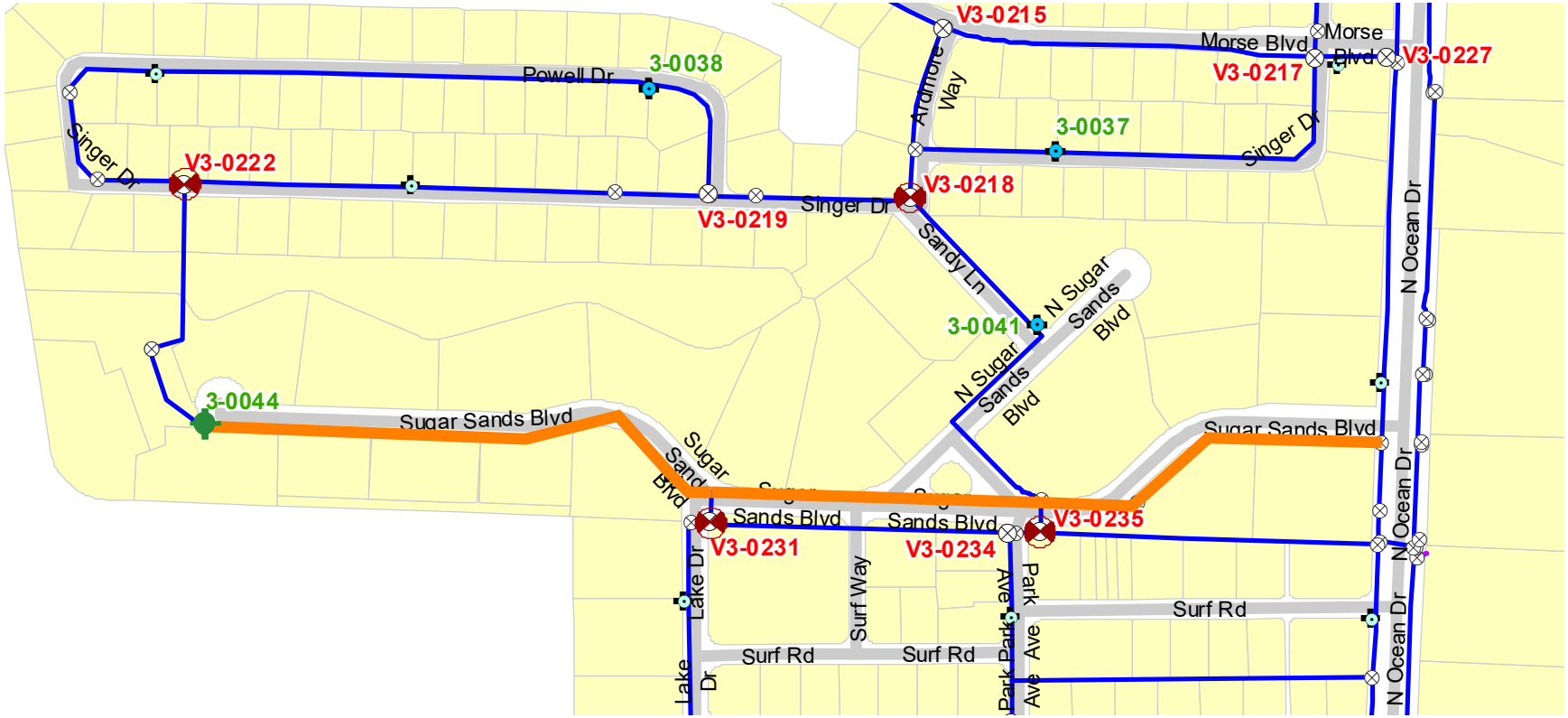
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes

Flushing Field Report

Study: East; Area: Zone 2; Event: 6

Primary View



Flushing Field Report

Study: East; Area: Zone 2; Event: 6

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0044				40.9	896

Valve	Operation	Notes
V3-0222	Closed (prior) ☐	
V3-0218	Closed (prior) ☐	
V3-0235	Close ☐	
V3-0231	Close ☐	
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Pipe Run to be Cleaned
P-4263, P-4262, P-4242, P-4221

Flushing	Minimum	Recommended
Time (min)	6.7	20.2
Volume (gal)	6,031.5	18,094.4

Start Time

End Time

Operator

Date

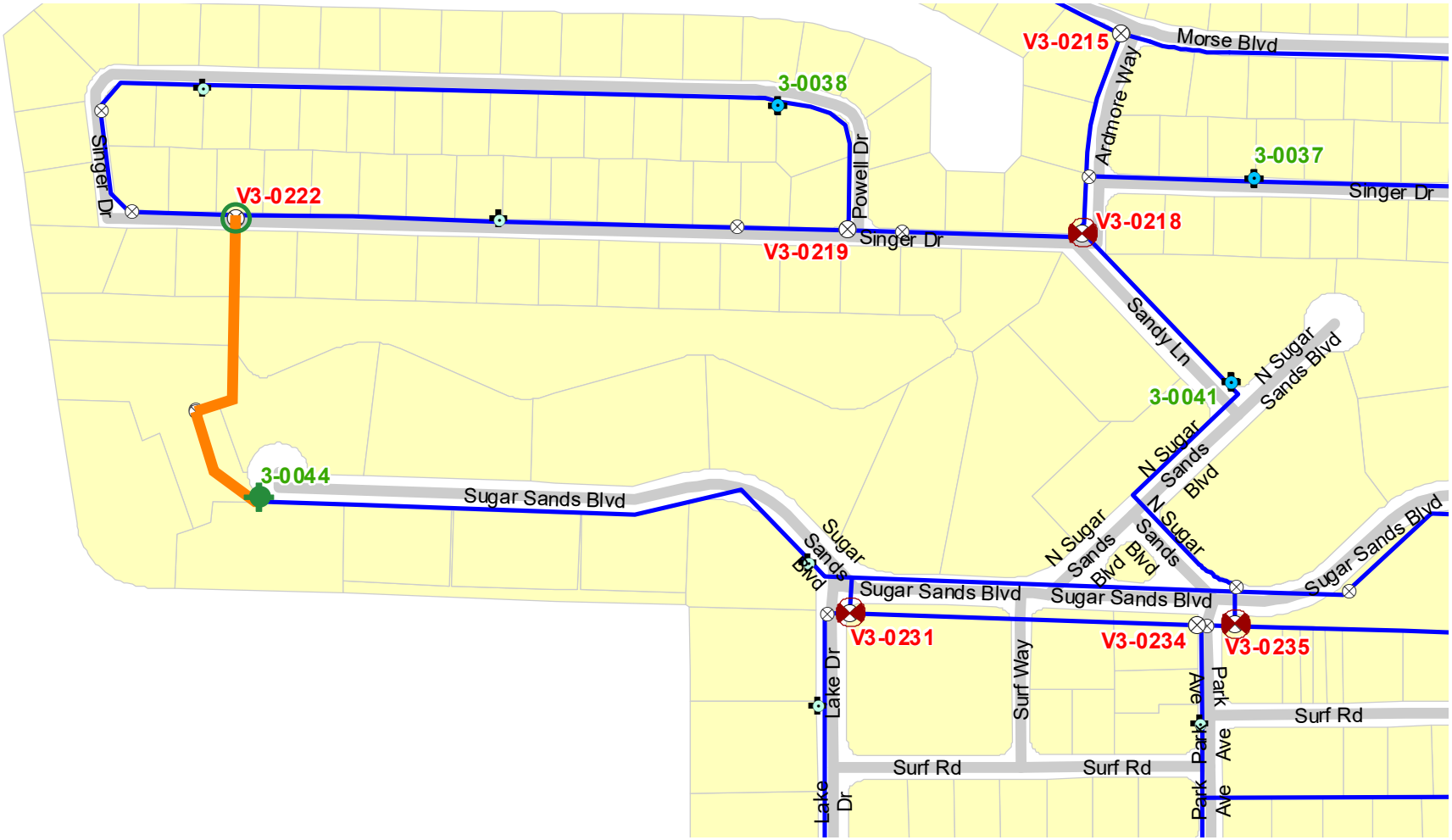
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes

Flushing Field Report

Study: East; Area: Zone 2; Event: 7

Primary View



Flushing Field Report

Study: East; Area: Zone 2; Event: 7

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0044				48.9	979

Valve	Operation	Notes
V3-0222	Reopen ☐	
V3-0231	Closed (prior) ☐	
V3-0235	Closed (prior) ☐	
V3-0218	Closed (prior) ☐	
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	☐	

Pipe Run to be Cleaned
P-3923, P-2633

Flushing	Minimum	Recommended
Time (min)	6.3	18.9
Volume (gal)	6,178.3	18,534.8

Start Time

End Time

Operator

Date

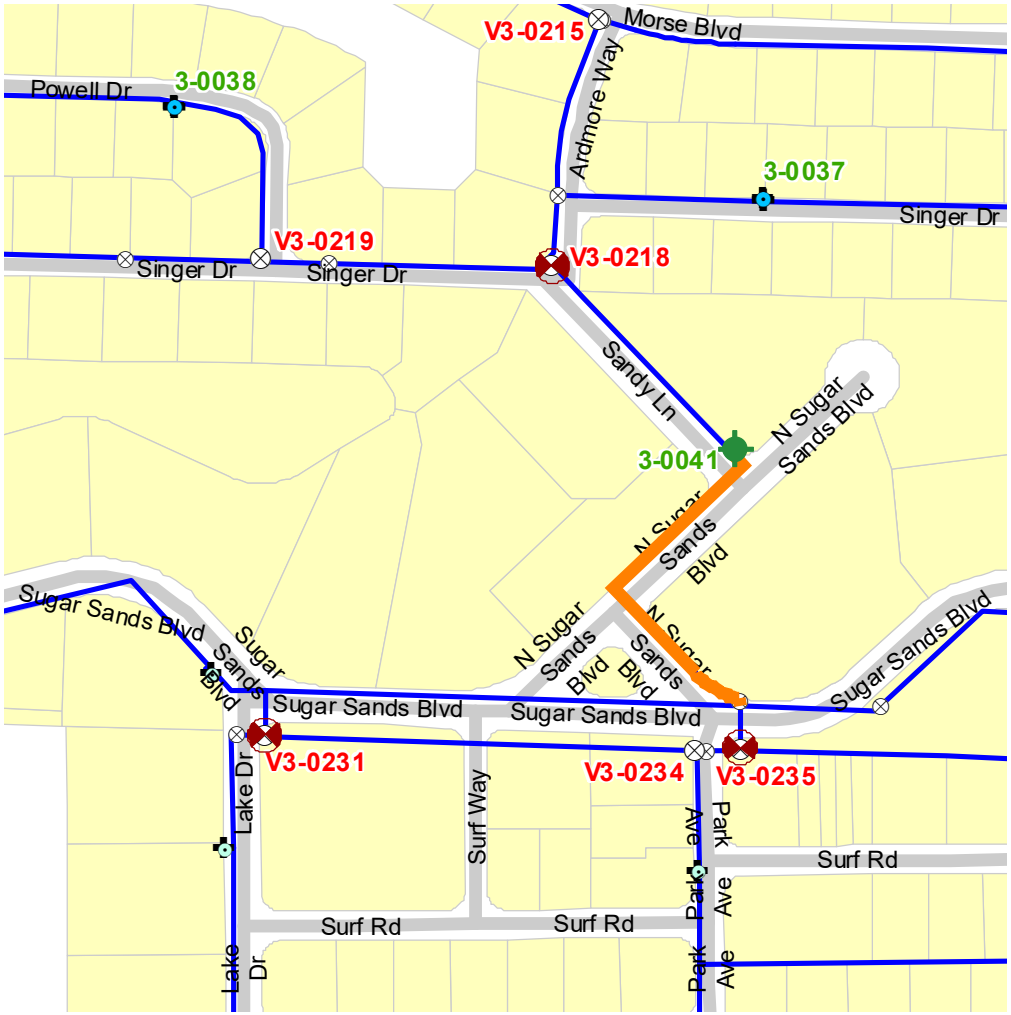
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes

Flushing Field Report

Study: East; Area: Zone 2; Event: 8

Primary View



Flushing Field Report

Study: East; Area: Zone 2; Event: 8

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0041				45.0	805

Valve	Operation	Notes
V3-0218	Closed (prior) ☐	
V3-0231	Closed (prior) ☐	
V3-0235	Closed (prior) ☐	
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Pipe Run to be Cleaned
P-4261, P-4255, P-4226

Flushing	Minimum	Recommended
Time (min)	0.9	2.7
Volume (gal)	734.9	2,204.6

Start Time

End Time

Operator

Date

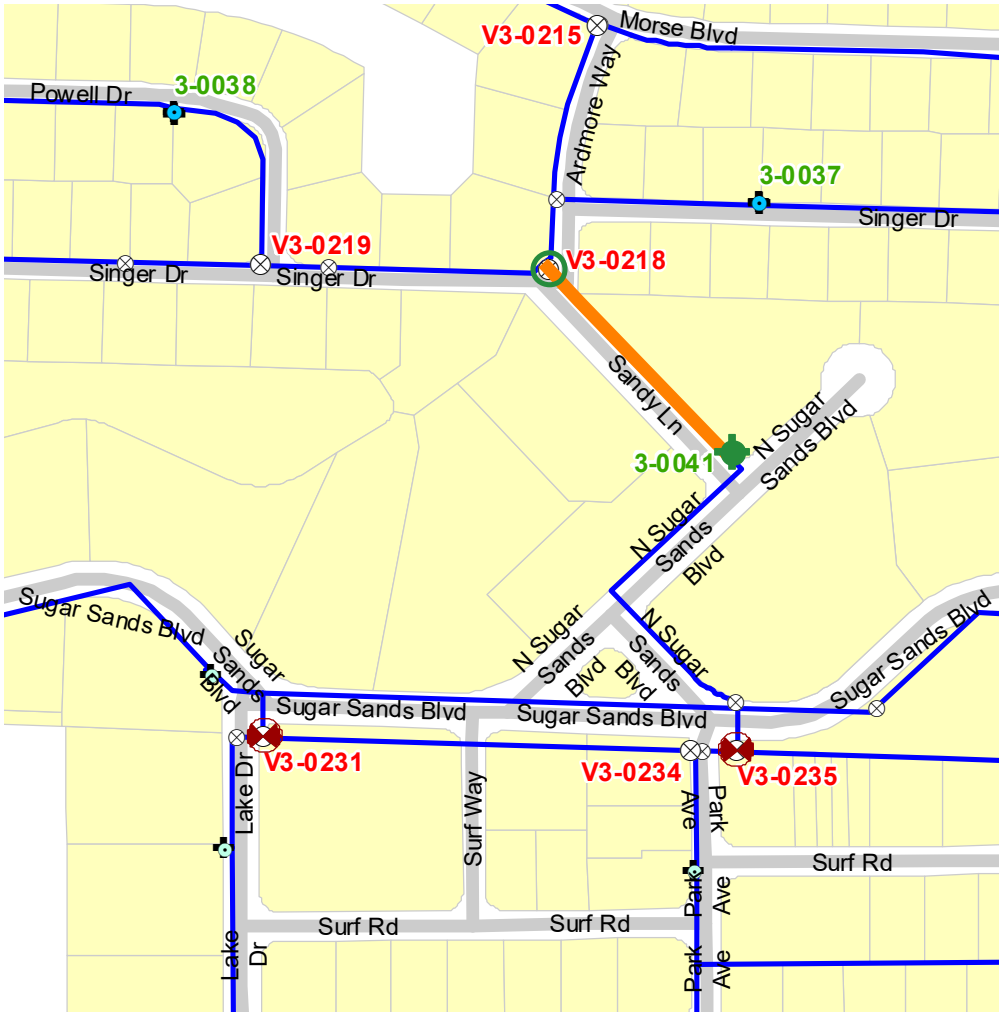
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes

Flushing Field Report

Study: East; Area: Zone 2; Event: 9

Primary View



Flushing Field Report

Study: East; Area: Zone 2; Event: 9

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0041				51.4	1,003

Valve	Operation	Notes
V3-0218	Reopen ☐	
V3-0235	Closed (prior) ☐	
V3-0231	Closed (prior) ☐	
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Pipe Run to be Cleaned
P-3893

Flushing	Minimum	Recommended
Time (min)	1.0	3.1
Volume (gal)	1,036.8	3,110.3

Start Time

End Time

Operator

Date

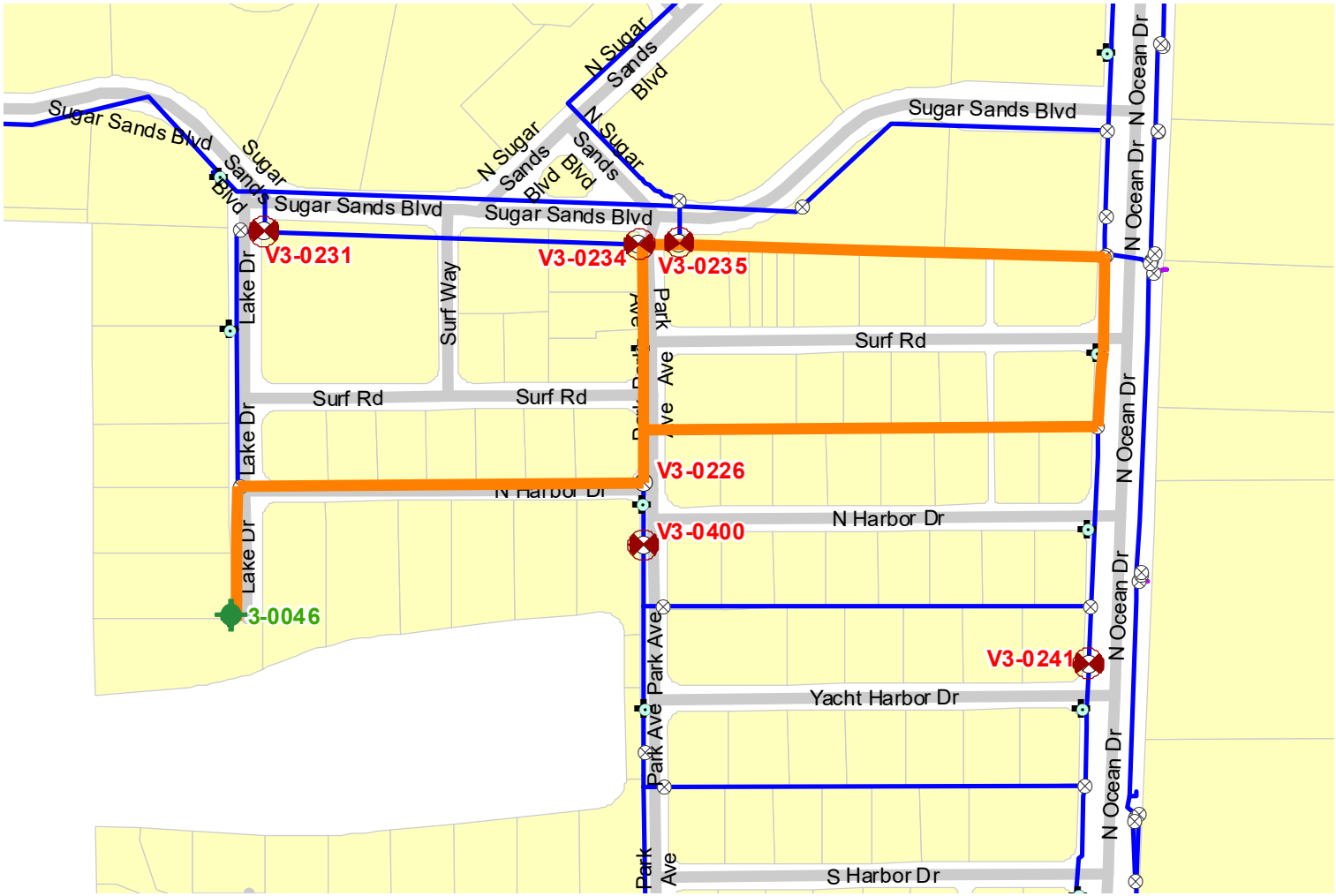
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes

Flushing Field Report

Study: East; Area: Zone 2; Event: 10

Primary View



Flushing Field Report

Study: East; Area: Zone 2; Event: 10

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0046				32.1	793

Valve	Operation	Notes
V3-0235	Closed (prior) ☐	
V3-0231	Closed (prior) ☐	
V3-0234	Close ☐	
V3-0400	Close ☐	
V3-0241	Close ☐	
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Pipe Run to be Cleaned
P-2820, P-4287, P-4276, P-1688, P-1690, P-4392, P-4600, P-4609, P-4730, P-4358,
P-4387

Flushing	Minimum	Recommended
Time (min)	9.2	27.6
Volume (gal)	7,309.7	21,929.2

Start Time _____

End Time _____

Operator _____

Date

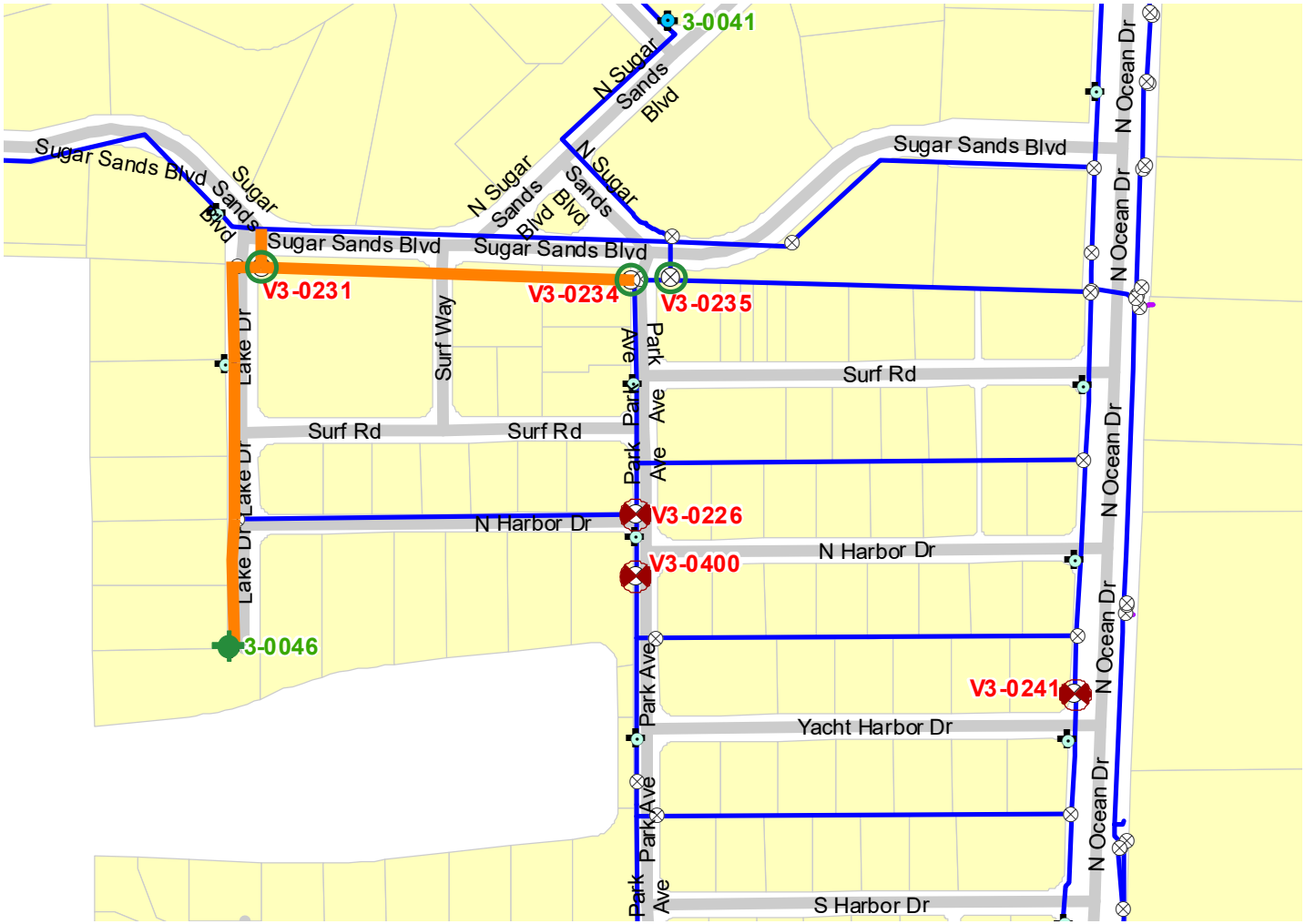
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes _____

Flushing Field Report

Study: East; Area: Zone 2; Event: 11

Primary View



Flushing Field Report

Study: East; Area: Zone 2; Event: 11

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0046				42.7	784

Valve	Operation	Notes
V3-0235	Reopen ☐	
V3-0231	Reopen ☐	
V3-0234	Reopen ☐	
V3-0241	Closed (prior) ☐	
V3-0226	Close ☐	
V3-0400	Closed (prior) ☐	
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Flushing	Minimum	Recommended
Time (min)	4.5	13.4
Volume (gal)	3,502.2	10,506.6

Start Time

End Time

Operator

Date

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Pipe Run to be Cleaned
P-4274, P-4267, P-4340, P-4610, P-4730

Notes

Flushing Field Report

Study: East; Area: Zone 2; Event: 11

Final Actions

Valve	Operation	Notes
V3-0241	Reopen ☐	
V3-0226	Reopen ☐	
V3-0400	Reopen ☐	
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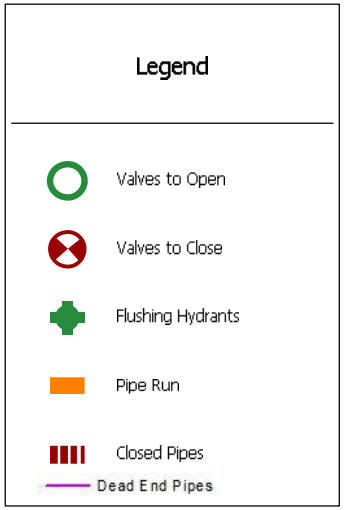
Flushing Field Report

Study: East

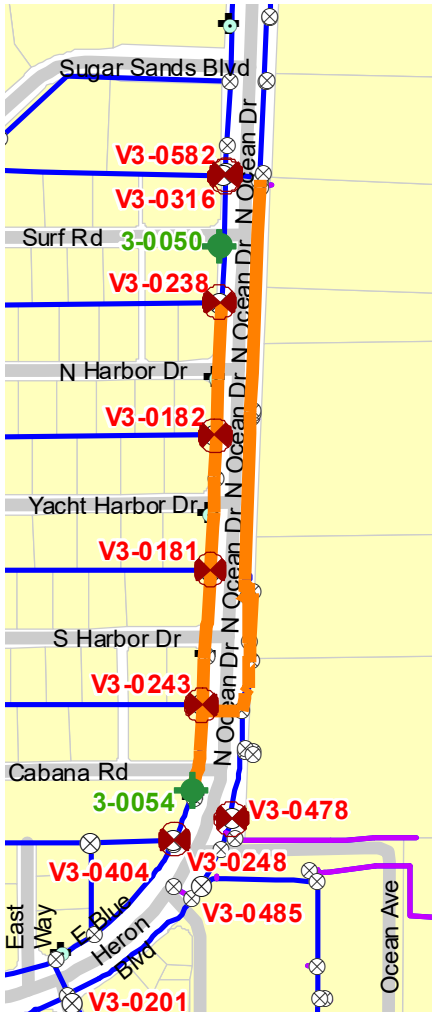


East Area - Zone 3

Flushing Field Report

Study: East; Area: Zone 3; Event: 1

Primary View



Flushing Field Report

Study: East; Area: Zone 3; Event: 1

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0050				23.4	677
3-0054				31.6	787

Valve	Operation	Notes
V3-0478	Close ☐	
V3-0248	Close ☐	
V3-0582	Close ☐	
V3-0316	Close ☐	
V3-0182	Close ☐	
V3-0181	Close ☐	
V3-0243	Close ☐	
V3-0238	Close ☐	
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Flushing	Minimum	Recommended
Time (min)	6.9	20.7
Volume (gal)	10,108.5	30,325.6

Start Time

End Time

Operator

Date

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

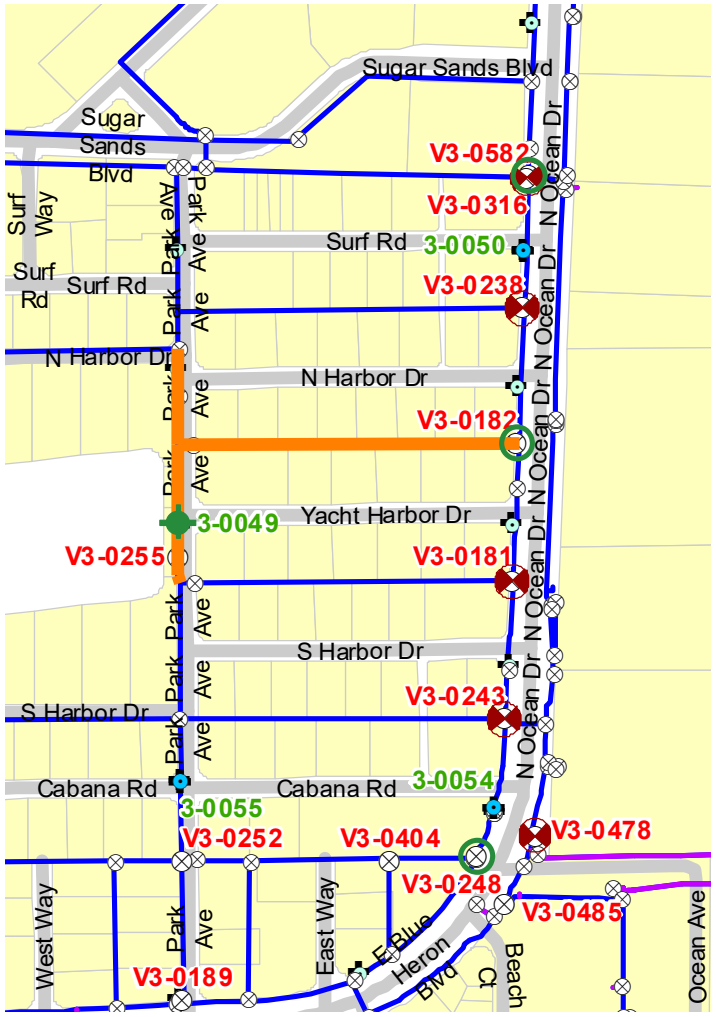
Pipe Run to be Cleaned
P-4641, P-4720, P-4718(2)(2)(2), P-4718(2)(2)(1), P-4943(1)(1), P-4718(1),
P-4718(2)(1), P-4943(1)(2), P-4943(2), P-1190(2), P-1190(1), P-5037, P-1189, P-8941, P-8942, P-8943, P-

Notes 2 hydrants flushing

Flushing Field Report

Study: East; Area: Zone 3; Event: 2

Primary View



Flushing Field Report

Study: East; Area: Zone 3; Event: 2

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0049				55.7	1,045

Valve	Operation	Notes
V3-0248	Reopen ☐	
V3-0582	Reopen ☐	
V3-0182	Reopen ☐	
V3-0316	Closed (prior) ☐	
V3-0243	Closed (prior) ☐	
V3-0238	Closed (prior) ☐	
V3-0181	Closed (prior) ☐	
V3-0478	Closed (prior) ☐	
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Flushing	Minimum	Recommended
Time (min)	5.5	16.6
Volume (gal)	5,778.4	17,335.1

Start Time

End Time

Operator

Date

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

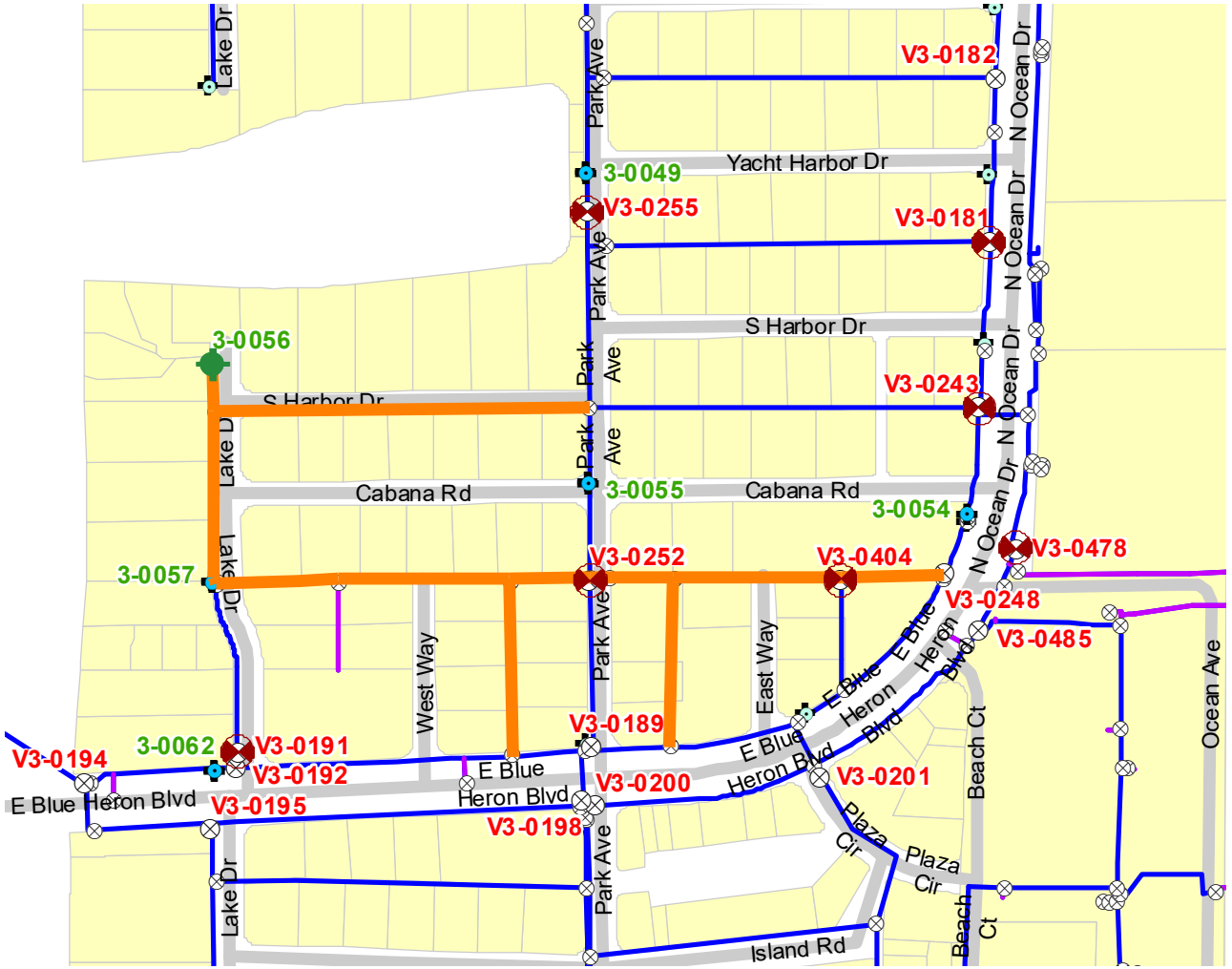
Pipe Run to be Cleaned
P-4628, P-4723, P-4722, P-4788, P-4809, P-4817, P-4825

Notes

Flushing Field Report

Study: East; Area: Zone 3; Event: 3

Primary View



Flushing Field Report

Study: East; Area: Zone 3; Event: 3

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0056				21.1	505

Valve	Operation	Notes
V3-0316	Reopen ☐	
V3-0238	Reopen ☐	
V3-0255	Close ☐	
V3-0191	Close ☐	
V3-0252	Close ☐	
V3-0404	Close ☐	
V3-0243	Closed (prior) ☐	
V3-0181	Closed (prior) ☐	
V3-0478	Closed (prior) ☐	
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	☐	

Pipe Run to be Cleaned
P-5003, P-5004, P-1700(2), P-3365, P-3364, P-3363, P-3361, P-3360, P-3359, P-5252,
P-5261, P-1700(1)

Flushing	Minimum	Recommended
Time (min)	9.7	29.2
Volume (gal)	4,912.6	14,737.9

Start Time

End Time

Operator

Date

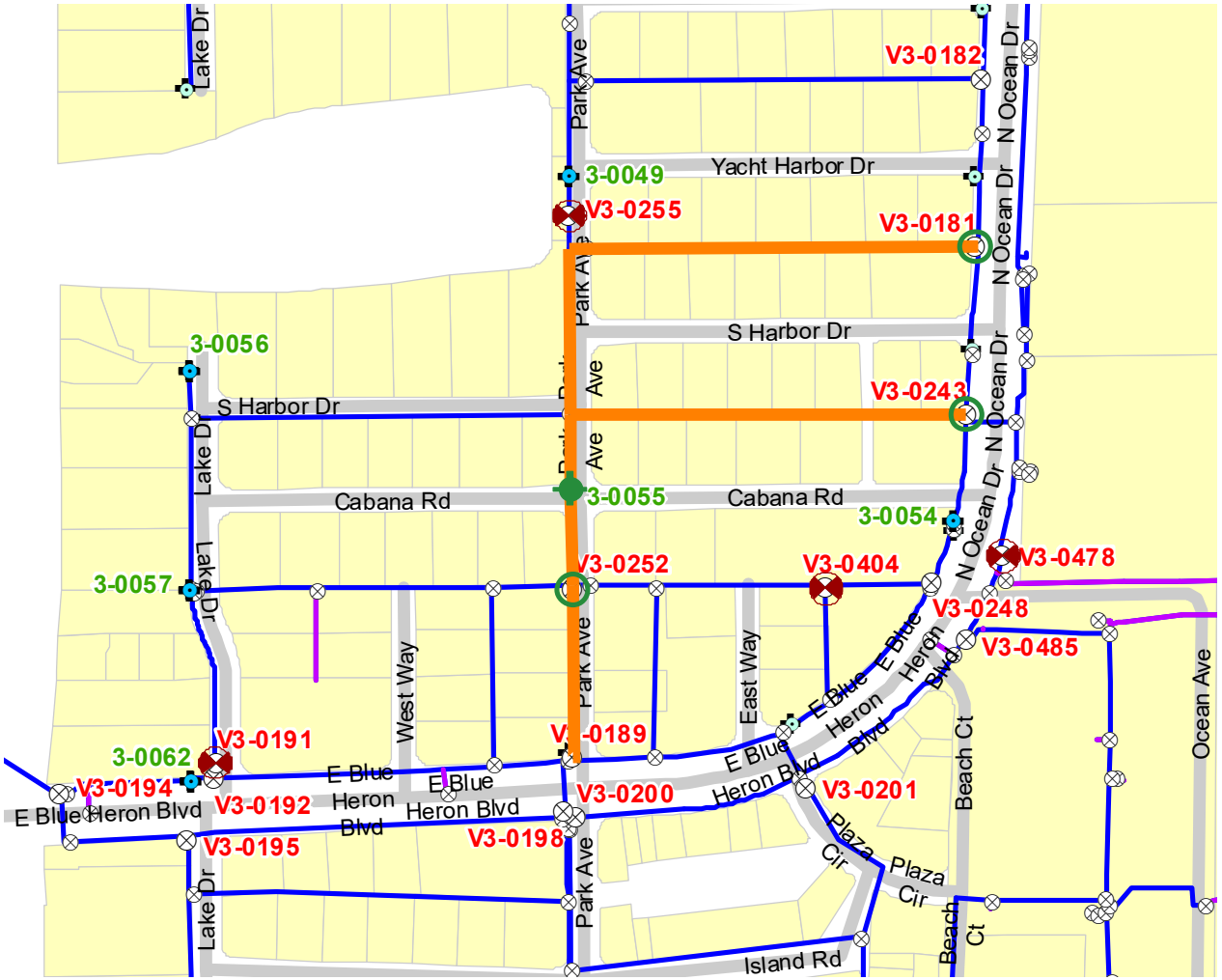
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes

Flushing Field Report

Study: East; Area: Zone 3; Event: 4

Primary View



Flushing Field Report

Study: East; Area: Zone 3; Event: 4

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0055				55.2	1,115

Valve	Operation	Notes
V3-0252	Reopen ☐	
V3-0243	Reopen ☐	
V3-0181	Reopen ☐	
V3-0255	Closed (prior) ☐	
V3-0191	Closed (prior) ☐	
V3-0404	Closed (prior) ☐	
V3-0478	Closed (prior) ☐	
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Pipe Run to be Cleaned
P-4824, P-4998, P-5248, P-3362, P-3962, P-4996

Flushing	Minimum	Recommended
Time (min)	11.1	33.4
Volume (gal)	12,422.7	37,268.2

Start Time

End Time

Operator

Date

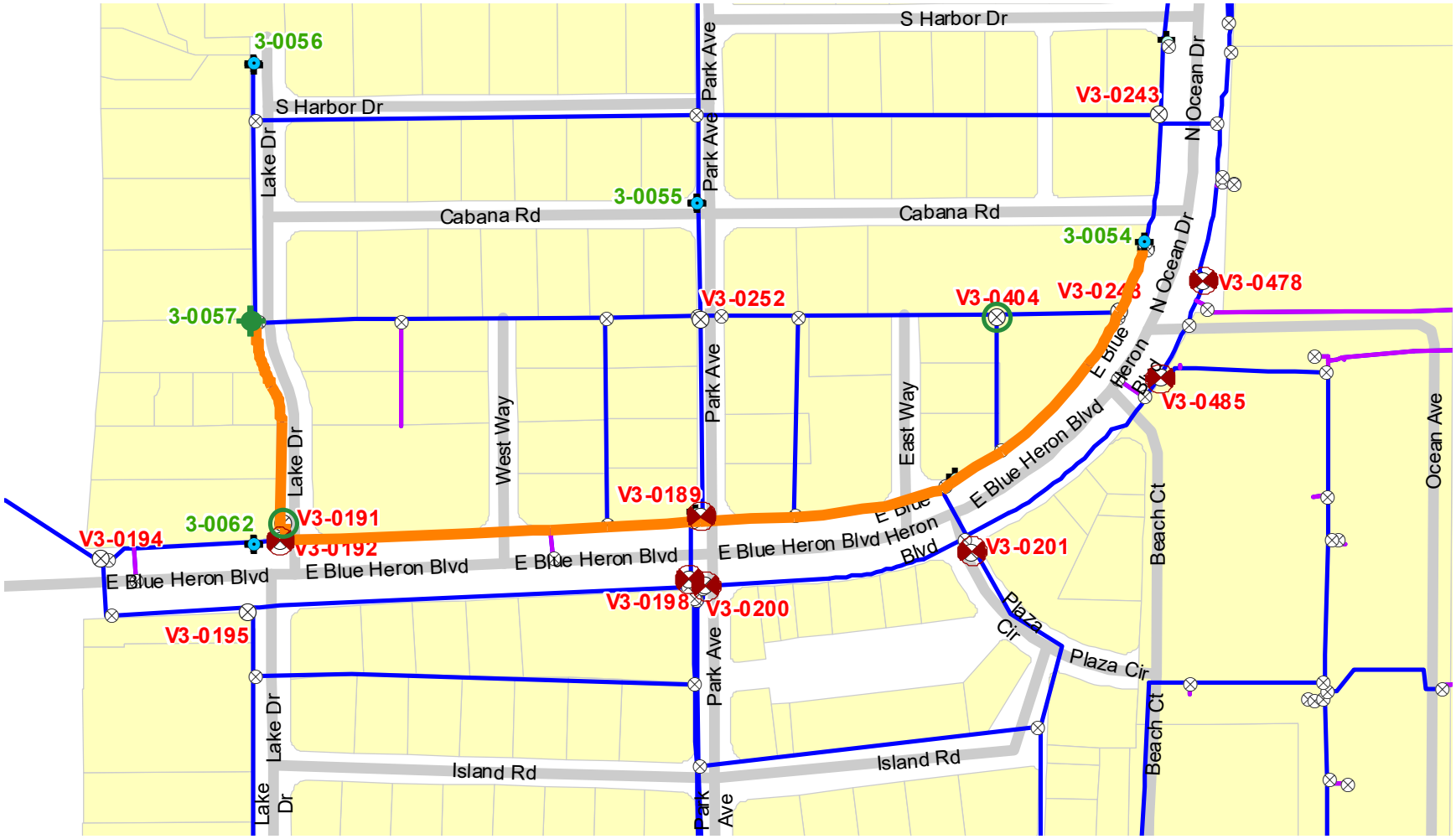
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes

Flushing Field Report

Study: East; Area: Zone 3; Event: 5

Primary View



Flushing Field Report

Study: East; Area: Zone 3; Event: 5

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0057				33.1	834

Valve	Operation	Notes
V3-0255	Reopen ☐	
V3-0191	Reopen ☐	
V3-0404	Reopen ☐	
V3-0192	Close ☐	
V3-0201	Close ☐	
V3-0198	Close ☐	
V3-0485	Close ☐	
V3-0189	Close ☐	
V3-0200	Close ☐	
V3-0478	Closed (prior) ☐	
	☐	
	☐	
	☐	

Pipe Run to be Cleaned
P-3355, P-3379, P-5452, P-5120, P-0272, P-5251, P-5255, P-5257, P-5260, P-5262,
P-5266, P-5267, P-5258, P-5420, P-4907

Flushing	Minimum	Recommended
Time (min)	7.1	21.4
Volume (gal)	5,960.5	17,881.6

Start Time

End Time

Operator

Date

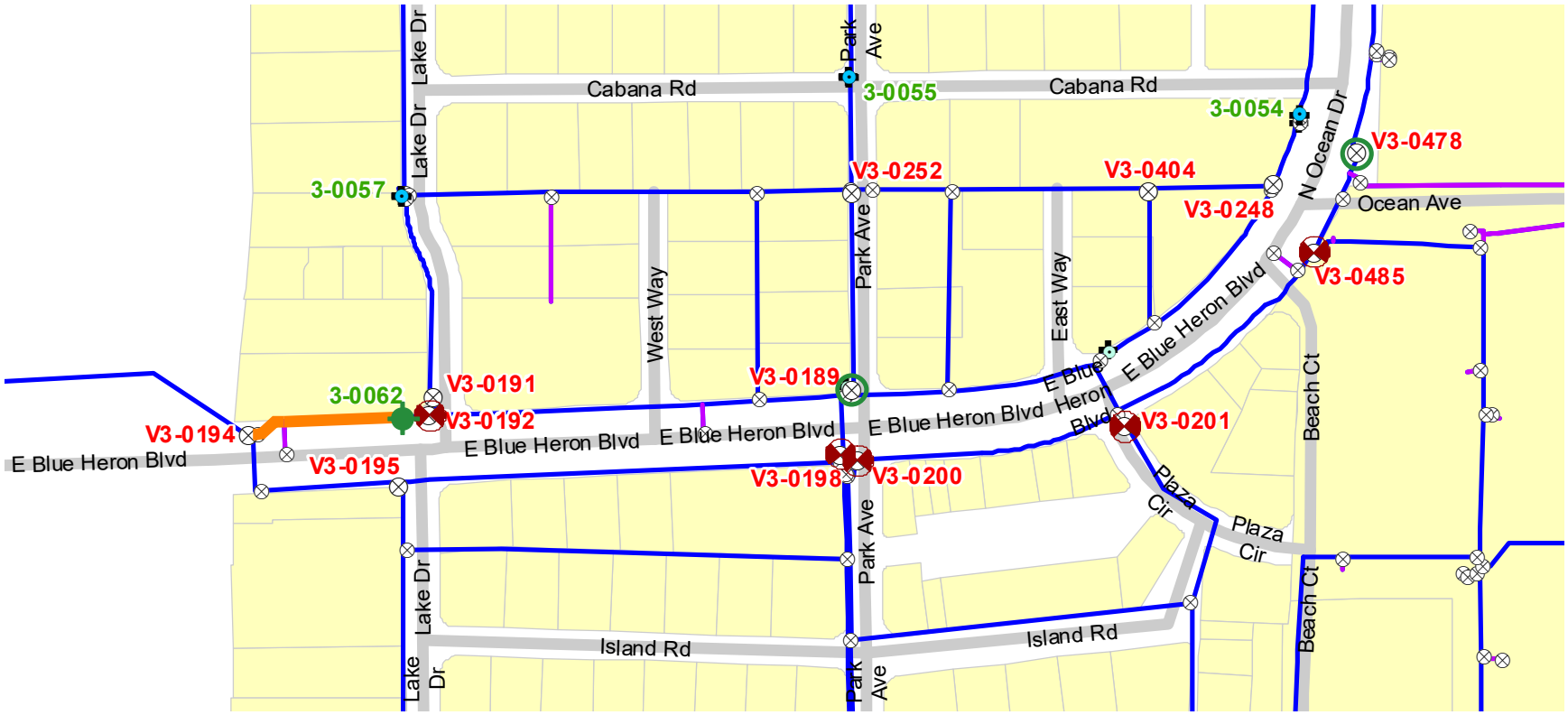
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes

Flushing Field Report

Study: East; Area: Zone 3; Event: 6

Primary View



Flushing Field Report

Study: East; Area: Zone 3; Event: 6

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0062				60.4	1,088

Valve	Operation	Notes
V3-0189	Reopen ☐	
V3-0478	Reopen ☐	
V3-0201	Closed (prior) ☐	
V3-0485	Closed (prior) ☐	
V3-0200	Closed (prior) ☐	
V3-0198	Closed (prior) ☐	
V3-0192	Closed (prior) ☐	
	☐	
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	☐	
	☐	
	☐	
	☐	

Pipe Run to be Cleaned
P-5296, P-5278

Flushing	Minimum	Recommended
Time (min)	0.5	1.6
Volume (gal)	592.8	1,778.3

Start Time _____

End Time _____

Operator _____

Date

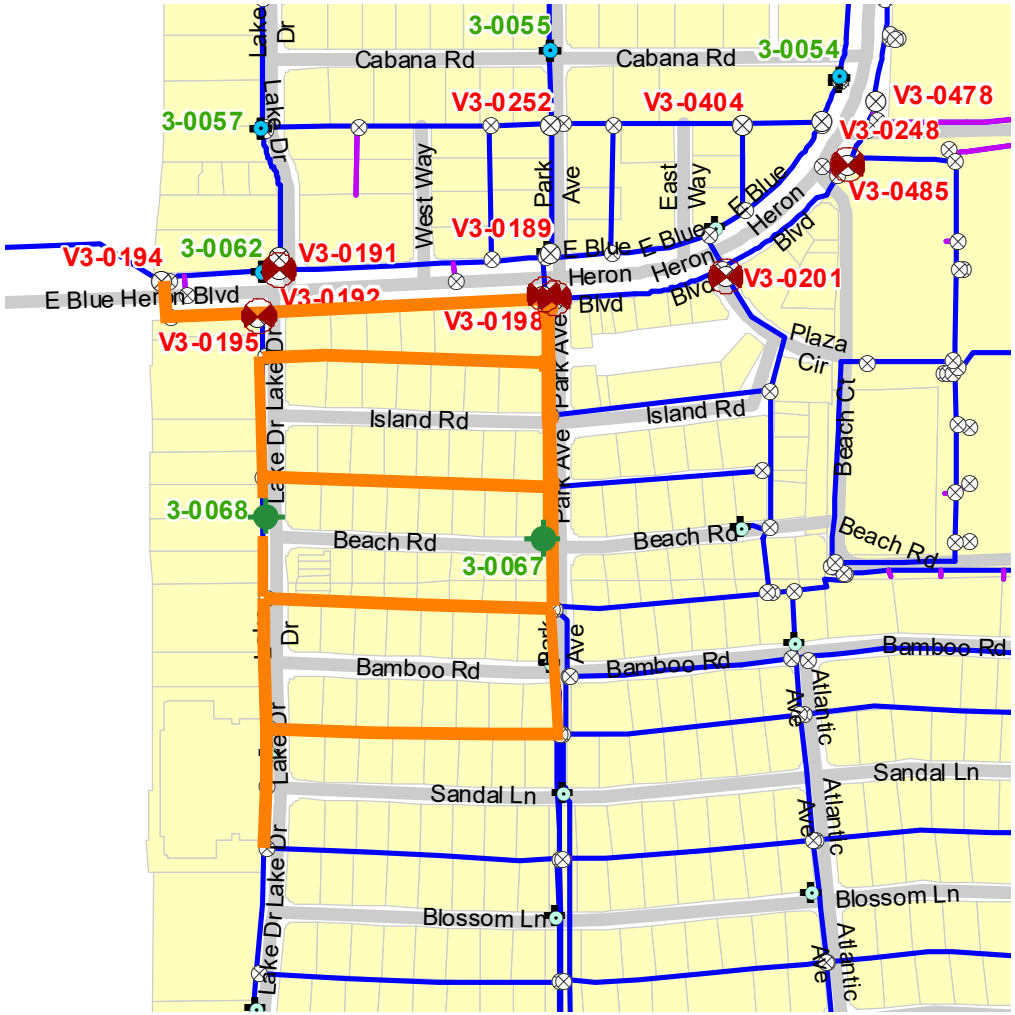
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes _____

Flushing Field Report

Study: East; Area: Zone 3; Event: 7

Primary View



Flushing Field Report

Study: East; Area: Zone 3; Event: 7

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0068				32.5	798
3-0067				50.1	991

Valve	Operation	Notes
V3-0200	Closed (prior) ☐	
V3-0198	Closed (prior) ☐	
V3-0201	Closed (prior) ☐	
V3-0485	Closed (prior) ☐	
V3-0195	Close ☐	
V3-0192	Closed (prior) ☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	

Flushing	Minimum	Recommended
Time (min)	20.3	60.8
Volume (gal)	36,230.5	108,691.4

Start Time	
End Time	
Operator	
Date	

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

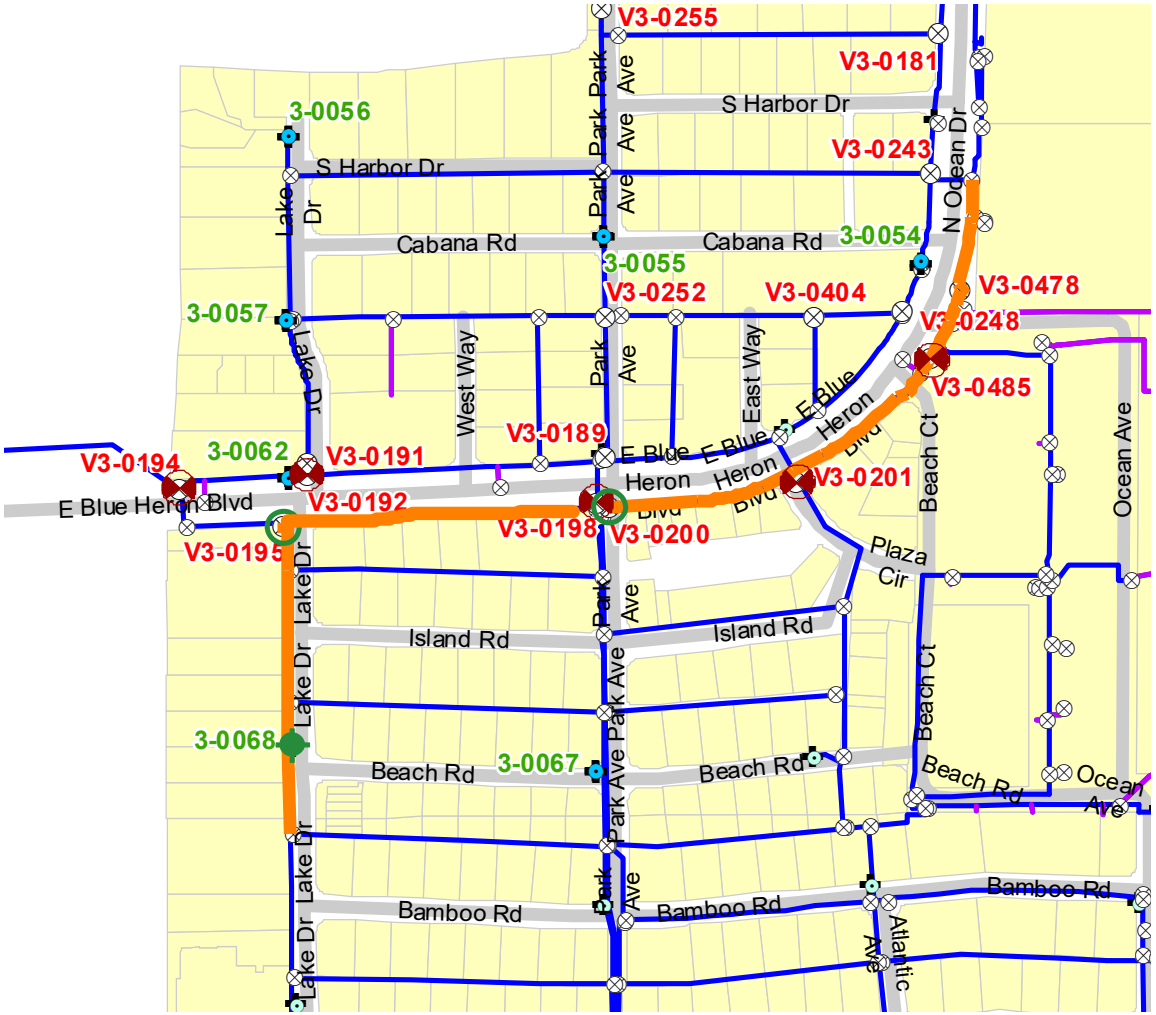
Pipe Run to be Cleaned
P-4466, P-4461, P-4442, P-4450, P-1345, P-1343(1), P-5720, P-1344, P-8384, P-1346,
P-5874(2), P-5941, P-5943, P-5873, P-5724, P-2183, P-6096, P-6133, P-3455, P-6097, P-5728

Notes 2 hydrants flushing; Recommended flushing time is 30 minutes

Flushing Field Report

Study: East; Area: Zone 3; Event: 8

Primary View



Flushing Field Report

Study: East; Area: Zone 3; Event: 8

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0068				28.4	693

Valve	Operation	Notes
V3-0200	Reopen ☐	
V3-0195	Reopen ☐	
V3-0198	Closed (prior) ☐	
V3-0201	Closed (prior) ☐	
V3-0485	Closed (prior) ☐	
V3-0194	Close ☐	
V3-0192	Closed (prior) ☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	

Flushing	Minimum	Recommended
Time (min)	7.4	22.1
Volume (gal)	5,100.9	15,302.7

Start Time _____

End Time _____

Operator _____

Date

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Pipe Run to be Cleaned
P-5711, P-4035, P-3388, P-5936, P-4077, P-4078, P-5404, P-5295, P-5263, P-5244,
P-5425, P-1161, P-5421, P-1162, P-3371, P-8923, P-0150, P-7076(1), P-7076(2), P-2857(1), P-2857(2)

Notes _____

Flushing Field Report

Study: East; Area: Zone 3; Event: 8

Final Actions

Valve	Operation	Notes
V3-0198	Reopen ☐	
V3-0201	Reopen ☐	
V3-0485	Reopen ☐	
V3-0194	Reopen ☐	
V3-0192	Reopen ☐	
	☐	
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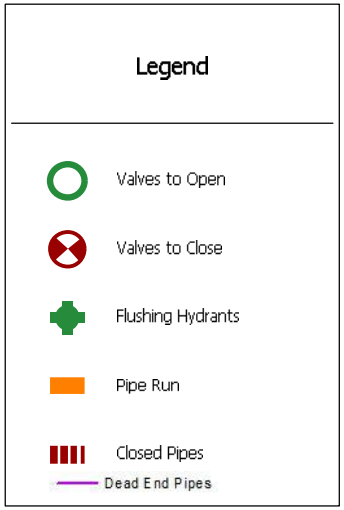
	☐	
	☐	

Flushing Field Report

Study: East

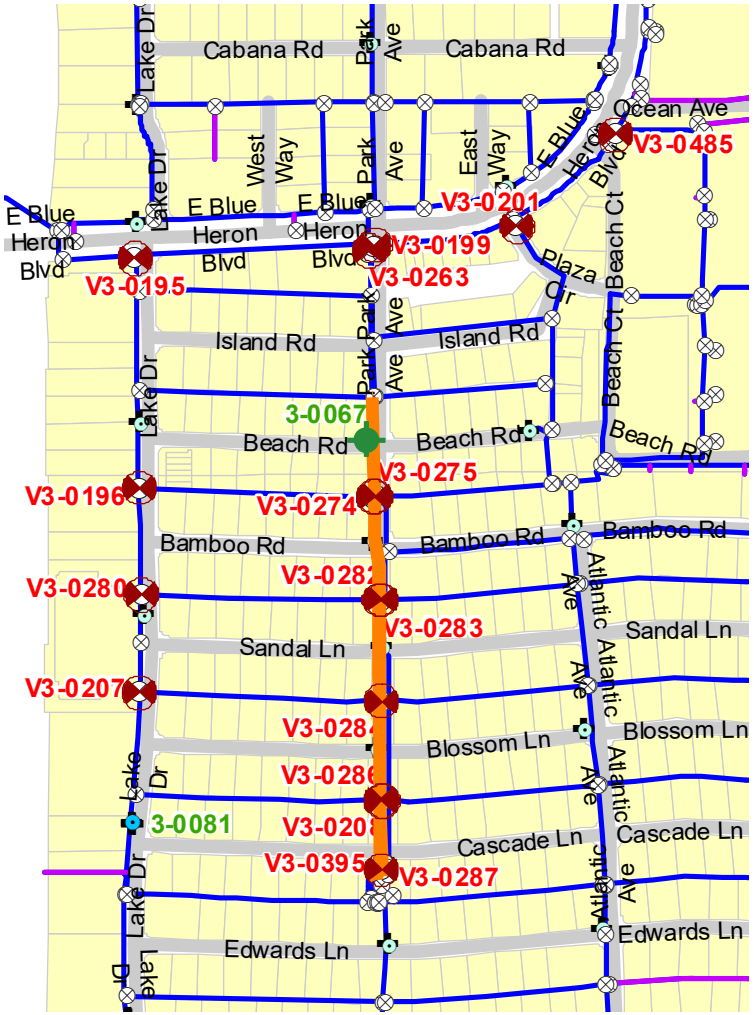


East Area - Zone 4

Flushing Field Report

Study: East; Area: Zone 4; Event: 1

Primary View



Flushing Field Report

Study: East; Area: Zone 4; Event: 1

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0067				26.8	518

Valve	Operation	Valve	Operation
V3-0199	Close ☐	V3-0274	Close ☐
V3-0195	Close ☐	V3-0208	Close ☐
V3-0201	Close ☐	V3-0485	Close ☐
V3-0263	Close ☐		☐
V3-0287	Close ☐		☐
V3-0286	Close ☐		☐
V3-0207	Close ☐		☐
V3-0282	Close ☐		☐
V3-0196	Close ☐		☐
V3-0280	Close ☐		☐
V3-0284	Close ☐		☐
V3-0283	Close ☐		☐
V3-0275	Close ☐		☐

Pipe Run to be Cleaned
P-0794, P-5946, P-2968, P-6091, P-6270, P-6099, P-5771, P-6358, P-5994, P-5999,
P-6006, P-6017, P-6022, P-6019, P-1555, P-1554, P-6361, P-5875, P-4504, P-6318, P-6279, P-6098

Flushing	Minimum	Recommended
Time (min)	9.1	27.3
Volume (gal)	4,702.9	14,108.7

Start Time _____

End Time _____

Operator _____

Date

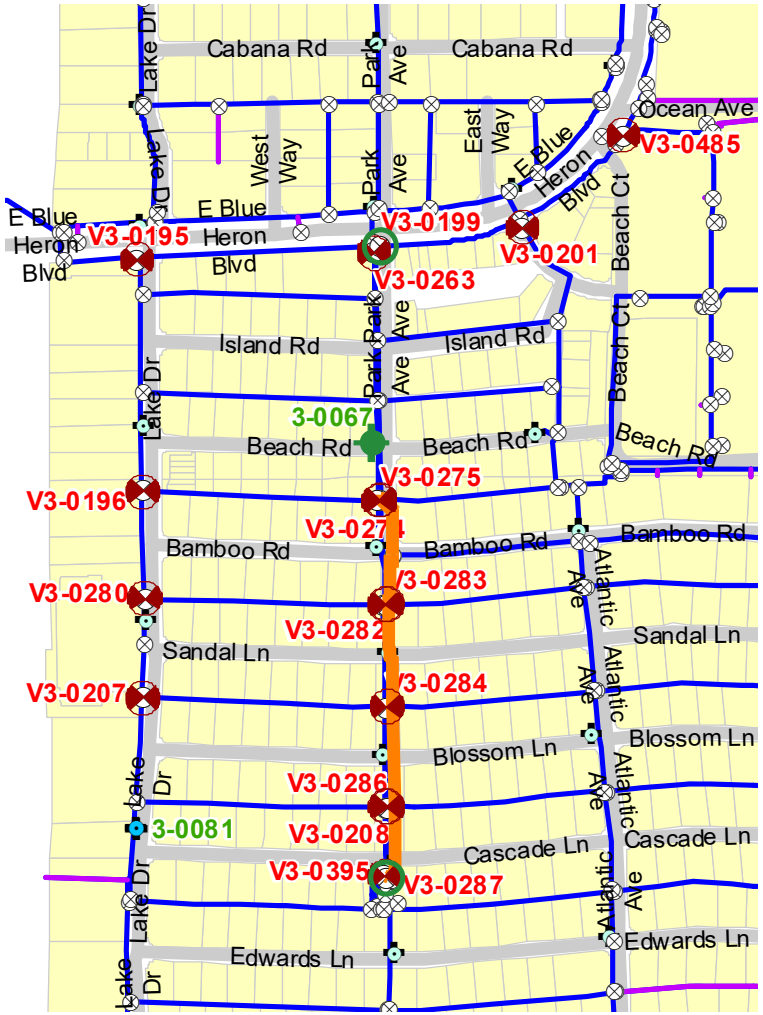
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes _____

Flushing Field Report

Study: East; Area: Zone 4; Event: 2

Primary View



Flushing Field Report

Study: East; Area: Zone 4; Event: 2

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0067				45.4	944

Valve	Operation		Valve	Operation	
V3-0199	Reopen	☐	V3-0274	Closed (prior)	☐
V3-0287	Reopen	☐	V3-0208	Closed (prior)	☐
V3-0195	Closed (prior)	☐	V3-0485	Closed (prior)	☐
V3-0201	Closed (prior)	☐	V3-0395	Close	☐
V3-0263	Closed (prior)	☐			☐
V3-0286	Closed (prior)	☐			☐
V3-0207	Closed (prior)	☐			☐
V3-0282	Closed (prior)	☐			☐
V3-0196	Closed (prior)	☐			☐
V3-0280	Closed (prior)	☐			☐
V3-0284	Closed (prior)	☐			☐
V3-0283	Closed (prior)	☐			☐
V3-0275	Closed (prior)	☐			☐

Pipe Run to be Cleaned
P-8109, P-8110, P-6273, P-6102, P-6356, P-6285, P-6008, P-6364, P-0970, P-5805

Flushing	Minimum	Recommended
Time (min)	4.9	14.6
Volume (gal)	4,580.2	13,740.7

Start Time _____

End Time _____

Operator _____

Date

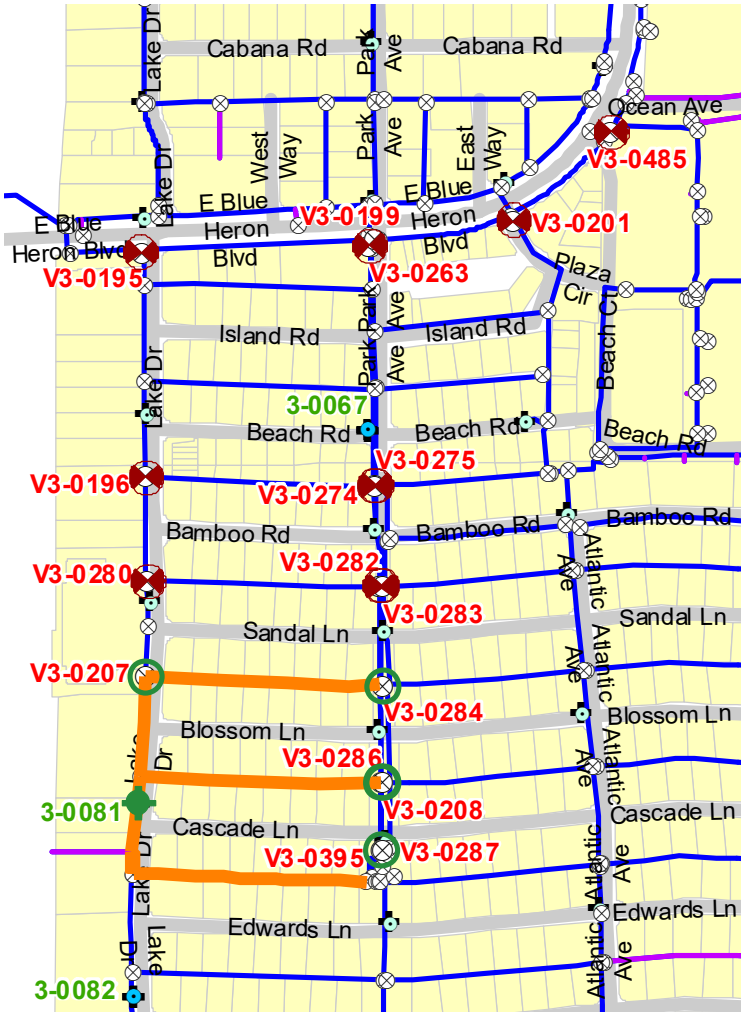
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes _____

Flushing Field Report

Study: East; Area: Zone 4; Event: 3

Primary View



Flushing Field Report

Study: East; Area: Zone 4; Event: 3

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0081				46.7	1,150

Valve	Operation		Valve	Operation	
V3-0286	Reopen	☐	V3-0274	Closed (prior)	☐
V3-0207	Reopen	☐	V3-0275	Closed (prior)	☐
V3-0284	Reopen	☐			☐
V3-0208	Reopen	☐			☐
V3-0395	Reopen	☐			☐
V3-0195	Closed (prior)	☐			☐
V3-0201	Closed (prior)	☐			☐
V3-0263	Closed (prior)	☐			☐
V3-0196	Closed (prior)	☐			☐
V3-0485	Closed (prior)	☐			☐
V3-0282	Closed (prior)	☐			☐
V3-0283	Closed (prior)	☐			☐
V3-0280	Closed (prior)	☐			☐

Pipe Run to be Cleaned
P-6282, P-6363, P-3495(1), P-3471, P-3472, P-6014, P-6007, P-5983, P-6342, P-6011

Flushing	Minimum	Recommended
Time (min)	10.0	29.9
Volume (gal)	11,461.2	34,383.5

Start Time

End Time

Operator

Date

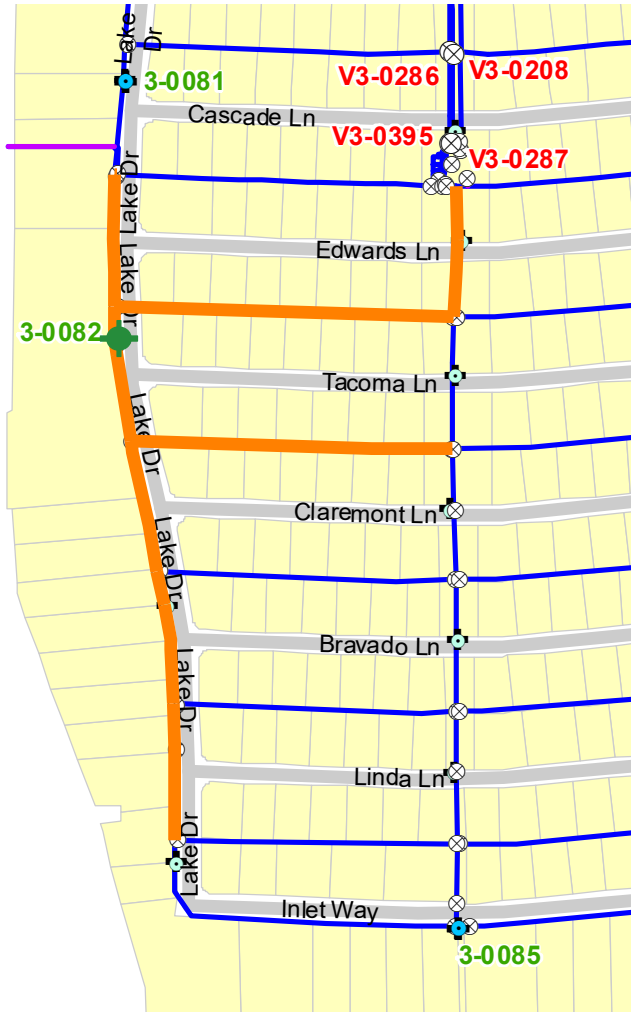
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes

Flushing Field Report

Study: East; Area: Zone 4; Event: 4

Primary View



Flushing Field Report

Study: East; Area: Zone 4; Event: 4

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0082				49.6	1,200

Valve	Operation	Notes
V3-0195	Reopen ☐	
V3-0201	Reopen ☐	
V3-0263	Reopen ☐	
V3-0196	Reopen ☐	
V3-0485	Reopen ☐	
V3-0282	Reopen ☐	
V3-0283	Reopen ☐	
V3-0280	Reopen ☐	
V3-0274	Reopen ☐	
V3-0275	Reopen ☐	
	☐	
	☐	
	☐	

Pipe Run to be Cleaned
P-3534, P-3473, P-6052, P-6379, P-6406, P-6525, P-2188, P-2202, P-6681, P-6783,
P-3540, P-6255, P-6539

Flushing	Minimum	Recommended
Time (min)	12.8	38.4
Volume (gal)	15,351.8	46,055.3

Start Time _____

End Time _____

Operator _____

Date

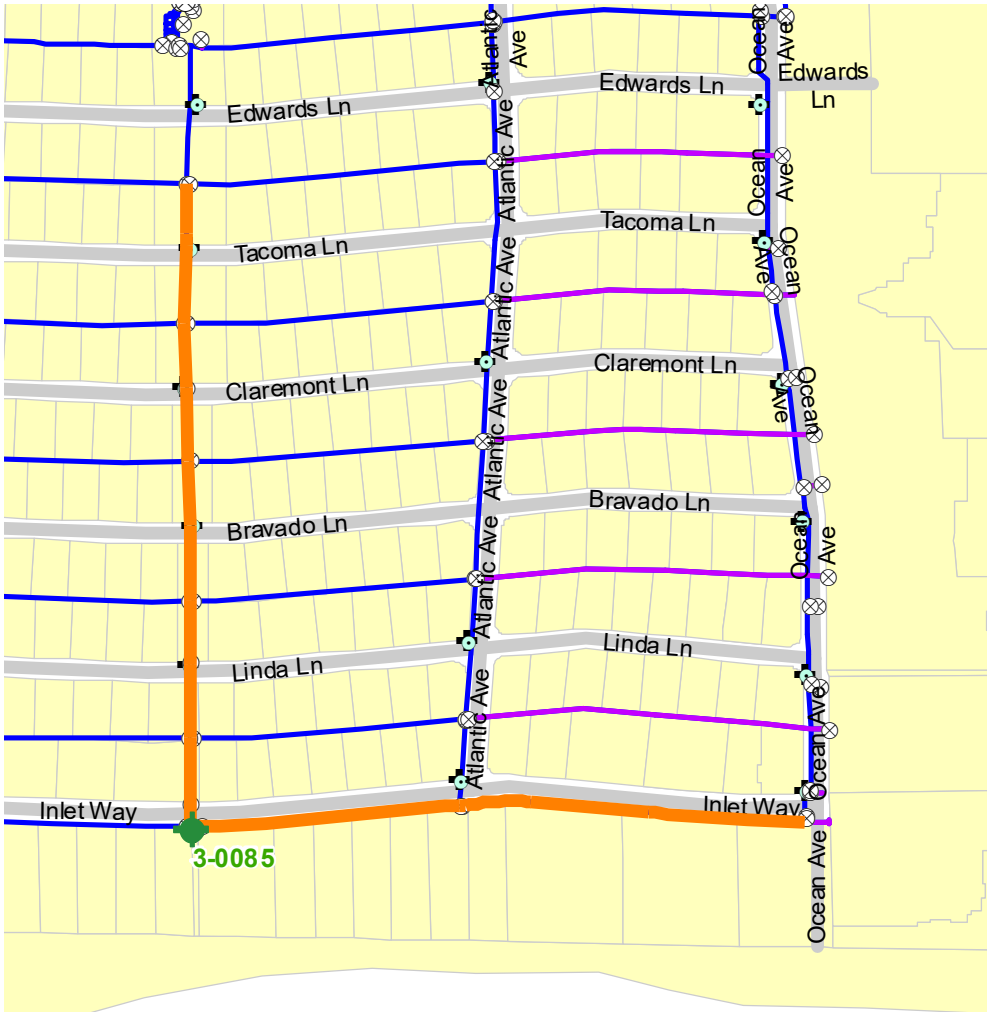
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes _____

Flushing Field Report

Study: East; Area: Zone 4; Event: 5

Primary View



Flushing Field Report

Study: East; Area: Zone 4; Event: 5

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0085				52.5	1,015

Valve	Operation	Notes
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	

Flushing	Minimum	Recommended
Time (min)	11.2	33.5
Volume (gal)	11,332.8	33,998.3

Start Time	
End Time	
Operator	
Date	

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Pipe Run to be Cleaned
P-6431, P-6446, P-6538, P-6581, P-2191, P-6599, P-6685, P-6737, P-6784, P-6828,
P-6827, P-6807, P-6808, P-6813, P-8129

Notes

Flushing Field Report

Study: East; Area: Zone 4; Event: 6

Primary View

Flushing Field Report

Study: East; Area: Zone 4; Event: 6

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0085				28.8	751

Valve	Operation	Notes
V3-0357	Close ☐	
V3-0327	Close ☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	

Pipe Run to be Cleaned
P-2192, P-6686, P-6785, P-6830, P-6795

Flushing	Minimum	Recommended
Time (min)	8.1	24.4
Volume (gal)	6,102.9	18,308.8

Start Time

End Time

Operator

Date

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes

Flushing Field Report

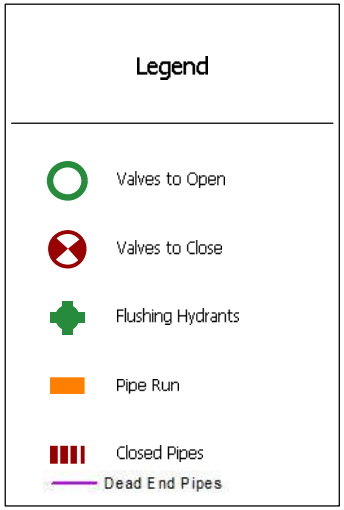
Study: East; Area: Zone 4; Event: 6

Final Actions

Valve	Operation	Notes
V3-0357	Reopen ☐	
V3-0327	Reopen ☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	

Flushing Field Report

Study: East

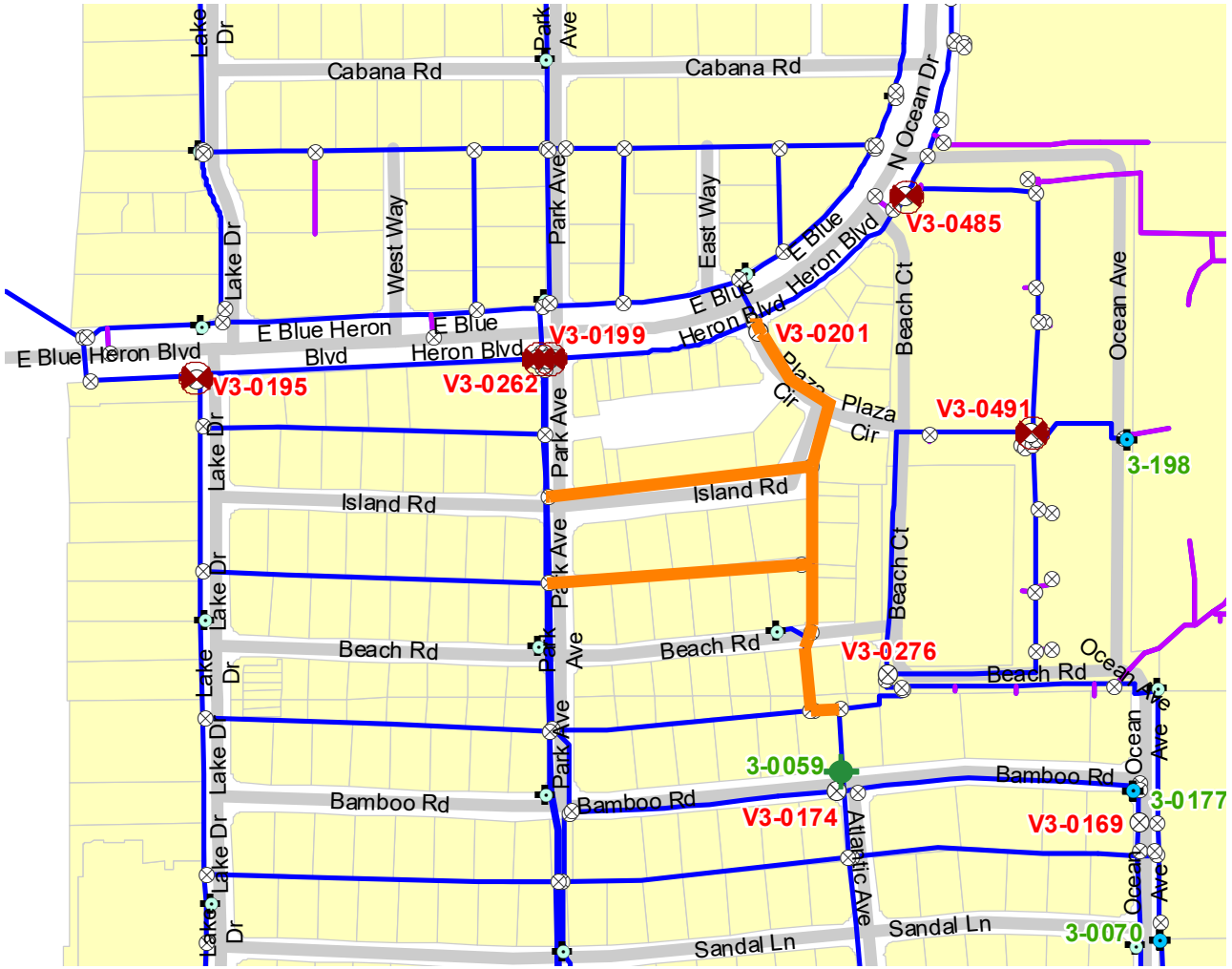


East Area - Zone 5

Flushing Field Report

Study: East; Area: Zone 5; Event: 1

Primary View



Flushing Field Report

Study: East; Area: Zone 5; Event: 1

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0059				29.2	232

Valve	Operation	Notes
V3-0262	Close ☐	
V3-0199	Close ☐	
V3-0195	Close ☐	
V3-0491	Close ☐	
V3-0485	Close ☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	

Flushing	Minimum	Recommended
Time (min)	4.2	12.6
Volume (gal)	975.6	2,926.7

Start Time

End Time

Operator

Date

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Pipe Run to be Cleaned
P-5270, P-5287, P-2639, P-5288, P-5767, P-5853, P-5872, P-5768, P-3400, P-4493,
P-5926, P-5876, P-5925

Notes

Flushing Field Report

Study: East; Area: Zone 5; Event: 2

Primary View

Flushing Field Report

Study: East; Area: Zone 5; Event: 2

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0059				56.2	375

Valve	Operation	Notes
V3-0485	Reopen ☐	
V3-0262	Closed (prior) ☐	
V3-0199	Closed (prior) ☐	
V3-0195	Closed (prior) ☐	
V3-0201	Close ☐	
V3-0491	Closed (prior) ☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	
	☐	

Flushing	Minimum	Recommended
Time (min)	8.1	24.4
Volume (gal)	3,042.8	9,128.5

Start Time

End Time

Operator

Date

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

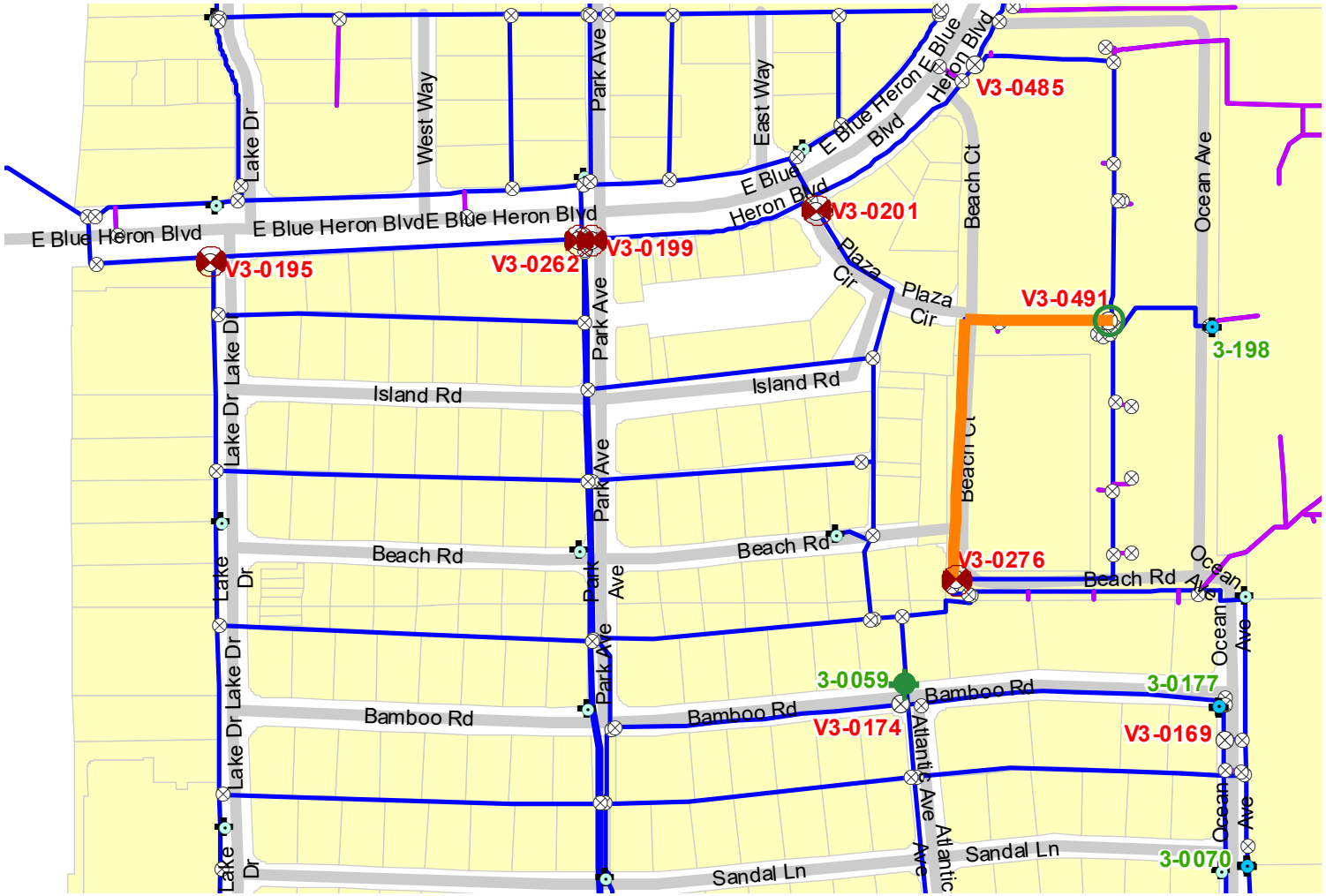
Pipe Run to be Cleaned
P-0121, P-8980, P-8981, P-3383, P-8983, P-3431, P-8993, P-8998, P-9001, P-9006,
P-9018, P-9014, P-9011, P-9007, P-9008, P-9005, P-9004, P-5829, P-5830, P-9023, P-9024, P-9025, P-0109

Notes

Flushing Field Report

Study: East; Area: Zone 5; Event: 3

Primary View



Flushing Field Report

Study: East; Area: Zone 5; Event: 3

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0059				44.1	929

Valve	Operation	Notes
V3-0491	Reopen ☐	
V3-0201	Closed (prior) ☐	
V3-0199	Closed (prior) ☐	
V3-0262	Closed (prior) ☐	
V3-0195	Closed (prior) ☐	
V3-0276	Close ☐	
	☐	
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	☐	
	☐	
	☐	
	☐	
	☐	

Pipe Run to be Cleaned
P-8995, P-8994, P-8996, P-8997

Flushing	Minimum	Recommended
Time (min)	2.1	6.3
Volume (gal)	1,942.8	5,828.5

Start Time

End Time

Operator

Date

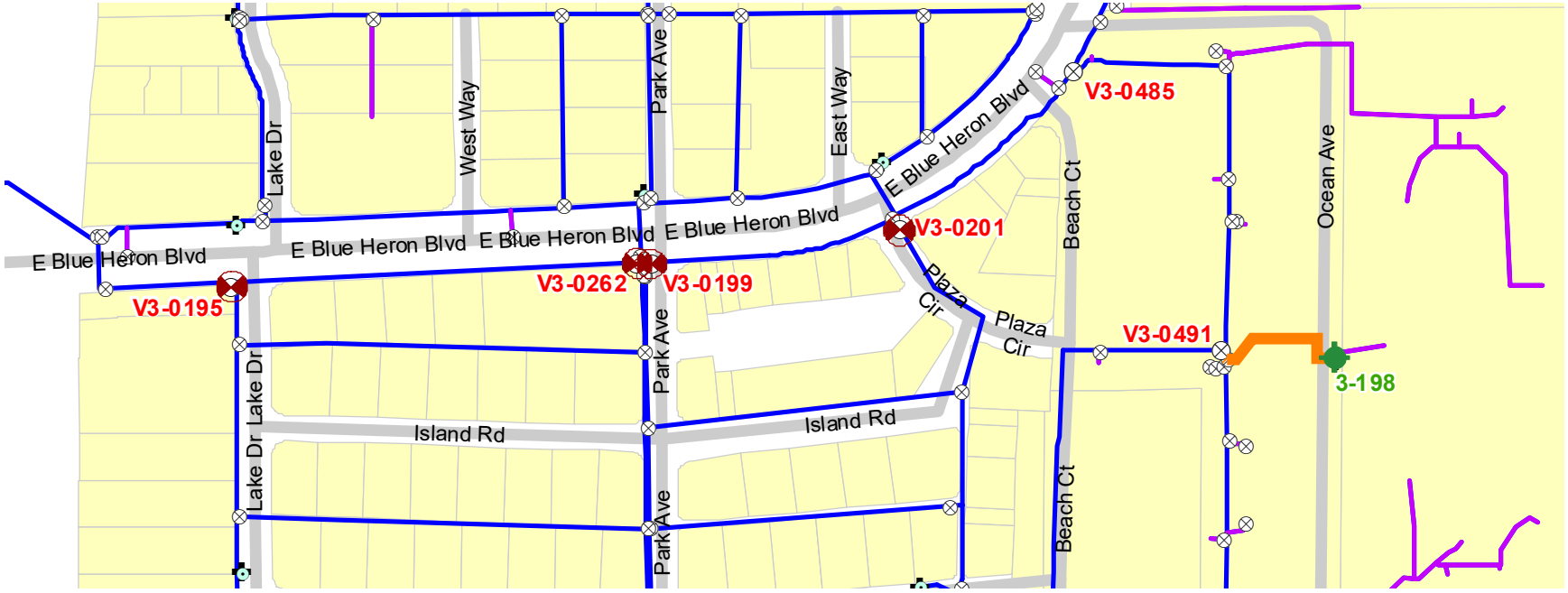
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes

Flushing Field Report

Study: East; Area: Zone 5; Event: 4

Primary View



Flushing Field Report

Study: East; Area: Zone 5; Event: 4

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-198				55.6	746

Valve	Operation	Notes
V3-0276	Reopen ☐	
V3-0201	Closed (prior) ☐	
V3-0199	Closed (prior) ☐	
V3-0262	Closed (prior) ☐	
V3-0195	Closed (prior) ☐	
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Pipe Run to be Cleaned
P-9000, P-8999, P-0186

Flushing	Minimum	Recommended
Time (min)	0.7	2.1
Volume (gal)	532.9	1,598.6

Start Time

End Time

Operator

Date

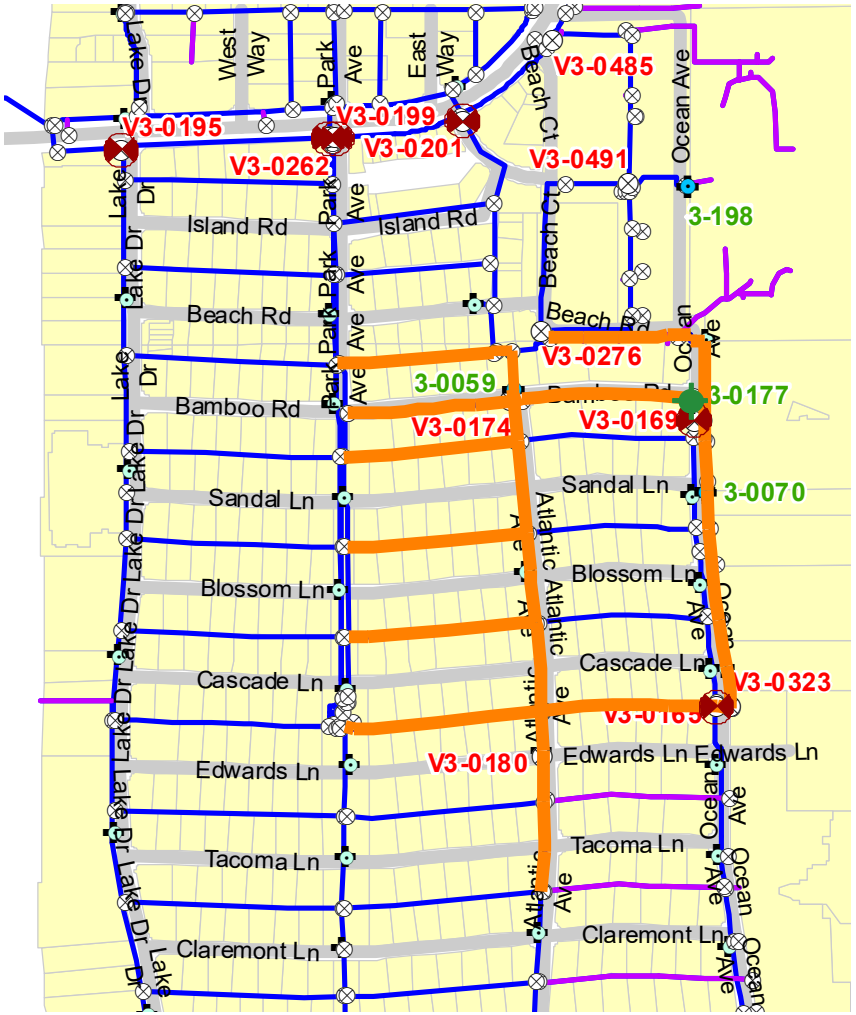
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes

Flushing Field Report

Study: East; Area: Zone 5; Event: 5

Primary View



Flushing Field Report

Study: East; Area: Zone 5; Event: 5

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0177				37.0	882

Valve	Operation	Notes
V3-0199	Closed (prior) ☐	
V3-0262	Closed (prior) ☐	
V3-0195	Closed (prior) ☐	
V3-0201	Closed (prior) ☐	
V3-0169	Close ☐	
V3-0165	Close ☐	
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Flushing	Minimum	Recommended
Time (min)	34.0	102.1
Volume (gal)	30,003.4	90,010.3

Start Time	
End Time	
Operator	
Date	

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

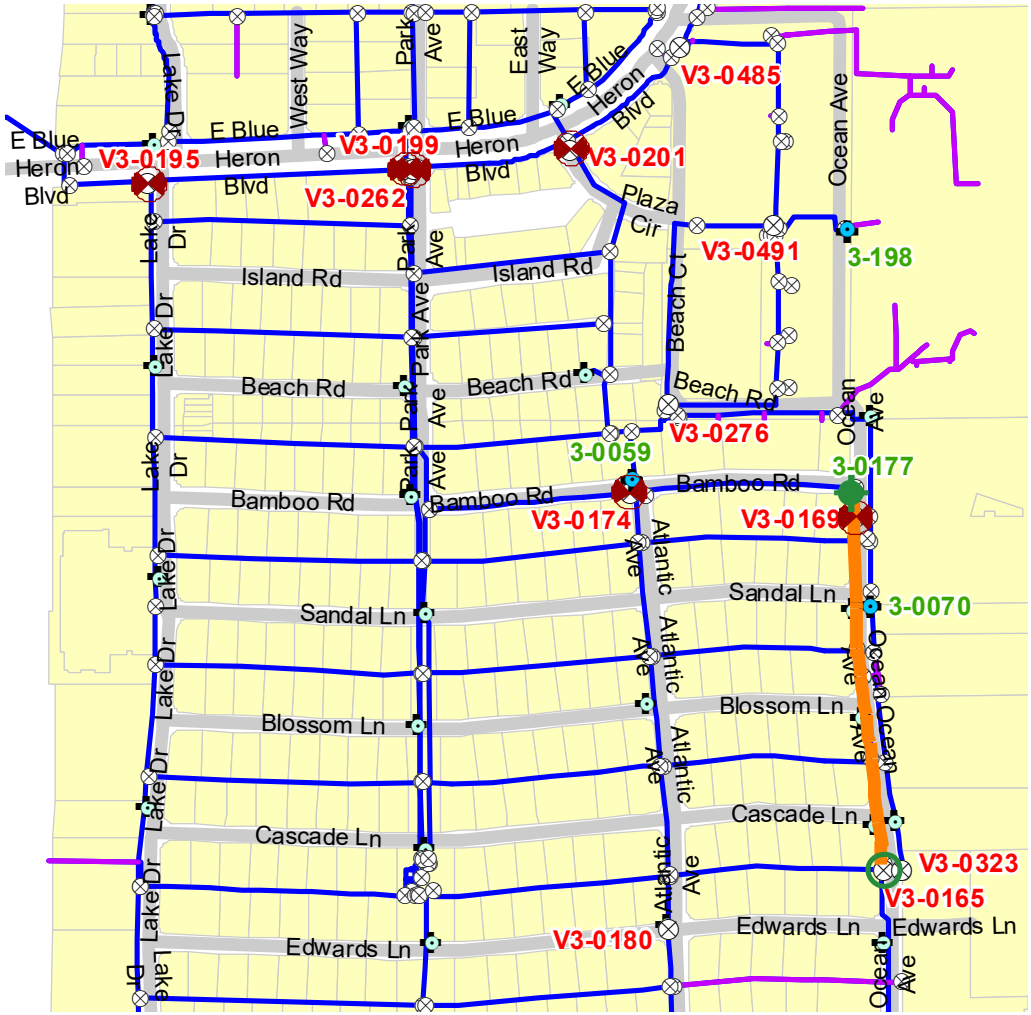
Pipe Run to be Cleaned
P-8126, P-6028, P-6225, P-6226, P-6029, P-6332, P-5382, P-3446, P-5959, P-4505,
P-6274, P-6095, P-8111, P-2155, P-8112, P-8113, P-2163, P-5940, P-1160, P-1634, P-1635, P-1648, P-1649

Notes: Recommended flushing time is 30 minutes

Flushing Field Report

Study: East; Area: Zone 5; Event: 6

Primary View



Flushing Field Report

Study: East; Area: Zone 5; Event: 6

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0177				38.6	870

Valve	Operation	Notes
V3-0165	Reopen ☐	
V3-0199	Closed (prior) ☐	
V3-0262	Closed (prior) ☐	
V3-0195	Closed (prior) ☐	
V3-0201	Closed (prior) ☐	
V3-0169	Closed (prior) ☐	
V3-0174	Close ☐	
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Flushing	Minimum	Recommended
Time (min)	4.2	12.5
Volume (gal)	3,638.2	10,914.6

Start Time

End Time

Operator

Date

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

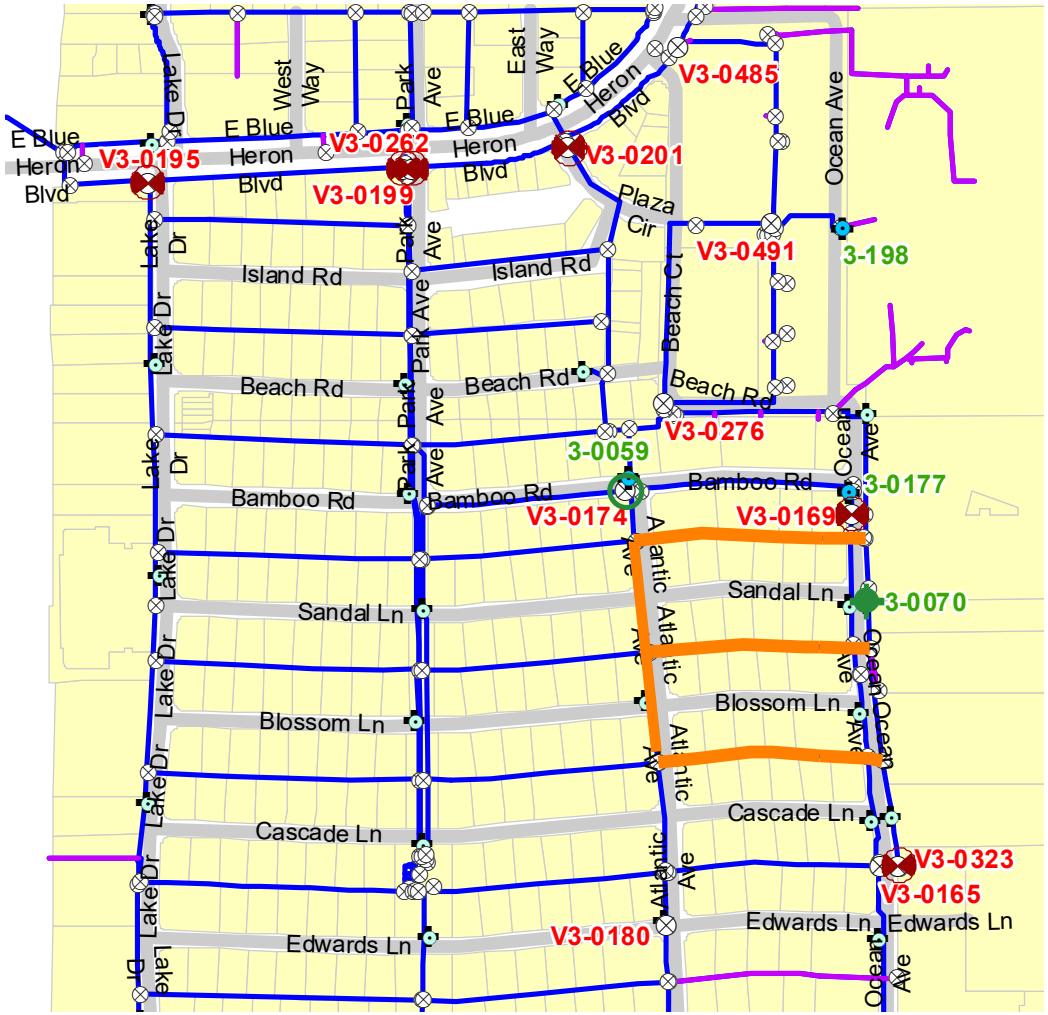
Pipe Run to be Cleaned
P-8114, P-8117, P-8118, P-8119, P-8120, P-8122(2), P-8122(1), P-8121, P-2147,
P-8123, P-8125

Notes

Flushing Field Report

Study: East; Area: Zone 5; Event: 7

Primary View



Flushing Field Report

Study: East; Area: Zone 5; Event: 7

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0070				41.4	901

Valve	Operation	Notes
V3-0174	Reopen ☐	
V3-0195	Closed (prior) ☐	
V3-0199	Closed (prior) ☐	
V3-0262	Closed (prior) ☐	
V3-0201	Closed (prior) ☐	
V3-0323	Close ☐	
V3-0169	Closed (prior) ☐	
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Pipe Run to be Cleaned
P-2162, P-2159, P-3445, P-3440, P-6331, P-6328

Flushing	Minimum	Recommended
Time (min)	7.2	21.6
Volume (gal)	6,475.5	19,426.4

Start Time

End Time

Operator

Date

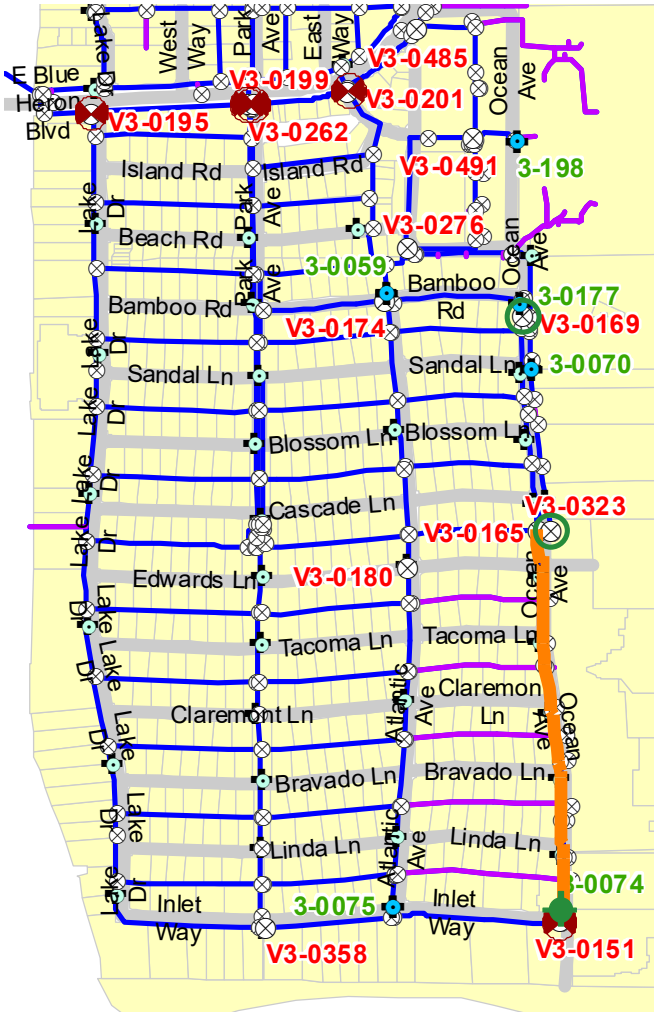
Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes

Flushing Field Report

Study: East; Area: Zone 5; Event: 8

Primary View



Flushing Field Report

Study: East; Area: Zone 5; Event: 8

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0074				41.0	897

Valve	Operation	Notes
V3-0323	Reopen ☐	
V3-0169	Reopen ☐	
V3-0195	Closed (prior) ☐	
V3-0262	Closed (prior) ☐	
V3-0199	Closed (prior) ☐	
V3-0201	Closed (prior) ☐	
V3-0151	Close ☐	
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Flushing	Minimum	Recommended
Time (min)	6.5	19.6
Volume (gal)	5,852.2	17,556.6

Start Time

End Time

Operator

Date

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

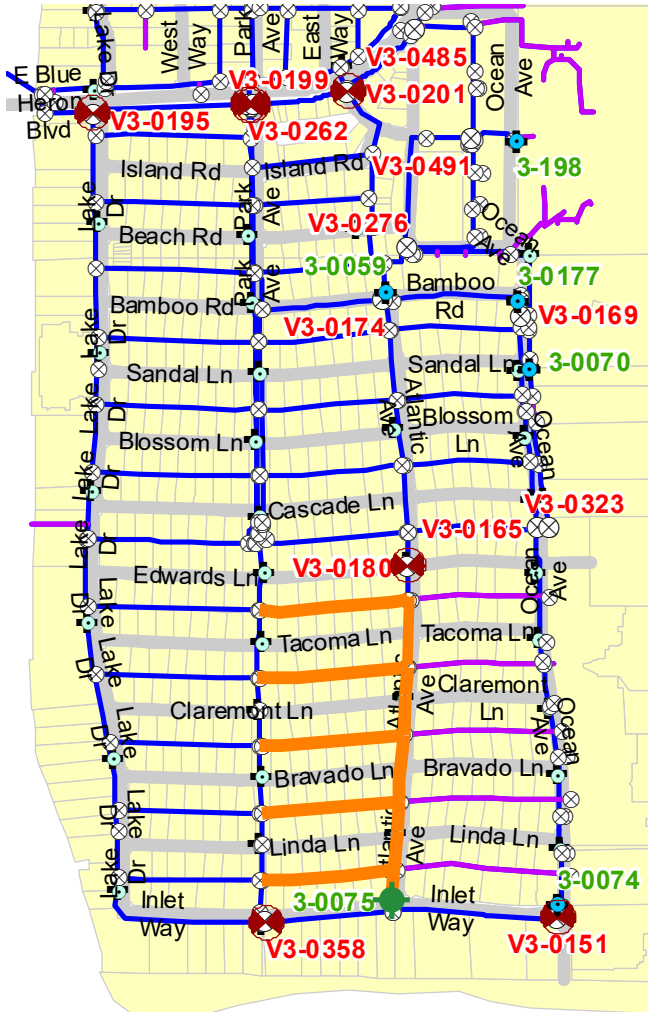
Pipe Run to be Cleaned
P-8124, P-2144, P-2143, P-2142, P-2140, P-2139, P-2138, P-2137, P-2134, P-2132,
P-2131, P-2128, P-2125, P-2127, P-2124, P-2123, P-2121, P-3093, P-3092, P-3091, P-3088

Notes

Flushing Field Report

Study: East; Area: Zone 5; Event: 9

Primary View



Flushing Field Report

Study: East; Area: Zone 5; Event: 9

Fire Hydrant	Notes	Pressure (psi) Static, Dynamic	Measured Flow (gpm)	Predicted Pressure (psi)	Predicted Flow (gpm)
3-0075				22.5	664

Valve	Operation	Notes
V3-0195	Closed (prior) ☐	
V3-0262	Closed (prior) ☐	
V3-0199	Closed (prior) ☐	
V3-0201	Closed (prior) ☐	
V3-0151	Closed (prior) ☐	
V3-0358	Close ☐	
V3-0180	Close ☐	
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Pipe Run to be Cleaned
P-6554, P-3333, P-6679, P-6705, P-6777, P-6799, P-6054, P-6537, P-2190, P-6684,
P-6786

Flushing	Minimum	Recommended
Time (min)	10.7	32.2
Volume (gal)	7,118.9	21,356.8

Start Time

End Time

Operator

Date

Water Quality	Initial	Final
Clear	☐	☐
Colored	☐	☐
Chlorine Residual		
Turbidity		

Notes

Flushing Field Report

Study: East; Area: Zone 5; Event: 9

Final Actions

Valve	Operation	Notes
V3-0195	Reopen ☐	
V3-0262	Reopen ☐	
V3-0199	Reopen ☐	
V3-0201	Reopen ☐	
V3-0151	Reopen ☐	
V3-0358	Reopen ☐	
V3-0180	Reopen ☐	
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