

Appendix A

List of WWTPs

APPENDIX A – Houston Wastewater TPDES/NPDES Permits

NAME	TPDES #	EPA ID #
69th Street WWTP	10495-090	TX0096172
Almeda Sims WWTP	10495-003	TX0034924
Beltway WWTP	10495-111	TX0065307
Cedar Bayou WWTP	10495-112	TX0103667
Chocolate Bayou WWTP	10495-009	TX0063061
Clinton Park WWTP	10495-010	TX0035106
Easthaven WWTP	10495-065	TX0034886
FWSD # 23 WWTP	10495-016	TX0063053
Forest Cove WWTP	10495-149	TX0115924
Greenridge WWTP	10495-110	TX0026433
Homestead WWTP	10495-023	TX0063029
Imperial Valley WWTP	10495-101	TX0020478
Intercontinental Airport WWTP	10495-078	TX0034916
Keegans Bayou WWTP	10495-119	TX0098191
Kingwood Central WWTP	10495-146	TX0066583
Kingwood West WWTP (frm. MUD # 48)	10495-142	TX0088501
MUD # 203 WWTP	10495-133	TX0084875
Metro Central WWTP (frm. 10495-136)	10495-152	TX0069736
Northbelt WWTP	10495-122	TX0103721
Northeast WWTP	10495-077	TX0063037
Northgate WWTP	10495-100	TX0055310
Northwest WWTP	10495-076	TX0063011
Park Ten WWTP	10495-135	TX0026395
Sagemont WWTP	10495-075	TX0063070
Sims Bayou North WWTP	10495-002	TX0062201
Sims Bayou South WWTP	10495-002	TX0105058
Southeast WWTP	10495-079	TX0035009
Southwest WWTP	10495-037	TX0062995
Tidwell Timbers WWTP	10495-148	TX0101460
Turkey Creek WWTP	10495-109	TX0035017
Upper Brays WWTP	10495-116	TX0088153
WCID # 111 WWTP	10495-095	TX0027201
WCID # 47 WWTP	10495-050	TX0063045
WCID # 76 WWTP	10495-150	TX0025291
West District WWTP	10495-030	TX0063002
West Lake Houston WWTP	14650-001	TX0128244
Westway WWTP	10495-139	TX0026875
White Oak WWTP	10495-099	TX0057347
Willowbrook WWTP	10495-126	TX0113131

Appendix B

Early Action Projects

APPENDIX B – EARLY ACTION PROJECTS

Lift Station Early Action Projects

Project Name	Project Description	Number of LS Impacted	Updated Timeframe for Completion of Construction
Lift Station Renewal and Replacement Woodway #1	Lift station upgrade to receive flow from Post Oak, Stablewood, Buckingham, and Bayou Timber Lift Station	1	2020
Lift Station Renewal and Replacement Hunterwood MUD Northbrook	Replace of Lift Station Pump, mechanical and structural remediation.	2	Complete
Lift Station Renewal and Replacement Greens Bayou Crossing #3 Fir Ridge Parker Rd	Rehab Lift Station Diversion to Sunny Glen LS Electrical and odor control upgrades	3	2020

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Lift Station Renewal and Replacement		4	2020
Tidwell Road #1	Rehab Lift Station		
Iroquois	Rehab Lift Station		
West Canino Road	Rehab Lift Station		
John Alber Road	Rehab Lift Station		
Lift Station Renewal and Replacement		2	2023
MUD #237	Abandonment and flow diversion		
MUD #159-	Abandonment and flow diversion		
Lift Station Renewal and Replacement		3	2023
MacGregor Way North #1	Rehab Lift Station		
Magnet	Replace Lift Station		
Westpark #1	Rehab Lift Station		

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Lift Station Renewal and Replacement		4	2022
Findlay	Rehab Lift Station		
Garden Villas	Rehab Lift Station		
Goodyear	Rehab Lift Station		
Reveille	Rehab Lift Station		
Lift Station Renewal and Replacement		3	2022
Interwood	Abandonment and flow diversion		
MUD #266	Abandonment and flow diversion		
Vickery	Abandonment and flow diversion		
Lift Station Renewal and Replacement		5	2023
East Park Ten	Replace Lift Station		
Maxey Road	Rehab Lift Station		
Mesa Drive	Rehab Lift Station		
Westmont	Rehab Lift Station		
North Shore	Upgrade from 10.8 MGD to 12.8 MGD		

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Lift Station Renewal and Replacement		4	2023
High Star	Replace lift station		
WCID #78	Rehab lift station		
Belle Park #1	Rehab lift station		
WCID #94	Replace lift station		
Lift Station Renewal and Replacement		2	2022
Eddington	Replacement of Lift Station		
Brock	Submersible Conversion		
Lift Station Renewal and Replacement		4	2022
Ayreshire	Rehab Lift Station		
Brompton	Rehab Lift Station		
Bradford	Rehab Lift Station		
Kirby Drive #2	Rehab Lift Station		
Lift Station Renewal and Replacement		2	2024
Kirby Drive #1	Abandonment and flow diversion		
Westridge	New Regional Lift Station and abandonment and flow diversion of existing LS		

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Lift Station Renewal and Replacement Main Street S.	Abandonment and flow diversion	1	2024
Lift Station Renewal and Replacement MacGregor #2 Eppes Kellogg Scott #2 Glengyle WCID #73	Rehab Lift Station Replace Lift Station Rehab Lift Station Rehab Lift Station Rehab Lift Station Rehab Lift Station	6	2022
Lift Station Renewal and Replacement Green River Dr Bretshire #2 No. 2 Bayfield UD Highland Meadow Hempstead #1 Ferguson Way	Abandonment and flow diversion Rehab Lift Station Rehab Lift Station Rehab Lift Station Rehab Lift Station Rehab Lift Station	6	2023

APPENDIX B – EARLY ACTION PROJECTS

<p>Lift Station Renewal and Replacement</p> <p>Willie Dockal</p>	<p>Replace Lift Station</p> <p>Submersible Conversion</p>	<p align="center">2</p>	<p align="center">2021</p>
<p>Clinton Drive Lift Station Improvements</p> <p>Clinton Drive #2</p>	<p>1. Replacement of electric equipment including but not limited to the existing service feeders, transformers, MCC equipment, breakers, control panels, Scada/Instrument ation equipment. 2. Provide provisions for a full redundant power source and associated transformers and switching components to operate lift station reliably at its full capacity. 3. Update all electrical, instrumentation and Scada systems to the latest city of Houston design standards.</p>	<p align="center">1</p>	<p align="center">2021</p>

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<p>Lift Station Renewal and Replacement</p> <p>MacGregor #3</p> <p>Gilpin</p> <p>West Orem</p> <p>Quail View</p> <p>Hillcroft</p> <p>Wheeler</p>	<p>Rehab Lift Station</p> <p>Rehab Lift Station</p> <p>Rehab Lift Station</p> <p>Rehab Lift Station</p> <p>Rehab Lift Station</p> <p>Rehab Lift Station</p>	<p>6</p>	<p>2024</p>
<p>Lift Station Renewal and Replacement</p> <p>Northboroug h Dr. #1</p> <p>Northboroug h Dr. #2</p> <p>Old Katy Rd.</p> <p>Richmond #1</p> <p>Bonner Rd.</p>	<p>Rehab Lift Station</p> <p>Rehab Lift Station</p> <p>Rehab Lift Station</p> <p>Rehab Lift Station</p> <p>Rehab Lift Station</p>	<p>5</p>	<p>2023</p>
<p>Lift Station Renewal and Replacement</p> <p>Alief Village</p> <p>Belle Park #2</p>	<p>Abandonment and flow diversion</p> <p>Abandonment and flow diversion</p>	<p>2</p>	<p>2024</p>

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FY 19 Lift Station Renewal and Replacement: Bintliff Gessner #1 Gessner #2 Park Ten #2 Farther Point Willowbend	Condition assessment and evaluation for possible rehab, replacement, relocation or consolidation.	6	2026
FY 20 Lift Station Renewal and Replacement MUD #175-1 West Court Dr Sherwood Oaks N.E. Sludge Transfer Green Dolphin	Rehab Lift Station Rehab Lift Station Rehab Lift Station Rehab Lift Station Rehab Lift Station	5	2028
FY 20 Lift Station Renewal and Replacement Braeswood N Post Oak #2 Bissonnet #4 Brooklet Synott Rd. #1	Rehab Lift Station Rehab Lift Station Rehab Lift Station Rehab Lift Station Rehab Lift Station	5	2028
FY 21 Lift Station Renewal and Replacement	Condition assessment and evaluation for possible rehab, replacement, relocation or consolidation.	6	2029

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FY 21 Lift Station Renewal and Replacement	Condition assessment and evaluation for possible rehab, replacement, relocation or consolidation.	5	2029
FY 22 Lift Station Renewal and Replacement	Condition assessment and evaluation for possible rehab, replacement, relocation or consolidation.	6	2030
FY 22 Lift Station Renewal and Replacement	Condition assessment and evaluation for possible rehab, replacement, relocation or consolidation.	6	2030

APPENDIX B – EARLY ACTION PROJECTS

Force Main Early Action Projects

Project Name	Project Description	Approximate Feet of Pipe	Updated Timeframe for Completion (Fiscal Year)
Force main Renewal and Replacement Stroud	18" FM renewal with CIPP	2,411	2022
Force Main Renewal and Replacement Bayfield Bretshire #2 Woodland Ridge Forest Shores	12,211 LF 12" & 14" CIPP or HDPE lining 3,118 LF of 24" CIPP or HDPE lining 3,370 LF of 10" CIPP or HDPE lining 3,042 LF of 8" CIPP or HDPE lining	21,741	2022
Force Main Renewal and Replacement Annunciation Banner Road Plum Creek	Install new 13,192 LF of 16" FM Install new 2,961 LF of 18" FM Replace 410 LF of 6" FM	16,563	2021
Force Main Renewal and Replacement Woodsman Trail	Replacement of 2,810 LF of 12" FM	2,810	2019

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Project Name	Project Description	Approximate Feet of Pipe	Updated Timeframe for Completion (Fiscal Year)
Force Main Renewal and Replacement Eldridge Parkway Beechnut West Orem	Replace 5,765 LF of 12" FM with 3,878 LF of 24" gravity line Replace 3,719 LF of 12" FM Replace 2,513 LF of 20" FM	11,997	2024
Force Main Renewal and Replacement Golf Course	Replacement of 3,180 LF 20" FM	3,180	2022
Force main Renewal and Replacement Tanya Circle Old Stone Trail	Replace 3,284 LF of 10" FM Replace 675 LF of 8" FM	3,959	2022
Force Main Renewal and Replacement Sleepy Hollow Telephone Road #1	Replace 11,000 LF 18" FM with 36" gravity line Replace 520 LF 8" FM	11,520	2023

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Project Name	Project Description	Approximate Feet of Pipe	Updated Timeframe for Completion (Fiscal Year)
FY 19 Force Main Renewal: Bay Area Belle Park #3 Highland Meadow	Evaluation and possible renewal or replacement of all or part of the listed force mains.	TBD	2026
Force Main Renewal and Replacement Gulf Freeway #2	Evaluation and possible renewal or replacement of all or part of the listed force mains.	TBD	2024
FY 21- Force Main Renewal and Replacement	Evaluation and possible renewal or replacement of all or part of the listed force mains.	TBD	2028
FY 22- Force Main Renewal and Replacement	Evaluation and possible renewal or replacement of all or part of the listed force mains.	TBD	2029
FY 23- Force Main Renewal and Replacement	Evaluation and possible renewal or replacement of all or part of the listed force mains.	TBD	2030

APPENDIX B – EARLY ACTION PROJECTS

Consolidation Early Action Projects

Project Name	Project Description	Number of LS Impacted	Approximate Feet of Pipe	Updated project completion Timeframe
37 MGD Northgate Regional Lift Station and Force Main	Construct a regional lift station of capacity 37 MGD and two force mains to discharge location at Green Road and Hardy Toll Road Intersection	1	9,500 LF of 24" and 30" FM	2023
Diversion and Abandonment of Kirkwood #3 Lift Station	Divert the flow from Kirkwood #3 LS to a newly constructed Harvest Moon by gravity sewer. Demolish Kirkwood #3 LS. Upgrade on Harvest Moon to 21.3 MGD	2	5,500 LF of 42" sewer	2023
West Belfort No. 2 and Fondren Meadow Lift Station Rehab	rehabilitation of West Belfort #2 and Fondren Meadow lift stations.	2	N/A	2022
Willow Meadow Rehab	rehabilitation of Willow Meadow, lift station	1	N/A	2023
Construction of Fountain View (regional) Lift Station,	Replacement of Westheimer #1 LS by a new LS at Fountain View and Skyline	2	4,200 LF of 48" sewer 4,900 LF of 36" FM	2022
Facilities Consolidation – Chelford City Diversion Package 1 – Segment 2	Construct 60" sewer along Westpark Drive from Alief Central LS site to Dairy Ashford Road	1	5,700 LF of 60" Sewer	2023

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Project Name	Project Description	Number of LS Impacted	Approximate Feet of Pipe	Updated project completion Timeframe
Chelford City Diversion Package 1– Segment 1	Construct 60” sewer along Westpark Drive Drive from Dairy Ashford to Houston Center; tie to 108” sewer	N/A	4,637 LF of 60” sewer	2022
Abandonment of Bering LS and San Felipe LS.	Gravity diversion of the flow from San Felipe LS. and Bering LS and divert to a proposed 48-inch sewer to Fountain View	2	2,100 LF of 30” 210 LF of 36” 4,400 LF of 48”	2023
Chelford City Diversion Package 2 – West Hollow LS flow diversion	Diversion of West Hollow LS flow to the new Upper Brays 60” tunnel	1	2,480 LF of 15” 7,255 LF of 36”	2024
Chelford City Diversion Package 3 – Green Crest LS flow Diversion	Green Crest LS flow diversion to Upper Brays WWTP	1	6,825 LF of 24”	2024
North Corridor Consolidation Package 3 Imperial Valley WWTP flow diversion	Flow Diversion (36-inch gravity sewer line) from Imperial Valley WWTP to Northgate Regional LS.	1	10,220 LF of 36”	2026
North Corridor Consolidation Package 4 MUD #203 WWTP flow diversion	Flow diversion through a 36” Gravity Sewer from MUD #203 WWTP to Northgate Regional LS.	1	11,758 LF of 36”	2026
Flow Diversion from Tidwell Timber to FWSD 23	Construct a new lift station, force main, and gravity line for flow diversion from Tidwell Timber to FWSD 23.	1	7,665 LF of 12” FM 4,375 LF of 30” sewer 3,075 LF of 36” sewer	2025

APPENDIX B – EARLY ACTION PROJECTS

Project Name	Project Description	Number of LS Impacted	Approximate Feet of Pipe	Updated project completion Timeframe
Force Main from Sagemont Lift Station to Southeast WWTP for the flow diversion	Construct force main sewer for flow diversion from Sagemont WWTP to Southeast WWTP	1	TBD	2025
Flow Diversion from Easthaven to Southeast WWTP	Construct force main or gravity line for flow diversion.	TBD	TBD	2028
Easthaven, Gulfway, Gulf Freeway #2, Howard Drive Lift Stations	Easthaven: rehab Gulf Freeway #2: rehab Gulfway MUD: New trunk main to divert flow to Metro Central Howard Drive: Abandonment	4	8" FM 1,592 LF 6" FM 8,035 LF 30" sewer 6,866 LF	Complete
Consolidation of Post Oak, Stablewood, and Buckingham Lift Stations	New trunk main to divert flow from Post Oak, Stablewood and Buckingham LS to Woodway #1 Lift Station	3	N/A	2020
Replacement and consolidation of Harvestmoon, Dairy Ashford #1, and Hardy Temp. Lift Stations	Harvestmoon: Lift station replacement Dairy Ashford #1: New trunk main to divert flow to Harvestmoon lift station. Hardy Temp: Eliminate lift station.	3	N/A	2020
Willow Run WWTP, W. Mount Houston, and Rutherford Lift Stations	W. Mount Houston: New trunk main to divert flow. Rutherford: New trunk main to divert flow. Willow Run WWTP: New trunk main to divert flow to DePries Lift Station	3	N/A	Complete

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Project Name	Project Description	Number of LS Impacted	Approximate Feet of Pipe	Updated project completion Timeframe
Wrightwood Tunnel	Design of 84" tunnel to divert flow of existing 60" sewer along Wrightwood to existing 90" tunnel.	N/A	~4,000 LF 84" sewer	2025
North Corridor Consolidation Package 1A Trunk Sewer	Design of a 4,000 LF of 54" (0.09% slope) sewer and 600 LF of 78" (0.049%) sewer from Aldine-Westfield @ Rankin Rd to HCFCD P155-00-00	N/A	4,000 LF of 54" sewer 600 LF of 78" sewer	2020
North Corridor Consolidation Package 1B:	Design of a 5,800 LF of 54" Trunk Sewer from Hardy Airport Connector @ HCFCD P155-00-00 to Greens Rd.to receive the flow from the dual FM designed in R-536-08-3	N/A	5,800 LF of 54" sewer	2021
Park Ten WWTP Abandonment and Flow Diversion to Turkey Creek WWTP	Design of gravity sewers to divert the flow from Park Ten WWTP to North Eldridge LS, which pumps to Turkey Creek	3	12,640 LF of 24" and 30" sewer 4,756 LF of 24" FM	2023

WWTP PRIORITIES

69th Street WWTP

Repair/Replacement of Centrifuges

The original twenty-one centrifuges started operation in 1987. Since that initial startup, two units have been replaced in-kind. It is anticipated that, beginning in FY2022, the remaining original centrifuges will be replaced in-kind with new units. Construction should be complete by FY2024.

Repair/Replacement of Sludge Dryers

The flash dryers also started operation in 1987. One dryer was overhauled in 2003 and it is anticipated that key parts of the other six (6) units will be replaced. Rehabilitation of the dryers is anticipated to begin in FY2021 and be complete by FY2026.

New Cloth Media Filters

New cloth media filters will be installed, providing greater hydraulic capacity while not requiring replacement of the filter structure. The filters will be procured in fiscal year 2019. Construction is

APPENDIX B – EARLY ACTION PROJECTS

scheduled to be complete by the end of FY2023.

Upper Brays WWTP

Work at the Upper Brays WWTP to repair the aeration system at aeration basin #3 is completed; diffuser replacement in basin #1 and #2 is in progress. Construction is scheduled to be complete by FY2019.

Other WWTPs

There are other plants which have had effluent or other issues which will be addressed by priority projects. These WWTPs, and the proposed projects, are identified in the following table:

WWTP Early Action Projects

WWTP	Project	Completion Date
Almeda Sims	Blower Replacement & Addition of Clarifier No. 6	FY 2024
Greenridge	Basin Cleaning	FY 2021
Keegans Bayou	Grit Removal System Improvements	FY 2021
	Blower Improvements	FY 2020
	Disinfection Improvements	FY 2020
	Clarifier Rehabilitation	FY 2020
Metro Central	Blower Improvements Clarifier Rehabilitation	FY 2021
Southwest	Purge Blower, Mixer and Chlorine Contact Basin Improvements	FY2021
Kingwood Central	Post-aeration basin modifications	Being re-evaluated due to Harvey damage.
FWSD 23	Chlorine Contact Basin Improvements	Being re-evaluated due to Harvey damage.
Westway	Clarifier Improvements	FY 2021

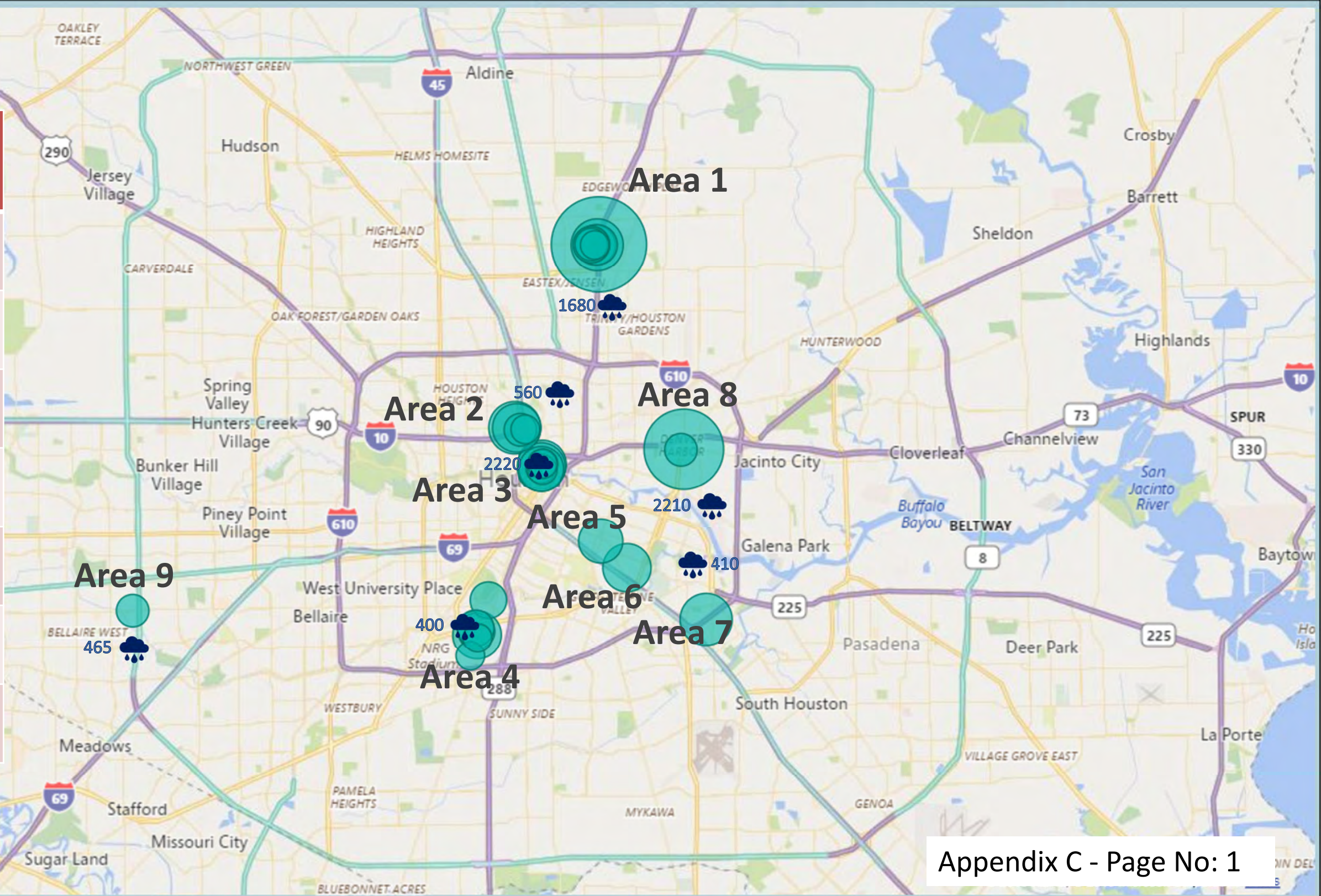
Appendix C

Description of 9 Areas for Capacity Remedial Measures Plan(s)

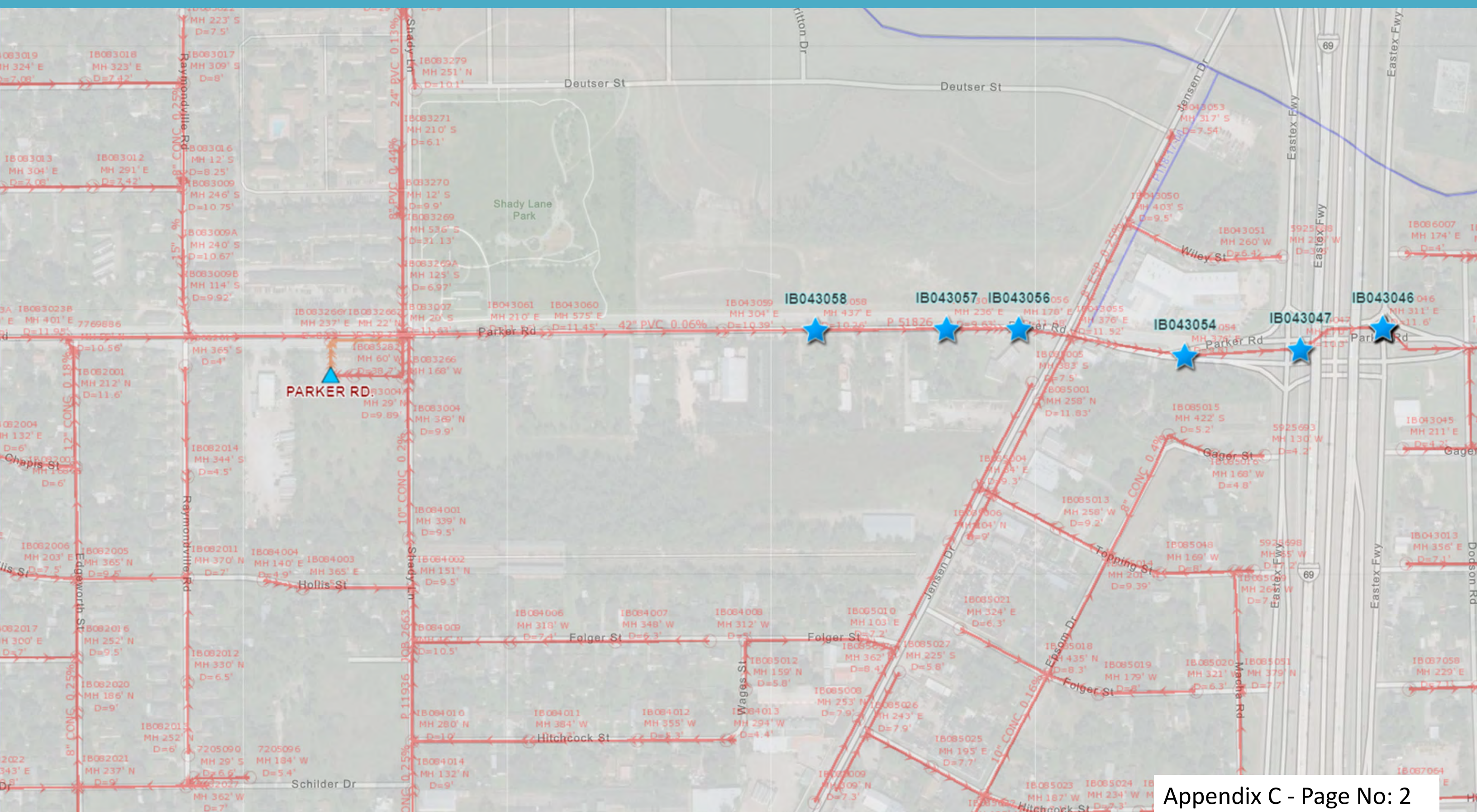
Known Capacity Constraints (Wet Weather SSO FY16 to FY18 Evaluation)

Fiscal Year (FY16, FY17 & FY18)
 System
 Excursion Cause
 134 SSO Occurrence
 33 Manhole Count
 MANHOLE

Area	HCFCD Raingage
Area 1	RG 1680
Area 2	RG 560
Area 3	RG 2220
Area 4	RG 400
Area 5, 6 & 7	RG 410
Area 8	RG 2210
Area 9	RG 465



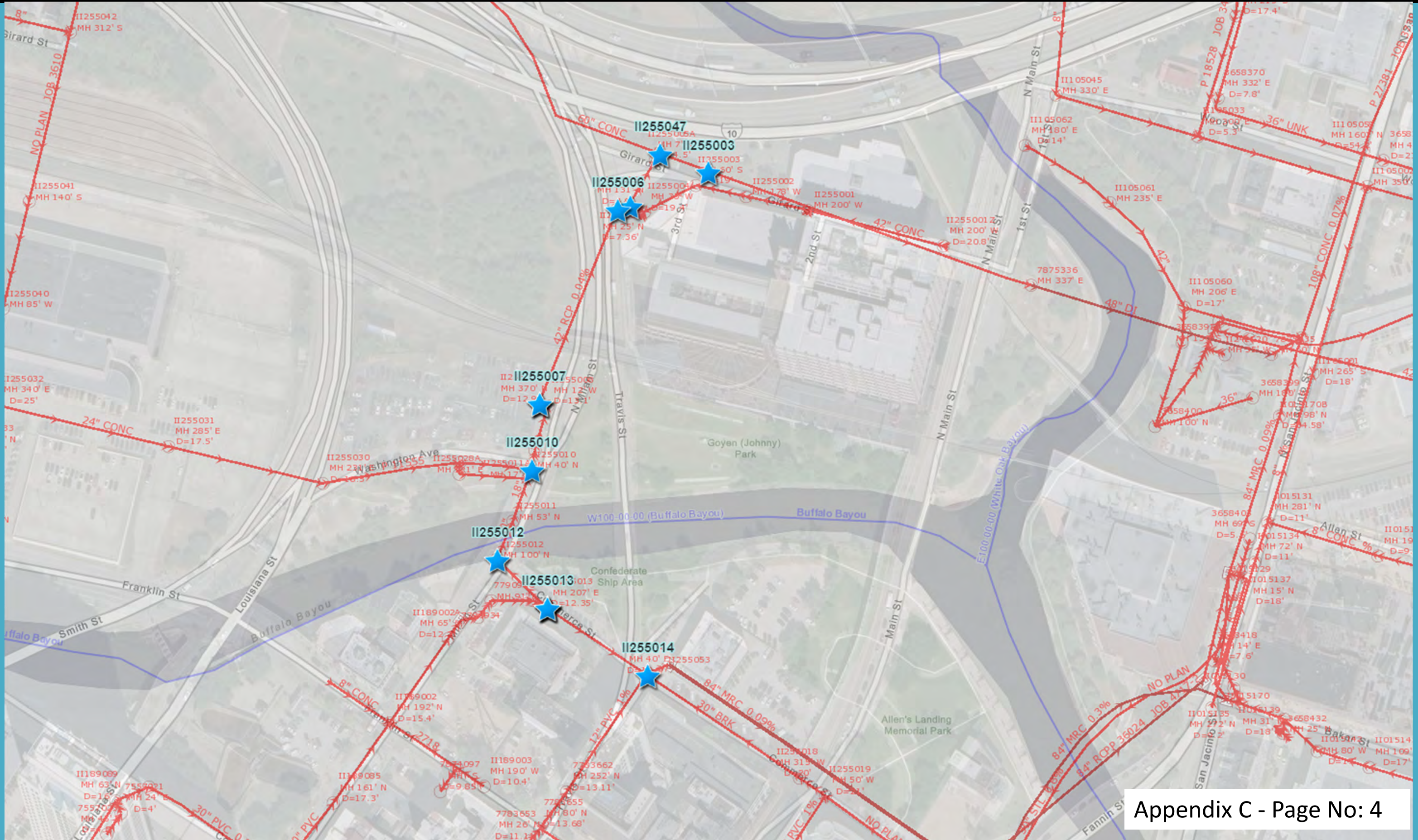
Area 1



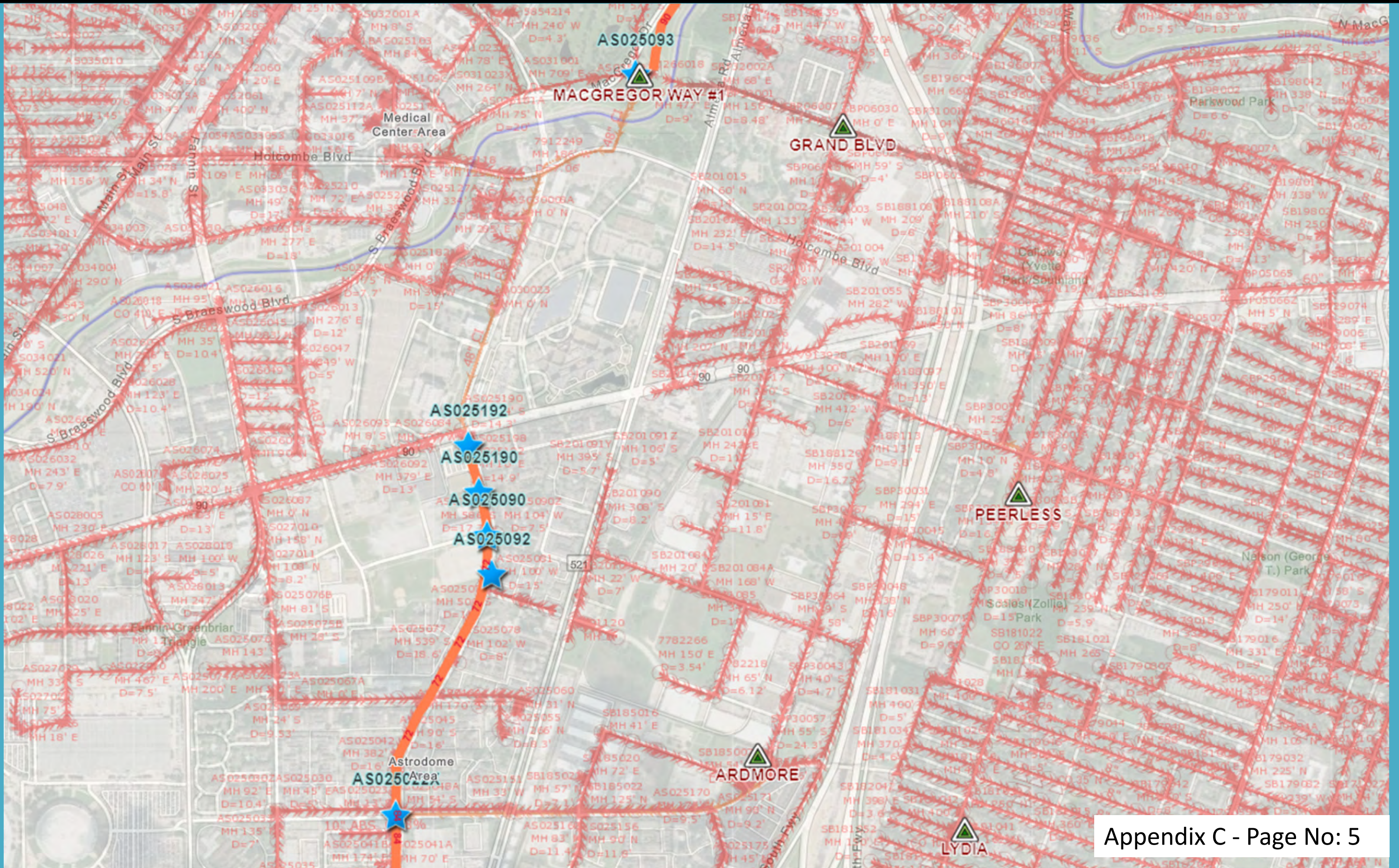
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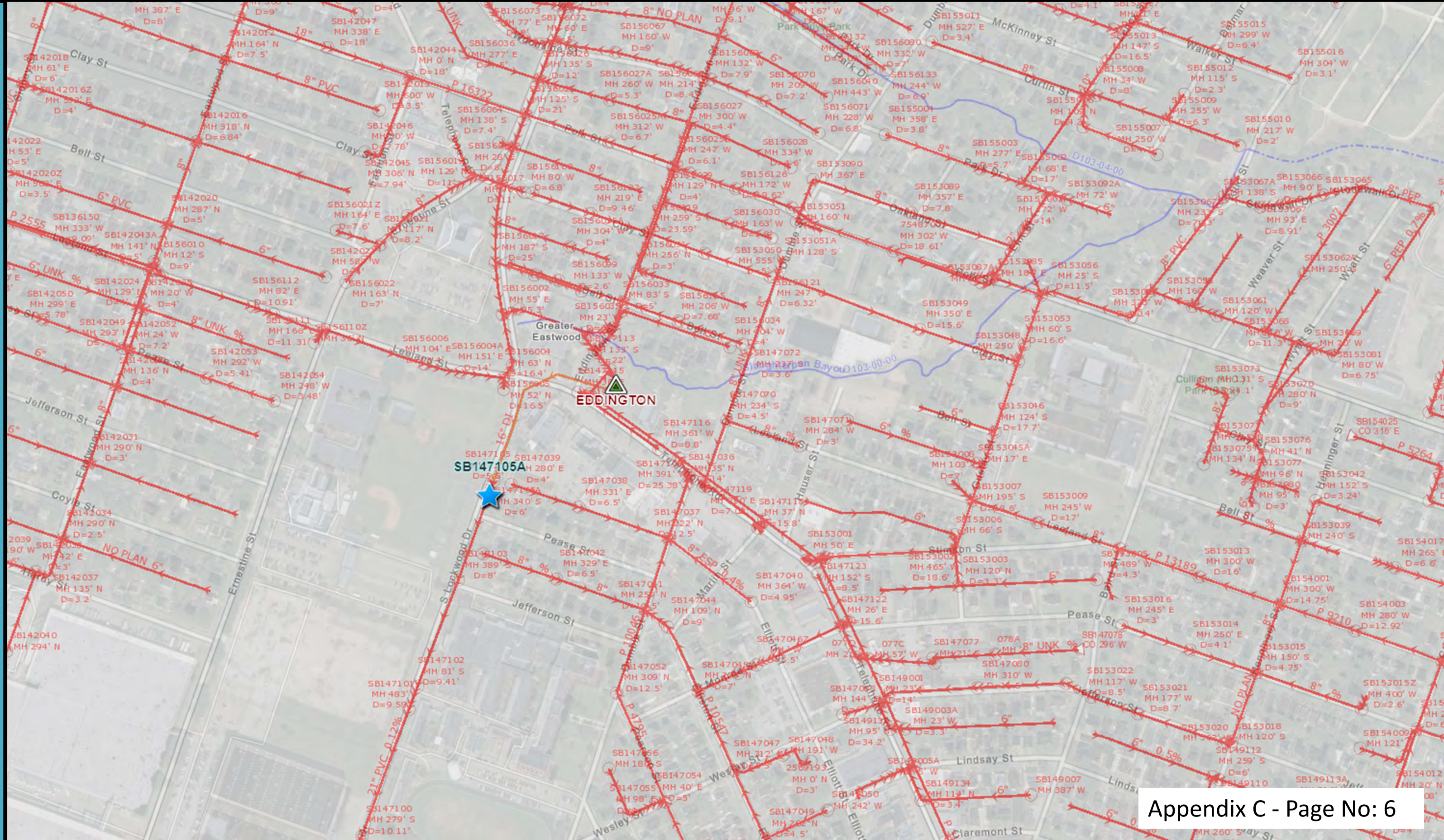
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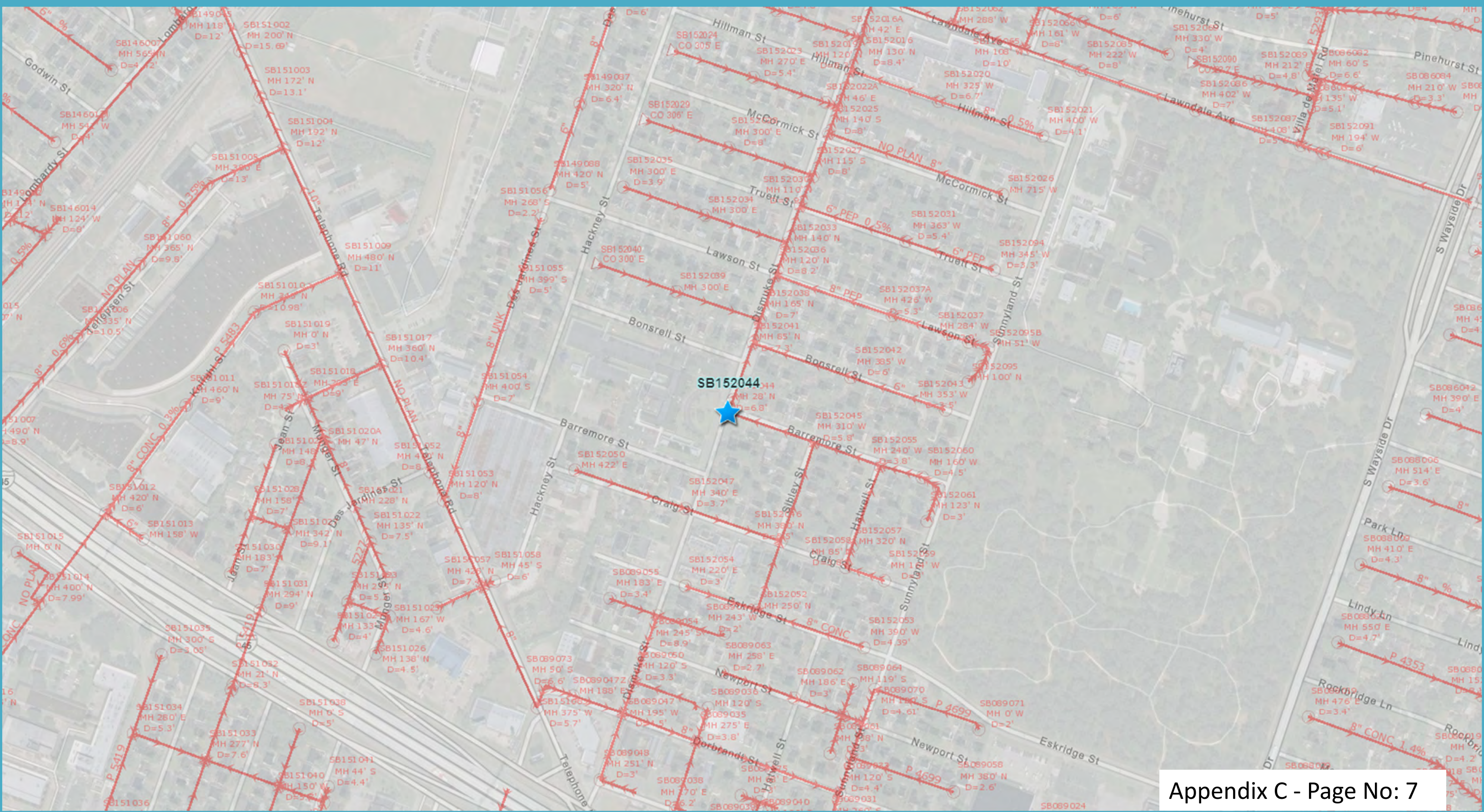
Area 4



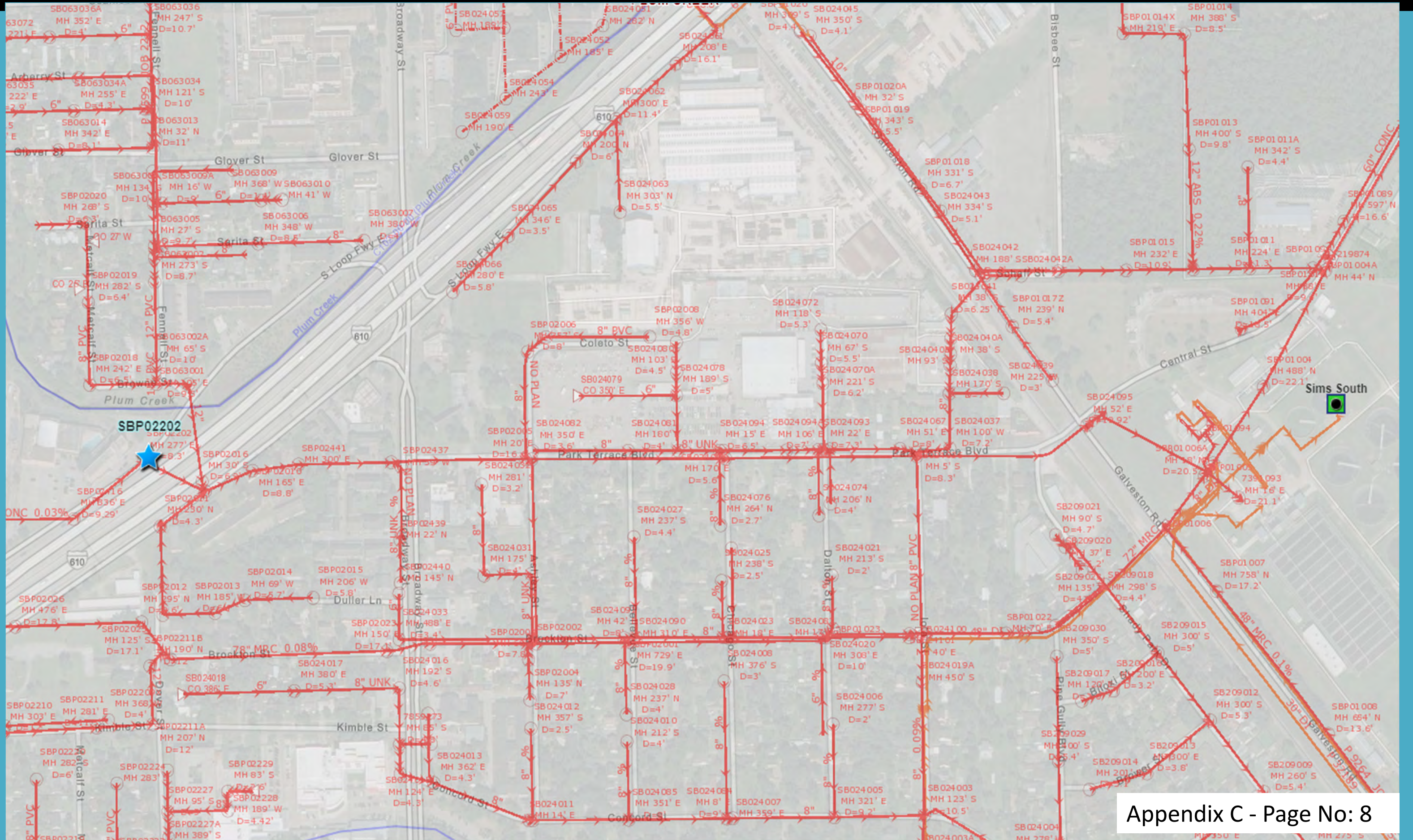
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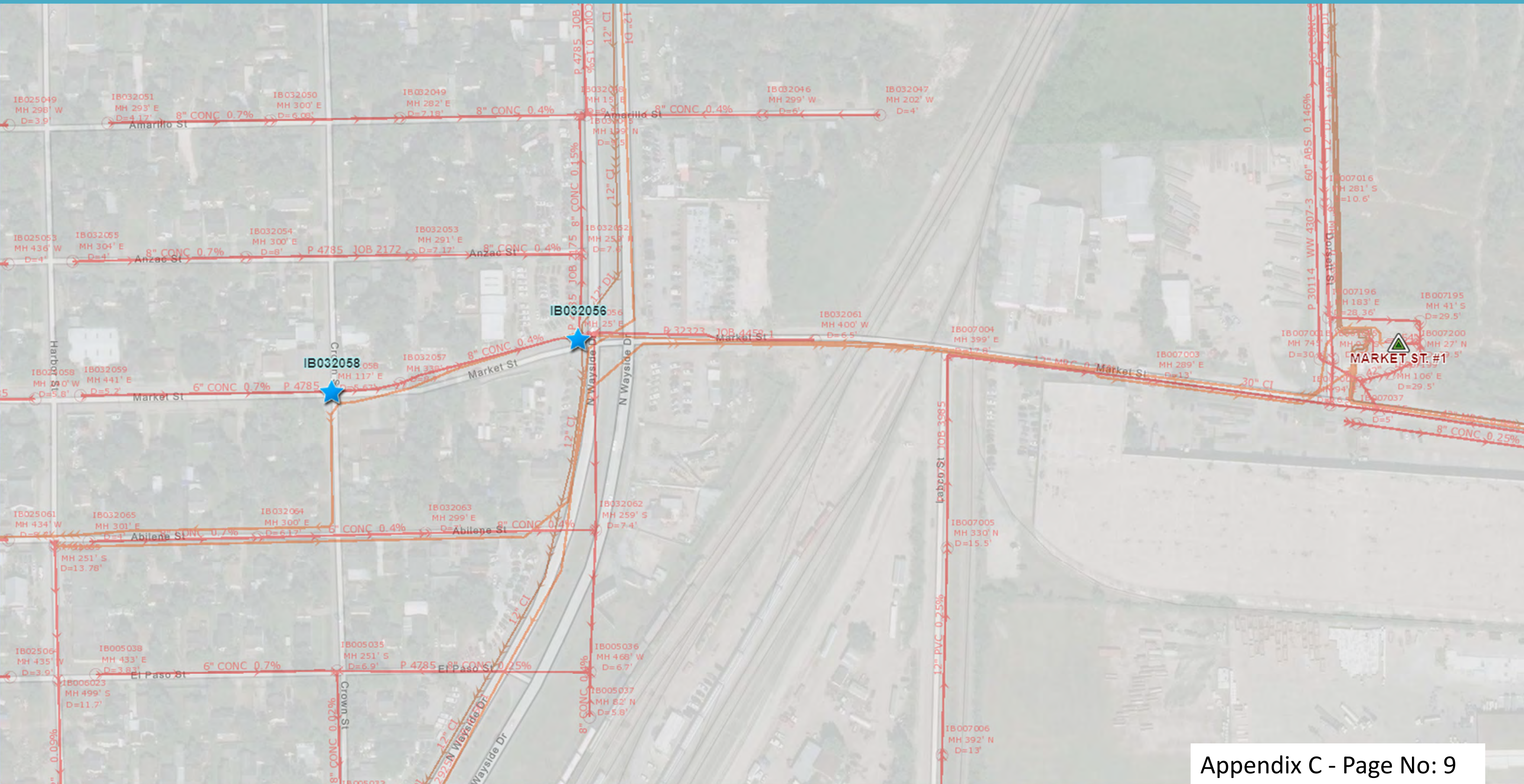
Area 6



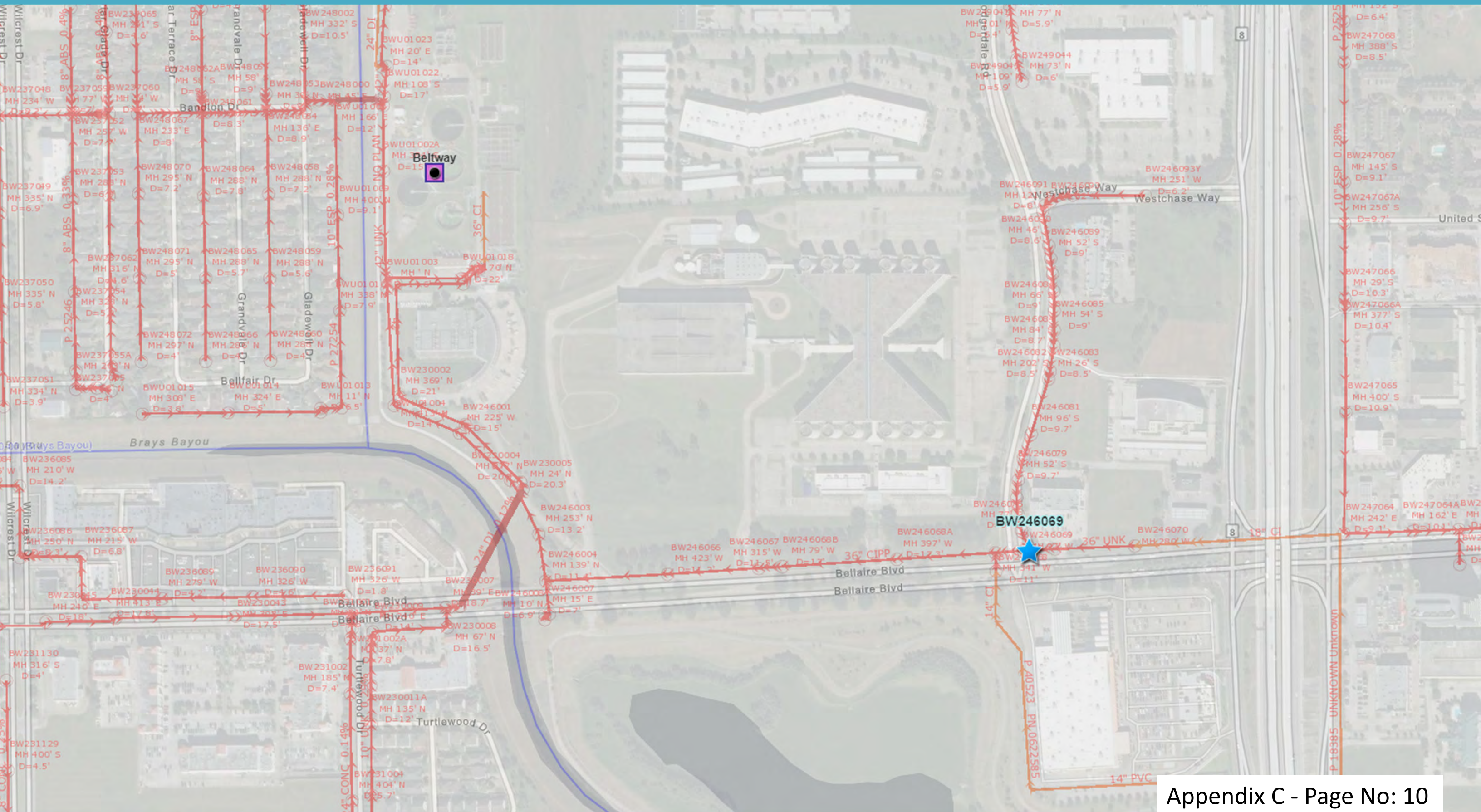
Area 7



Area 8



Area 9



Appendix D

Sewer Basin and Lift Station Prioritization Matrices

Sewer Basin Prioritization:

	Relative Weightage for Different Parameters Used for Sewer Basin Prioritization							
	Regulatory			Level of Service				
Level 1 Relative Weights	60%			40%				
	RSSO	Public SSO	Private SSO	Almost SSO	Repeat Stoppage	Stoppage	Repeat Odor	Odor
Level 2 Relative Weights	50%	40%	10%	40%	30%	15%	10%	5%

Scoring Criteria for Sewer Basin Prioritization Parameters

(Score: 0 to 5, 5 being the worst)

S. N.	Parameter	5	4	3	2	1	0
1	Repeat SSO (RSSO)	Normalized RSSO Count > 9.400	Normalized RSSO count > 4.050 to 9.400	Normalized RSSO count > 1.885 to 4.050	Normalized RSSO count > 1.130 to 1.885	Normalized RSSO count > 0.200 to 1.130	RSSO = 0
2	Public SSO	Normalized Public SSO count > 9.570	Normalized Public SSO count > 5.345 to 9.570	Normalized Public SSO count > 2.738 to 5.345	Normalized Public SSO count > 1.524 to 2.738	Normalized Public SSO count > 0 to 1.524	Public SSO count= 0
3	Private SSO	Normalized Private SSO count > 10.850	Normalized Private SSO count > 6.537 to 10.850	Normalized Public SSO count > 3.665 to 6.537	Normalized Public SSO count > 1.920 to 3.665	Normalized Public SSO count > 0 to 1.920	Private SSO count= 0
4	Almost SSO	Normalized Almost SSO count > 4.265	Normalized Almost SSO count > 3.412 to 4.265	Normalized Almost SSO count > 2.439 to 3.412	Normalized Almost SSO count > 1.813 to 2.439	Normalized Almost SSO count > 0.210 to 1.813	No Almost SSO
5	Repeat Stoppage	Normalized Value > 79.600	Normalized Value > 45.200 to 79.600	Normalized Value > 20.850 to 45.200	Normalized Value > 9.930 to 20.850	Normalized Value > 0.670 to 9.930	No Repeat Stoppage
6	Stoppage	Normalized Value > 33.400	Normalized Value > 21.150 to 33.400	Normalized Value > 11.940 to 21.150	Normalized Value > 6.030 to 11.940	Normalized Value > 0.470 to 6.030	No Stoppage
7	Repeat Odor	Normalized Value > 9.450	Normalized Value > 4.200 to 9.450	Normalized Value > 2.730 to 4.200	Normalized Value > 1.953 to 2.730	Normalized Value > 0.450 to 1.953	No Repeat Odor
8	Odor	Normalized Value > 8.670	Normalized Value > 5.355 to 8.670	Normalized Value > 3.082 to 5.355	Normalized Value > 1.702 to 3.082	Normalized Value > 0.470 to 1.702	No Odor Complaint

Lift Station Prioritization (Risk-based):

Risk Score = Likelihood of Failure (LOF) x Consequence of Failure (COF)

Scoring Criteria for LOF Parameters (for Lift Station Prioritization)

(Score: 1 to 5, 5 being the worst)

S. N.	Likelihood of Failure (LOF)	Relative Weight (abs)	5	4	3	2	1
1	Age	3	>= 31 yrs.	20 to 30 yrs.	15 to 19 yrs.	11 to 14 yrs.	10 yrs. or less
2	Structural Condition	2	Very Poor/ Require Replacement	Poor/ Require Rehabilitation	Moderate/ Require Significant Maintenance	Good/ Minor Defects	Excellent/ Very Good
3	Mechanical Condition	4	Very Poor/ Require Replacement	Poor/ Require Rehabilitation	Moderate/ Require Significant Maintenance	Good/ Minor Defects	Excellent/ Very Good
4	Electrical Condition	3	Very Poor/ Require Replacement	Poor/ Require Rehabilitation	Moderate/ Require Significant Maintenance	Good/ Minor Defects	Excellent/ Very Good
5	Capacity Limitation	2	Capacity Inadequate				Capacity adequate
			@ 10K GPAD				@ 10K GPAD
6	Site Property	1	High Risk				Low Risk
7	Facility Building	1	High Risk				Low Risk
8	Accessibility	1	High Risk				Low Risk
9	FIRM Capacity	1	FC > 5 MGD	FC >2.25 to 5 MGD	FC >0.5 to 2.25 MGD	FC > 0.25 to 0.5 MGD	FC <= 0.25 MGD
10	Design Safety	1	High Risk				Low Risk
11	Flood Zone	1	in Floodway	in 100-yr FP		in 500 yr FP	In Zone X

Scoring Criteria for COF Parameters (for Lift Station Prioritization)

(Score: 1 to 5, 5 being the worst)

S. N.	Consequence of Failure (COF)	Relative Weight (abs)	5	4	3	2	1
1	Public Disruption	1	SA >580 ac	SA=> 281 to 580	SA=> 141 to 280	SA=> 61 to 140	SA<= 60
2	Customer Odor Complaints	1	No of odor complaint =>7	No of odor complaint = 6	No of odor complaint = 4 to 5	No of odor complaint = 3	No of odor complaint <=2
3	Number of Upstream Lift Stations	1	No of US LS =>2		No of US LS =1		No of US LS =0
4	Work Order History	3	No. of WO in 3-yrs =>18	No. of WO in 3-yrs =16 to 17	No. of WO in 3-yrs =14 to 15	No. of WO in 3-yrs =12 tp 13	No. of WO in 3-yrs <12
5	Lift Station Related SSOs	3	No. of SSO in 3-yrs =>14	No. of SSO in 3-yrs =11 to 13	No. of SSO in 3-yrs = 8 to 10	No. of SSO in 3-yrs =5 to 7	No. of SSO in 3-yrs<5
6	Repair Cost	2	Motor HP =>120	Motor HP >50 to 119	Motor HP >20 to 49	Motor HP > 8 to 19	Motor HP <=8
7	Retention Time	3	T<5 hrs	T= 5 to 10 hrs	T= 11 to 16 hrs	T= 17 to 71 hrs	T=>72 hrs
8	Critical Industries	1	>3		2 to 3		0 to 1
9	Elimination/Consolidation Potential	1	High		Medium		Low

Appendix E

WWTP Violations and Associated Corrective Action

Plant Greenridge

Permit Parameter	Non-Compliance Date(s)	Initial Root Cause Assessment	CORRECTIVE ACTION
2-hr peak	8/26/2017 8/28/2017 8/27/2017	Hurricane Harvey related. The region experienced extreme rainfall due to Hurricane Harvey. Ten inches of rain were recorded at the WWTP on August 26, 2017.	Operations personnel made process adjustments, as conditions allowed, to maximize treatment.
CBOD5	04/17/2015	During the heavy rainfall of 3.27 inches on April 17, 2015, a sudden hydraulic surge was created through the plant, due to the sudden rise in the flow (18 mgd). This caused solids to build up in the clarifiers and escape with the effluent, which contributed in the CBOD-5 excursion.	Operations staff is closely monitoring the plant and making process adjustments, as needed.
E. coli	05/13/2015	Insufficient bleach feed in the system during an abnormal high flow at the time of sampling. Chlorine deficiency in the contact basin resulted in elevated E. coli bacteria in the effluent.	Work order # 1122347 was created for the chlorination group to thoroughly inspect the chlorination system to ensure proper operation.
	06/18/2015	Undetermined. Both the operator logs and SCADA trends indicated that the chlorine residual and effluent flow were variable, but the chlorine residual was above 1.0 mg/L prior to and at the time of sample collection.	Work order # 1134273 was created for the chlorination group to evaluate the chlorination system to ensure proper operation.
	07/01/2015	Undetermined. Chlorine residual by grab sample and analyzer indicated that the plant was in compliance.	Work order # 1134273 was created for the chlorination group to evaluate the chlorination system to ensure proper operation.
	3/3/2016	Undetermined. SCADA trends indicate that the residual was 1.75 mg/L at the time of sampling.	Chlorination system was assessed under work order # 1233658
	12/21/2016	Equipment failure resulted in insufficient chlorination to properly disinfect the effluent.	The chlorination group troubleshooted the chlorine monitoring system.
	9/27/2017	The disinfection system was not maintaining an adequate chlorine residual at the time of sample collection.	The chlorination group repaired the disinfection system.
NH3-N	8/29/2016	The return sludge pumps malfunctioned, causing inadequate return of sludge to the process and an elevated ammonia concentration in the effluent.	All return sludge pumps were immediately restored back to service under work orders 1231783 and 1237180.
	4/2/2018	Clogged return telescopes caused a deficiency of RAS in the process, disrupting the complete treatment of ammonia.	The return telescope cleaning schedule was revised to include more frequent monitoring and cleaning.
	01/22/2015	Combination of heavy rain and multiple flow restrictions in the clarifiers. According to the rain gauge at the WWTP, it rained 1.10 inches on 1/22/2015 and caused a sustained flow of 10 mgd for over 4 hours. The hydraulic surge due to the wet weather caused debris to plug the inlets and center wells of the clarifiers. This caused solids to build up and escape with the effluent, and resulted in a high TSS concentration.	Work order # 1087159 was created to remove all trash and debris from clarifier inlets and center wells. The situation corrected itself once flow subsided.
TSS	1/18-1/24/2015	Combination of heavy rain and multiple flow restrictions in the clarifiers. According to the rain gauge at the WWTP, it rained 1.10 inches on 1/22/2015 and caused a sustained flow of 10 mgd for over 4 hours. The hydraulic surge due to the wet weather caused debris to plug the inlets and center wells of the clarifiers. This caused solids to build up and escape with the effluent and resulted in a very high TSS concentration on January 22, 2015, which affected the calculated 7-day average concentration.	Work order # 1087159 was created to remove all trash and debris from clarifier inlets and center wells. The situation corrected itself once flow subsided.
	04/01/2015	All lift station pumps came on during the heavy rainfall of 3.27 inches on April 17, 2015, resulting in a flow increase to 18 mgd. This apparently reduced detention time, allowing solids to build up in the clarifiers that escaped with the effluent. This increased the TSS daily average above the permitted limit.	Operations staff is closely monitoring the plant and making process adjustments, as needed.
	04/16/2015	During the heavy rainfall of 2.5 inches on April 16, 2015, a sudden hydraulic surge was created through the plant, due to the sudden rise in the flow (>15 mgd). This caused solids to build up in the clarifiers and escape with the effluent.	Operations staff is closely monitoring the plant and making process adjustments, as needed.
	04/17/2015	During the heavy rainfall of 3.27 inches on April 17, 2015, a sudden hydraulic surge was created through the plant, due to the sudden rise in the flow (18 mgd). This caused solids to build up in the clarifiers and escape with the effluent.	Operations staff is closely monitoring the plant and making process adjustments, as needed.
	4/12 TO 4/18/2015	Heavy rainfall of 3.27 inches on April 17, 2015, and 2.5 inches on April 16, 2015, created hydraulic surges through the WWTP. Solids built up in the clarifiers and escaped with the effluent, leading to TSS exceedance for two days. The high TSS concentrations for two consecutive days affected the calculated 7-day average concentration.	Operations staff is closely monitoring the plant and making process adjustments, as needed.
	05/12/2015	Clarifier issues were caused by debris build up in the inlet of # 3 clarifier, increasing flow toward the smaller clarifiers (# 1 and 2). Some short circuiting occurred, allowing a high rate of flow to reach the weirs prior to settling. Severe thunderstorms produced 3.20 inches of rain, which may have contributed to the problem. These factors allowed solids to escape over the weirs and caused the TSS violation.	Work orders have been submitted to clean the inlets and center wells of the clarifiers. (#1083298, #1083490, #1087159)
	2/8/2016	A combination of high solids in the plant and problems with the lift station caused elevated TSS in the effluent. Rainfall may have also contributed to the problem. On January 8, 2016, 0.76 inches of rain were recorded at the WWTP.	Operations is working diligently to remove excess solids from the plant.
	5/2/2017	A sudden surge of flow, created when the lift station pumps were reprimed, caused solids to be pushed out of the clarifier, into the chlorine contact basin, and out the outfall.	The operator has been retrained on the effects of sudden surges of flow. A work order was written for the installation of air relief valves on the lift pumps.
	7/10/2017	A power outage on July 8, 2017 caused the return pump to trip off. As a result, an accumulation of solids in clarifier #2 eventually flowed over the clarifier weirs to the chlorine contact basin and through the outfall.	The tripped return pumps were repaired.

Plant FWSD 23			
Permit Parameter	Non-Compliance Date(s)	Initial Root Cause Assessment	CORRECTIVE ACTION
2 hour peak flow	10/24/2015 10/25/2015	Severe rain in the service area. On October 24, 8.43 inches of rain were recorded at the WWTP. On October 25, 1.41 inches of rain were recorded at the WWTP.	Operations staff is closely monitoring the plant and making process adjustments as needed.
	10/30/2015 10/31/2015	Severe rain in the service area. On October 30, 7.6 inches of rain were recorded at the WWTP. On October 31, 1.17 inches of rain were recorded at the WWTP.	Operations staff is closely monitoring the plant and making process adjustments as needed.
	12/13/2015	Heavy rain in the service area. On December 13, 2015, 1.42 inches of rain were recorded at the WWTP.	Operations staff is closely monitoring the plant and making process adjustments as needed.
	1/8/2016	Rain in the service area. On January 8, 2016, 0.79 inches of rain were recorded at the WWTP.	Operations staff is closely monitoring the plant and making process adjustments as needed.
	4/18/2016	A total of 4.43 inches of rain were recorded at the WWTP on April 17 and 18, 2016. 4/17/16: 3.63 inches 4/18/16: 0.8 inch	On April 18, 2016, Governor Greg Abbott issued a Disaster Proclamation for Harris County and other areas of southeast Texas.
	5/27/2016	Heavy rain in the service area. On May 27, 2016, 2.86 inches of rain were recorded at the WWTP.	Operations staff is closely monitoring the plant and making process adjustments as needed.
	6/2/2016	Heavy rain in the service area. On June 2, 2016, 2.10 inches of rain were recorded at the WWTP.	Operations staff is closely monitoring the plant and making process adjustments as needed.
	6/3/2016	Heavy rain in the service area. On June 3, 2016, 1.7 inches of rain were recorded at the WWTP.	Operations staff is closely monitoring the plant and making process adjustments as needed.
	6/4/2016	Heavy rain in the service area. On June 3 and 4, 2016, 1.70 and 0.20 inches of rain were, respectively, recorded at the WWTP.	Operations staff is closely monitoring the plant and making process adjustments as needed.
	1/18/2017	Heavy rain in the service area. On January 17 and 18, 2017 a total of seven inches of rain were recorded at the WWTP.	Operations staff is closely monitoring the plant and making process adjustments as needed. NOTE: The Bretshire WWF did not discharge.
	1/20/2017	Heavy rain in the service area. On January 20, 2017 2.64 inches of rain were recorded at the WWTP.	Operations staff is closely monitoring the plant and making process adjustments as needed. NOTE: The Bretshire WWF did not discharge.
	1/21/2017	Heavy rain in the service area. On January 20 and 21, 2017 a total of 2.72 inches of rain were recorded at the WWTP.	Operations staff is closely monitoring the plant and making process adjustments as needed. NOTE: The Bretshire WWF did not discharge.
	3/29/2017	Heavy rain in the service area. On March 29, 2017, 2.2 inches of rain were recorded at the WWTP.	Operations staff is closely monitoring the plant and making process adjustments as needed. NOTE: The Bretshire WWF did not discharge.
	8/7/2017	Heavy rain in the service area. On August 7, 2017, 4.78 inches of rain were recorded at the WWTP.	Operations staff is closely monitoring the plant and making process adjustments as needed. NOTE: The Bretshire WWF did not discharge.
	2/10/2018	Heavy rain in the service area. On February 9 and 10, 2018, 3.17 inches of rain were recorded at the WWTP	Operations staff is closely monitoring the plant and making process adjustments as needed. NOTE: The Bretshire WWF did not discharge.
	6/20/2018	Heavy rain in the service area. On June 20, 2018, 2.89 inches of rain were recorded at the WWTP.	Plant operations returned to normal after the rain subsided.
7/4/2018	Heavy rain in the service area. On July 4, 2018, 4.35 inches of rain were recorded at the WWTP	Operations staff is closely monitoring the plant and making process adjustments as needed. Upon issuance of the pending TPDES permit (WQ0010495016), the 2-hour peak flow limit will be 33,056 gpm. TCEQ received the application on November 1, 2002; the latest draft permit was issued on July 25, 2016. NOTE: The Bretshire WWF did not discharge.	
9/9/2018	Heavy rain in the service area. On September 9, 2018, 3.06 inches of rain were recorded at the WWTP.	Operation staff is closely monitoring the plant and making process adjustments as needed.	
NH3-N	11/14/2016 (outfall 001, 003)	Undetermined. The WWTP was operating normally, with no upsets. The influent NH3-N was measured at 82 mg/L and may have contributed to the noncompliance.	The WWTP influent will be closely monitored to determine if an investigation of possible illegal dumping is warranted.
	9/3/-9/9/2017 (outfall 001, 003)	Hurricane Harvey related. Flooding at the facility site damaged the blowers, motors, and electrical gear. This prevented adequate secondary treatment.	On August 30, 2017, emergency electrical and mechanical repairs were begun. Two temporary blowers were installed for back-up. Secondary treatment was partially restored on September 3, 2017 and fully restored on September 4, 2017. NOTE: The Bretshire WWF did not discharge.
	9/4/2017 (outfall 001 and 003)	Hurricane Harvey related. The WWTP was inaccessible from August 27 to 29, 2017.	Clarifiers and blowers became available for service on September 4, 2017.
	9/5/2017 (outfall 001 and 003)	Hurricane Harvey related. Flooding at the facility site damaged the blowers, motors, and electrical gear. This prevented adequate secondary treatment.	On August 30, 2017, emergency electrical and mechanical repairs were begun. Two temporary blowers were installed for back-up. Secondary treatment was partially restored on September 3, 2017 and fully restored on September 4, 2017.
	3/15/2018 (outfall 001 and 003)	An air diffuser broke off of the air header, preventing air from being fed into the aeration basins. This equipment failure happened after hours and was not discovered until the morning shift arrived.	A work order was generated for the repair of the broken diffuser.

	9/18/2018 9/20/2018 9/16/18-9/22/18	A stoppage in the air lift pump system and blowers out of service for maintenance caused incomplete treatment.	Maintenance completed stoppage removal from the air return lines.
TSS	5/12/2015 (outfall 001 and 003)	Combination of high sludge blanket in clarifier #4 due to clogged sludge wasting line and out of service equipment (clarifier #2). Rainfall of 2.54 inches on 5/12/2015 and 0.9 inches on the day before may have contributed to the problem. These factors allowed solids to escape over the weirs.	Work order #1121170 was generated to clear the blockage in the sludge wasting line on clarifier #4.
	5/15/2015 (outfall 001 and 003)	Combination of high sludge blanket in clarifier #4 due to clogged sludge wasting line and out of service equipment (clarifier #2). Rainfall of 0.70 inches on 5/15/2015 may have contributed to the problem. These factors allowed solids to escape over the weirs.	Work order #1121170 was generated to clear the blockage in the sludge wasting line on clarifier #4.
	3/10/2016 (outfall 001 and 003)	Combination of equipment failure and heavy rainfall in the area. Two clarifiers were out of service due stoppages in the return air lift pumps. On March 9 and 10, 2016, 3.75 inches of rainfall were recorded at the WWTP.	Wasting rates were adjusted. Maintenance and operations removed the stoppages in the air lift pumps and placed clarifier #2 back in service.
	1/20/2017 (outfall 001 and 003)	Clarifier #5 was taken out of service to clear a stoppage in the return line. This allowed a hydraulic surge, experienced during a period of heavy rainfall, to push solids out of the in-service clarifiers.	Maintenance crews are removing the stoppage in the Clarifier #5 return line.
	1/1/2017-1/31/17 (outfall 001 and 003)	Clarifier #5 was taken out of service to clear a stoppage in the return line. This allowed a hydraulic surge, experienced during a period of heavy rainfall, to push solids out of the in-service clarifiers.	Maintenance crews are removing the stoppage in the Clarifier #5 return line. NOTE: The Bretshire WWF did not discharge.
	1/15/2017-1/21/17 (outfall 001 and 003)	Clarifier #5 was taken out of service to clear a stoppage in the return line. This allowed a hydraulic surge, experienced during a period of heavy rainfall, to push solids out of the in-service clarifiers.	Maintenance crews are removing the stoppage in the Clarifier #5 return line.
	8/7/2017 (outfall 001 and 003)	Poor settling caused solids to discharge over the clarifier weirs. Heavy rainfall (4.78 inches on 8/7/17) may have contributed.	Process adjustments were made to maximize treatment.
	1/23/2018 (outfall 001 and 003)	Unknown. All plant equipment was in service and all process controls were within appropriate ranges.	None

Plant: Kingwood Central

Permit Parameter	Non-Compliance Date(s)	Initial Root Cause Assessment	CORRECTIVE ACTION
COBDS	9/6/2017 9/7/2017 9/8/2017 9/3-9/6/2017 9/1-9/30/2017 9/1-9/30/2017	Hurricane Harvey related. Floodwaters (over 23 inches of rain were recorded at the WWTP) damaged all three blowers and destroyed the UV disinfection system. The storm left the plant with no power.	Bids for replacing/repairing the UV system are being solicited. Blowers are being repaired.
E.coli	01/13/2015	Plant rainfall of 1" on January 11, 2015 caused a power surge at the ultraviolet (UV) disinfection system. Routine preventive maintenance activities on Monday, January 12, 2014 revealed 72 lights burned out, preventing the plant from maintaining the optimal disinfection efficiency. This allowed the E. coli bacteria value to rise above the permitted value.	Additional ballasts were ordered to replace stock on hand.
	02/10/2015	UV system shut down due to electrical problem. This allowed the E. coli bacteria value to rise above the permitted value.	Work assignment was ordered to STES contractor for UV system evaluation.
	9/5/2016	Rags accumulated on the bulbs of the UV system, preventing adequate disinfection.	The mechanical bar screen is being repaired, which will prevent this problem from occurring again.
	9/6/2017 9/7/2017 9/8/2017 9/9/2017 9/10/2017	Hurricane Harvey related. Floodwaters (over 23 inches of rain were recorded at the WWTP) damaged all three blowers and destroyed the UV disinfection system. The storm left the plant with no power.	Bids for replacing/repairing the UV system are being solicited. Blowers are being repaired.
	9/20/2017	The bleach injection system was unable to maintain an adequate chlorine residual. Hurricane Harvey destroyed the UV disinfection system; a temporary bleach system is being utilized.	An emergency purchase order is being pursued for repairs to and/or replacement of the disinfection system.
	7/31/2018	Elevated flow due to rainfall (1.0 inch recorded at the WWTP) is believed to have contributed to incomplete disinfection.	Inframark is making process control adjustments and troubleshooting the disinfection system to ensure proper treatment. NOTE: The UV disinfection system was destroyed by Hurricane Harvey. Chlorination is being used for disinfection.
NH3-N	2/12/2016	The blowers tripped off on February 11, 2016 during non-working hours, and the alarm system failed. Insufficient aeration caused incomplete treatment in the aeration basin. **The laboratory provided updated analytical results on March 9, 2016.	The communication issue with the alarm system was corrected.
	9/6/2017 9/7/2017 9/8/2017 9/3-9/9/2017 9/1-9/30/2017	Hurricane Harvey related. Floodwaters (over 23 inches of rain were recorded at the WWTP) damaged all three blowers and destroyed the UV disinfection system. The storm left the plant with no power.	Bids for replacing/repairing the UV system are being solicited. Blowers are being repaired.
TSS	9/6/2017 9/7/2017 9/8/2017 9/3-9/9/2017 9/1-9/30/2017	Hurricane Harvey related. Floodwaters (over 23 inches of rain were recorded at the WWTP) damaged all three blowers and destroyed the UV disinfection system. The storm left the plant with no power.	Bids for replacing/repairing the UV system are being solicited. Blowers are being repaired.

Plant Metro Central

Permit Parameter	Non-Compliance Date(s)	Initial Root Cause Assessment	CORRECTIVE ACTION
CBOD5	8/27/2017-9/2/2017 9/1/2017	Hurricane Harvey related. The facility was flooded for several days. Blowers were unable to run because water had collected in discharge lines. Return sludge pumps on both clarifiers suffered failures and could not return solids.	Return sludge pumps and valves on blowers have been replaced. Blower discharge lines have been cleared. Plant solids have been reduced and reseeded was performed to introduce active bacteria.
Enteroco	11/2/2016	Undetermined. According to the SCADA trends, the chlorine residual was within an adequate range for disinfection at the time of sample collection.	The disinfection system was checked for problems, but it was found to be working properly. Operations personnel is continuously monitoring plant operations and disinfection system equipment.
	2/21/2018	Undetermined. At the time of sample collection, the chlorine residual was with an adequate range for disinfection. Plant flow was normal, and all plant process equipment was in service.	Operations is continuously monitoring plant processes, equipment, and chemical feed systems.
	7/25/2018	Undetermined. SCADA trends show that the chlorine residual was within an adequate range for disinfection at the time of sample collection. Plant flow was normal, and all process equipment was in service.	Continuously monitor plant operations, equipment, and chemical feed systems.
NH3-N	7/1-7/31/2015	Multiple RAS pump issues throughout the month of July resulted in excessive sludge blankets in the clarifiers which affected the treatment process and caused elevated ammonia-nitrogen levels throughout the month.	RAS pumps have been either replaced or repaired and electrical issues have been addressed.
	9/1/2017 9/4/2017 9/5/2017 8/17-9/2/2017 9/3-9/9/2017 9/1-9/30/2017	Hurricane Harvey related. The facility was flooded for several days. Blowers were unable to run because water had collected in discharge lines. Return sludge pumps on both clarifiers suffered failures and could not return solids.	Return sludge pumps and valves on blowers have been replaced. Blower discharge lines have been cleared. Plant solids have been reduced and reseeded was performed to introduce active bacteria.
	01/22/2015	Heavy rain. According to the rain gauge at the WWTP, it rained 2.78 inches on 1/22/2015. The hydraulic surge due to the sustained high flow of 10.0 MGD for nearly four hours, caused solids from the sludge blankets to escape with the effluent, and resulted in the elevated TSS concentration.	Operations staff is closely monitoring the plant and making process adjustments, as needed.
TSS	02/09/2015	The main return pumps lost prime during a five hour power outage. Sludge built up in the clarifiers and accumulated solids escaped with the effluent.	The plant returned to normal operation once the power was restored and the return pumps were primed.
	12/1-12/31/2015	One of the clarifiers malfunctioned, causing the bio solids removal system to fail. Rising bio solids exited the clarifier over the weirs and subsequently discharged in the effluent.	A work request was made for the electrician to service the traveling bridge limit torque switch and a railing contactor that was tripping the unit off.
	1/11/31/2016	The malfunction of clarifier #4 caused the solids level in the clarifier to rise and exit over the clarifier weirs. This resulted in elevated TSS concentrations throughout the month which caused the daily average to exceed the permitted limit.	Rags are continuously cleaned from the sludge return lines, and the contractor is working on getting an additional clarifier in service.
	12/1-12/31/2016	Only one clarifier was available for use and various return pump failures caused elevated TSS concentrations throughout the month.	Service requests have been made for repairs to clarifiers and the associated pumps.
	5/1/2017 4/30-5/6/2017	The composite sampler was recently moved so a contractor could perform upgrades. In doing so, the intake tube was placed adjacent to the chlorine contact basin wall. It is suspected that the cause of the elevated TSS is an accumulation of sand along the wall of the chlorine contact basin.	The lab group has been requested to relocate the sampler. Operations personnel are also performing maintenance activities in the chlorine contact basin.
	8/27/2017-9/2/17	Hurricane Harvey related. The facility was flooded for several days. Blowers were unable to run because water had collected in discharge lines. Return sludge pumps on both clarifiers suffered failures and could not return solids.	Return sludge pumps and valves on blowers have been replaced. Blower discharge lines have been cleared. Plant solids have been reduced and reseeded was performed to introduce active bacteria.

Plant Southwest			
Permit Parameter	Non-Compliance Date(s)	Initial Root Cause Assessment	CORRECTIVE ACTION
CBOD5	5/24- 5/30/2015 5/29/2015	The Houston area experienced intense, sustained rainfall of 11 inches in less than six hours over May 25/26, 2015. As a result, Brays Bayou overflowed its banks and flooding occurred. The entire WWTP was flooded and extensive damage occurred to the electrical and blower systems. The inability to use the full capacity of the blowers caused insufficient air in the aeration basins, allowing the ammonia value to rise above the permitted amount.	Operators will closely monitor the situation while electrical systems, blowers and all other equipment are being repaired.
	1/28/2018-2/1/2018 2/2/2018	A power failure to the return flow station caused the violation.	Power was restored, and work orders were generated to verify proper operation of the return pumps.
Cerio NOEC	1/9/2017	A review of the routine water chemistries did not reveal a definitive cause of the sublethal failure.	Additional analyses may be conducted to determine a potential cause for toxicity. Increased monitoring will be conducted as required by the permit.
	1/1/2017-1/31/17	A review of the routine water chemistries did not reveal a definitive cause of the failure. Additional testing is being conducted.	None
	3/7/2017	A review of the routine water chemistries did not reveal a definitive cause of the failure. Additional testing is being conducted.	None
E.coli	01/05/2015	Insufficient bleach feed due to a failure to the pre-analyzer pump. This caused a temporary chlorine residual drop in the plant's effluent and the E. coli bacteria value to rise above the permitted value.	Work order #1083183 was created to evaluate and verify proper operation of the chlorination system. Operations and the control center will closely monitor the chlorination system.
	03/09/2015	Combination of wet weather events and electrical failure in the effluent lift station system. These caused the out of service filter deck to flood and re-contaminate the plant's effluent.	Work order #1098330 was created to check the cause of the lift station failure. Operations will closely monitor the situation.
	5/15/2015 5/15/2015	Chlorination system failed on May 12 and May 13, 2015, due to PLC problem on the first day, and power failure at the plant on the second. The insufficient bleach feed resulted in high E. coli concentrations.	Work orders #1120166 and #1122231 were created to check PLC and power failure. Operators will closely monitor the situation.
	5/29/2015 6/5/2015 6/18/2015	The Houston area experienced intense, sustained rainfall of 11 inches in less than six hours over May 25/26, 2015. As a result, Brays Bayou overflowed its banks and flooding occurred. The entire WWTP was flooded and extensive damage occurred to the electrical and blower systems. The inability to use the full capacity of the blowers caused insufficient air in the aeration basins, allowing the ammonia value to rise above the permitted amount.	Operators will closely monitor the situation while electrical systems, blowers and all other equipment are being repaired.
	10/15/2015	Unknown. According to SCADA trends and operator logs, the chlorine residual was in range, and the bleach feed was working properly at the time of sample collection.	Operations staff is closely monitoring the plant and making process adjustments, if needed.
	10/29/2015	Unknown. The mix point and pre-dechlorination analyzers indicated that there was adequate bleach in the system during the sample period.	The process and equipment will continue to be monitored.
	12/1/2016	Equipment failure. The SCADA system alerted the operator of low chlorine residuals at the mix point and pre-dechlorination point. When the operator arrived the chlorine pump and metering pump were tripped.	A work order was written for the chlorination group to troubleshoot and/or repair the chlorine pump and metering pump.
	4/20/2016	Undetermined. According to SCADA trends, the chlorine residual was in range at the time of sampling. No problem found with the chlorination system.	Chlorination system was checked and confirmed working properly.
	5/20/2016	Undetermined. According to SCADA trends, the chlorine residual was in range at the time of sampling. No problem found with the chlorination system.	Chlorination system was checked and confirmed working properly.
	6/8/2016	Undetermined. According to SCADA trends, the chlorine residual was in range at the time of sampling. No problem was found with the chlorination system.	The chlorination system was checked and was working properly.
	7/26/2016	Undetermined. According to SCADA trends, the chlorine residual was within an acceptable range for disinfection at the time of sample collection.	The chlorination system was checked for malfunction but was found to be working properly.
	8/14/2016	Undetermined. SCADA trends at the time of sample collection indicate a chlorine residual adequate for disinfection.	The chlorination system was troubleshooted. No problems were found.
	1/4/2017	A power failure disabled the chlorination system, causing inadequate disinfection.	An electrician traced the power failure and restored power.
	3/14/2017	Undetermined. The SCADA trends indicate that the chlorine residual at the time of sample collection was adequate for disinfection. The chlorination system was working properly.	The chlorination system was troubleshooted, but not problems were found.
	5/26/2017	Undetermined. At the time of sample collection, the SCADA trends indicate an adequate chlorine residual for disinfection.	None.
	9/19/2017	A power failure disabled both chlorine pumps, resulting in inadequate disinfection.	Power was restored, and the chlorine pumps were put back online.
	12/7/2017	Intermittent power failures affecting the chlorination system caused inadequate disinfection at the time of sample collection.	A work order was generated for the chlorination group to troubleshoot the disinfection system.
	1/20/2018	The chlorine analyzer failed, resulting in an inadequate chlorine residual at the time of sample collection.	The chlorination group troubleshooted the disinfection system.
	3/9/2018	Undetermined. At the time of sample collection, the SCADA trends show that the chlorine residual was within an adequate range for disinfection. The chlorination equipment was not experiencing any issues.	Operations personnel verified the operability of the chlorination system.
	3/29/2018	A temporary increase in hydraulic load caused solids to rise and escape the clarifiers, causing an increase in E. coli.	The chlorination group troubleshooted the disinfection system.
6/5/2018	The chlorine pump lost prime, resulting in inadequate disinfection.	The chlorination group removed a stoppage from the pump and returned it to service.	
6/12/2018	Undetermined. SCADA trends indicate that the chlorine residual was within an acceptable range for disinfection.	None	
7/3/2018	Failure of the chlorine pump prevented adequate disinfection.	The chlorination group repaired the chlorine pump.	
NH3-N	5/24- 5/30/2015 5/29/2015 6/1/2015	The Houston area experienced intense, sustained rainfall of 11 inches in less than six hours over May 25/26, 2015. As a result, Brays Bayou overflowed its banks and flooding occurred. The entire WWTP was flooded and extensive damage occurred to the electrical and blower systems. The inability to use the full capacity of the blowers caused insufficient air in the aeration basins, allowing the ammonia value to rise above the permitted amount.	Operators will closely monitor the situation while electrical systems, blowers and all other equipment are being repaired.
	6/3-6/30/2016	Multiple power failures caused inadequate aeration and mixing on the reactor deck during the month of June.	The electrician was notified and power was restored each time there was a loss of power.
	6/9/2017 6/10/2017 6/12/2017 6/4-6/10/2017 6/11-6/17/2017 6/4-6/30/2017	A combination of planned shutdowns for contractor work and a power failure resulted in insufficient dissolved oxygen in the system.	All equipment was put back into service, and power was restored.
	8/27-9/2/17 9/3-9/9/2017 9/1/2017 9/2/2017 9/3/2017 9/4/2017 9/5/2017	Hurricane Harvey related. The facility was flooded for several days. Blowers were unable to run as a result of water damage.	A contractor was dispatched to check the electrical feeder lines and repair the damaged blowers.
	9/1-9/30/17	The clarifier inlet lines are plugged, causing the mixed liquor channel to overflow into the adjacent clarifier effluent channel.	A work order has been generated to have all clarifier inlet lines cleaned.
	06/12/2015	Heavy rainfall was recorded as 0.85" on May 27, 2014 and 1.10" on the previous day, causing a hydraulic surge through the WWTP. The mixed liquor channel overflowed into the clarifier effluent channels.	Operations made process adjustments throughout the plant to balance the flow. A work order is pending to investigate and remove debris that may be impeding flow.
	5/27/2015 6/9/2015 6/17/2015	The Houston area experienced intense, sustained rainfall of 11 inches in less than six hours over May 25/26, 2015. As a result, Brays Bayou overflowed its banks and flooding occurred. The entire WWTP was flooded and extensive damage occurred to the electrical and blower systems. The inability to use the full capacity of the blowers caused insufficient air in the aeration basins, allowing the ammonia value to rise above the permitted amount.	Operators will closely monitor the situation while electrical systems, blowers and all other equipment are being repaired.
TSS	7/7/2015 7/8/2015 7/9/2015 7/8-7/11/2015	In order for the electrical contractor to safely perform repairs, electricity to the return flow station had to be disconnected to a portion of the plant. During the power outage, the return activated sludge overflowed the return flow station into the effluent filter deck, elevating the TSS concentration in the effluent.	The electrical contractor was performing repair work to Power Center #7 in response to the damages incurred during the historic flooding on May 26, 2015. Repairs to Power Center #7 were completed on July 9, 2015. Future electrical work will be limited to a maximum shut-down time of four hours.
	1/30/2016	Problems with the return flow lift pumps caused an increase in the elevation of solids in the center well which caused solids to enter the effluent.	Repair of the return flow pumps was put under work order numbers 1176062, 1212634, 1212913, and 1212635.
	4/14/2017 4/15/2017	A communications malfunction within the return flow station resulted in a false reading of the return flow well level which prevented the return flow pumps from activating.	The plant network technician repaired the communications malfunction. A second work order was written for the electrical group to check and repair the transducer at the return.
	9/15/2017	The clarifier inlet lines are plugged, causing the mixed liquor channel to overflow into the adjacent clarifier effluent channel.	A work order has been generated to have all clarifier inlet lines cleaned.
	11/4/2017 11/5/2017	An intermittent overflow of the clarifier #4 inlet pit into the clarifier effluent channel elevated the concentration of TSS in the effluent.	Clarifier inlet pit cleaning is ongoing.
	12/6/2017 12/3-12/9/2017	The clarifier #4 inlet pit was intermittently overflowing into the clarifier effluent channel.	Clarifier inlet pit cleaning is ongoing.
	2/1-2/28/18 2/1-2/28/2018 1/29-2/3/2018 2/2/2018	A power failure to the return flow station caused elevated TSS concentrations at the beginning of the month.	Power was restored, and work orders were generated to verify proper operation of the return pumps.

Plant Upper Brays

Permit Parameter	Non-Compliance Date(s)	Initial Root Cause Assessment	CORRECTIVE ACTION
CBOD5	03/21/2015	A combination of 1.2" of rainfall and high sludge blanket in clarifier #3 contributed to the high CBOD-5 concentration.	The situation corrected upon adjustment of the clarifier telescopes.
	8/4/2016 8/5/2016 8/9/2016 8/10/2016 8/11/2016 8/12/2016 8/13/2016 8/14/2016 8/15/2016 8/1-8/31/2016 8/1-8/31/2016 7/31/2016-8/6/2016 8/7-8/13/2016	Insufficient oxygen in the treatment process caused by various blower/diffuser issues. During the period of July 22 to 28, blowers tripped off periodically. During the period of August 1 to 12, blowers tripped off daily. Problems with the blowers can be attributed to high ambient temperatures and added pressure in the air distribution lines due to fouled diffusers in the aeration basins. The inconsistent and prolonged periods of oxygen deficiency caused the plant to reach septic conditions.	There is a long term plan in place to address the fouled diffusers in the aeration basins.
	12/12/2016	Clogged return telescopes caused sludge to overflow the clarifier weirs.	Operations will closely monitor the return telescopes and clean as needed.
	1/18/2017	A combination of blower issues, plugged returned telescopes, and wet weather caused incomplete treatment of CBOD.	Blowers were adjusted, and debris was removed from the return telescopes.
	6/7/2017 6/10/2017 6/11/2017 6/12/2017 5/28-6/3/2017 6/1-6/30/2017 6/4-6/10/2017 6/11-6/17/2017	Insufficient dissolved oxygen in the process due to issues with the air distribution system caused incomplete treatment of CBOD.	Contractors are onsite making permanent improvements to the aeration basins.
	9/1-9/30/2017	Hurricane Harvey related. Problems with blowers resulted in too little dissolved oxygen to fully treat ammonia-nitrogen. This issue was worsened by abnormally high flows and decreased detention time. In order to provide relief to the inundated West District WWTP, raw sewage from the West District collection system was diverted to the Upper Brays WWTP. This additional flow inflated the loadings to a level outside of the normal range for this facility.	The blowers have been repaired. The solids inventory has been restored to normal levels.
Cerio lethal	12/12/2016 12/12/2016	The most probable cause of toxicity was the high ammonia-nitrogen concentrations in samples 1 and 2.	Retests were scheduled for January and February 2017.
	1/23/2017	An elevated concentration of ammonia-nitrogen in the effluent is believed to have contributed to the failure.	Additional testing will be conducted as required by the permit.
	1/1-3/31/2017	An elevated concentration of ammonia-nitrogen in the effluent is believed to have contributed to the failure in January 2017. This affected the calculated daily average.	Additional testing will be conducted as required by the permit.
	7/3/2017	Elevated ammonia-nitrogen in the samples.	The contractor has completed repairs on one of the aeration basins. The repaired basin was put back into service on July 8, 2017.
	7/1/2017-9/30/17	Elevated ammonia-nitrogen in the samples. A failure in July 2017 caused the calculated daily average to violate the permitted limit. Cerio lethal	The contractor has completed repairs on one of the aeration basins. The repaired basin was put back into service on July 8, 2017.
	7/1/2017-9/30/17	Elevated ammonia-nitrogen in the samples. A failure in July 2017 caused the calculated daily average to violate the permitted limit. cerio sub lethal	The contractor has completed repairs on one of the aeration basins. The repaired basin was put back into service on July 8, 2017.
	10/1-12/31/17	At this time, the cause of the failure is unclear. Sample check-in chemistries were within normal ranges. Additional testing to determine the cause of the failure is pending. The October 2017 test failed, causing the daily average percentage to fall below the permitted limit.	Monthly testing will continue. The City is working with the contract laboratory to identify potential causative agents.
	10/23/2017	At this time, the cause of the failure is unclear. Sample check-in chemistries were within normal ranges. Additional testing to determine the cause of the failure is pending.	Monthly testing will continue. The City is working with the contract laboratory to identify potential causative agents.
	1/1-3/31/2018	The contract laboratory suspects that a combination of copper and zinc caused toxicity in the test conducted in January 2018. This failure affected the reported daily average.	Monthly testing will continue. The City is working with the contract laboratory to identify potential causative agents.
	1/16/2018	The contract laboratory suspects that a combination of copper and zinc caused toxicity.	Monthly testing will continue. The City is working with the contract laboratory to identify potential causative agents.
E.coli	05/08/2015	Insufficient bleach feed due to low level of bleach in tank. This caused a temporary chlorine residual drop in the plant's effluent and the E. Coli bacteria value to rise above the permitted value.	were held with the operators involved to reiterate the standard operating procedures and established standards regarding end
	09/10/2015	Insufficient bleach feed due to an analyzer malfunction. This caused a temporary chlorine residual drop in the plant's effluent and the E. Coli bacteria value to rise above the permitted value.	The analyzer was repaired and the chlorination system is back to normal.
	4/20/2016	Undetermined. At the time of sample collection, the chlorine residual was above the acceptable level.	E. coli values will be closely monitored in subsequent days.
	8/22/2016	Undetermined. At the time of sample collection, the chlorine residual was within an acceptable range for disinfection.	E. coli values will be closely monitored in subsequent days.
	1/18/2017	Inadequate chlorine residual. At the time of sample collection, the plant was experiencing a wet weather event, and the chlorination system was unable to maintain an adequate chlorine residual. In addition, elevated TSS was being discharged because of plugged RAS telescopes.	The chlorination group troubleshooted the chlorination system.
	1/19/2017	Inadequate chlorine residual. At the time of sample collection, the chlorination system was unable to maintain an adequate chlorine residual.	The chlorination group troubleshooted the chlorination system.
	3/27/2017	The bleach pump lost prime overnight, causing an inadequate chlorine residual at the time of sample collection.	The chlorination group has troubleshooted the disinfection system.
	5/26/2017	At the time of sample collection, the chlorination system was unable to maintain an acceptable chlorine residual.	The chlorination group troubleshooted the system.
5/29/2017	At the time of sample collection, the flow was elevated and the chlorination system was unable to maintain an acceptable chlorine residual.	The chlorination group troubleshooted the system.	
Fathead Lethal	12/12/2016	The most probable cause of toxicity was the high ammonia-nitrogen concentrations in samples 1 and 2.	Retests were scheduled for January and February 2017.
	1/23/2017	An elevated concentration of ammonia-nitrogen in the effluent is believed to have contributed to the failure.	Additional testing will be conducted as required by the permit.
	1/1-3/31/2017	An elevated concentration of ammonia-nitrogen in the effluent is believed to have contributed to the failure in January 2017. This affected the calculated daily average.	Additional testing will be conducted as required by the permit.

7/1/2017-9/30/2017	Elevated ammonia-nitrogen in the samples. A failure in July 2017 caused the calculated daily average to violate the permitted limit.	The contractor has completed repairs on one of the aeration basins. The repaired basin was put back into service on July 8, 2017.
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	7/3/2017	Elevated ammonia-nitrogen in the samples.	The contractor has completed repairs on one of the aeration basins. The repaired basin was put back into service on July 8, 2017.
NH3_N	4/17-4/23/2016	On three days during the third week of April, the operator found the aeration blowers off upon the start of the morning shift. This left the WWTP without sufficient dissolved oxygen to thoroughly treat ammonia.	The SCADA group is troubleshooting communications with the blowers to prevent the blowers from being out of service for extended periods of time in the future.
NH3_N	5/1/2016 5/2/2016	The aeration blower tripped off over night, leaving the treatment process with insufficient dissolved oxygen.	The Electrical Group is troubleshooting the functionality of the blower control systems.
NH3_N	5/13/2016 5/14/2016 5/15/2016 5/16/2016 5/1-5/31/2016 5/15-5/21/2016	Insufficient dissolved oxygen in the treatment process. The blower tripped off overnight. The blower was restarted, but upon inspection the next morning, air was found escaping from the blow off valve. Broken/clogged diffusers may be contributing to the problems with the blowers.	The Electrical Group is troubleshooting the functionality of the blower control systems. An Emergency Purchase Order has been submitted to repair the diffusers in the aeration basin to allow for increased dissolved oxygen.
NH3_N	6/12/2016, 6/16/2016 6/17/2016, 6/18/2016 6/19/2016, 6/20/2016 6/21/2016, 6/22/2016 6/23/2016, 6/30/2016 6/12-6/18/2016 6/19-6/25/2016 6/27-7/2/2016 6/1-6/30/2016 6/1-6/30/2016 7/1/2016, 7/2/2016 7/3/2016, 7/4/2016	Insufficient oxygen in the treatment process caused by various blower/aeration basin diffuser issues.	Troubleshooting of the blower control systems is being performed. An emergency purchase order has been submitted to repair diffusers in the aeration basin.
NH3_N	7/23/2016, 7/24/2016 7/25/2016, 7/26/2016 7/27/2016, 7/28/2016 7/29/2016, 7/30/2016 7/31/2016 7/3-7/9/2016 7/17-7/23/2016 7/24-7/30/2016 7/1-7/31/2016 7/1-7/31/2016 8/1/2016, 8/2/2016, 8/3/2016, 8/4/2016 8/4/2016, 8/5/2016 8/7/2016, 8/8/2016 8/9/2016, 8/10/2016 8/11/2016, 8/12/2016, 8/13/2016, 8/14/2016 8/15/2016, 8/16/2016 8/17/2016, 8/18/2016 7/31-8/6/2018 8/7-8/13/2016 8/14-8/20/2016 8/1-8/31/2016 8/1-8/31/2016	Insufficient oxygen in the treatment process caused by various blower/diffuser issues. During the period of July 22 to 28, blowers tripped off periodically. During the period of August 1 to 12, blowers tripped off daily. Problems with the blowers can be attributed to high ambient temperatures and added pressure in the air distribution lines due to fouled diffusers in the aeration basins. The inconsistent and prolonged periods of oxygen deficiency caused the plant to reach septic conditions.	There is a long term plan in place to address the fouled diffusers in the aeration basins.
NH3_N	12/10/2016 12/11/2016	Clogged RAS telescopes prevented sufficient return activated sludge to return to the process.	A request was made for vector trucks to clean out the return pits to prevent further stoppages.
NH3_N	12/12/2016 12/13/2016 12/11-12/17/2016	Insufficient dissolved oxygen in the process due to air leaking out of an empty basin caused elevated NH3-N in the effluent.	Plant operations were restored once leaks were corrected.
NH3_N	1/16/2017 1/17/2017	Insufficient oxygen in the process due to issues with the blowers.	Operations is closely monitoring the blowers.
NH3_N	1/18/2017, 1/19/2017 1/20/2017, 1/21/2017 1/22/2017, 1/23/2017 1/24/2017, 1/25/2017 1/26/2017, 1/27/2017 1/28/2017, 1/29/2017 1/30/2017, 1/31/2017 1/15-1/21/2017 1/22-1/28/2017 1/29-2/4/2017 1/1-1/31/2017	A combination of blower issues, plugged returned telescopes, and wet weather caused incomplete treatment of NH3-N.	Blowers were adjusted, and debris was removed from the return telescopes.
NH3_N	2/27/2017	Problems with the blowers caused insufficient dissolved oxygen in the process.	The blowers were troubleshooted and found to be working properly.
NH3_N	4/24/2017 4/23/2017-4/29/17 4/1-4/31/2017	The blowers were tripped off for an extended period of time, causing insufficient dissolved oxygen in the process.	Work orders were submitted to troubleshoot the blowers.
NH3_N	5/1/2017, 5/2/2017 5/3/2017, 5/4/2017 5/5/2017, 5/6/2017 5/7/2017, 5/8/2017 5/9/2017, 5/10/2017 5/11/2017, 5/12/2017 5/13/2017, 5/14/2017 5/15/2017, 5/16/2017 5/18/2017, 5/19/2017 5/20/2017, 5/21/2017 5/22/2017, 5/23/2017 5/24/2017, 5/25/2017 5/26/2017, 5/17/2017 5/28/2017, 5/29/2017 5/30/2017, 5/31/2017 4/30/2017-5/6/17 5/7-5/13/2017 5/14-5/21/2017 5/21-5/27/2017 5/28-6/3/2017 5/1-5/31/2017 5/1-5/31/2017	Insufficient dissolved oxygen in the process due to air leaks and multiple blower issues.	The air leak was repaired, and additional adjustments were made to the process to maximize treatment of NH3-N.

NH3_N	6/1/2017,6/2/2017 6/3/2017,6/4/2017	Insufficient dissolved oxygen in the process due to air leaks and multiple blower issues.	The air leak was repaired, and additional adjustments were made to the process to maximize treatment of NH3-N.
NH3_N	6/5/2017,6/6/2017 6/8/2017,6/9/2017 6/10/2017, 6/11/2017 6/12/2017, 6/13/2017 6/14/2017, 6/15/2017 6/16/2017, 6/17/2017 6/18/2017, 6/19/2017 6/20/2017, 6/21/2017 6/22/2017, 6/22/2017 6/23/2017, 6/24/2017 6/25/2017, 6/26/2017 6/27/2017, 6/28/2017 6/29/2017, 6/30/2017 6/4-6/10/2017 6/11-6/17/2017 6/18-6/24/2017 6/25-7/1/2017 6/1-6/30/217 6/1-6/30/2017	Insufficient dissolved oxygen in the process due to issues with the air distribution system.	Contractors are onsite making permanent improvements to the aeration basins.
NH3_N	7/1/2017,7/2/2017 7/3/2017,7/4/2017 7/5/2017,7/6/2017 7/7/2017,7/8/2017 7/9/2017,7/10/2017 7/11/2017, 7/12/2017 7/13/2017, 7/14/2017 7/18/2017, 7/19/2017 7/2-7/8/2017 7/9-7/15/2017 7/16-7/22/2017 7/1-7/31/2017 7/1-7/31/2017	Insufficient dissolved oxygen in the process due to ongoing issues with the air distribution system.	The contractor has completed repairs on one of the aeration basins. The repaired basin was put back into service on July 8, 2017.
NH3_N	9/11/2017 9/12/2017 9/10-9/16/2017 9/1-9/30/2017 9/1-9/30/2017	Hurricane Harvey related. Problems with blowers resulted in too little dissolved oxygen to fully treat ammonia-nitrogen. This issue was worsened by abnormally high flows and decreased detention time. In order to provide relief to the inundated West District WWTP, raw sewage from the West District collection system was diverted to the Upper Brays WWTP.	The blowers have been repaired. The solids inventory has been restored to normal levels.
TSS	3/21/2015 3/15-3/21/2015	A combination of 1.2" of rainfall and high sludge blanket in clarifier #3 contributed to the high TSS concentration.	The situation corrected itself once flow subsided and clarifier telescopes were adjusted.
	8/13/2016 8/1-8/31/2016	Insufficient oxygen in the treatment process caused by various blower/diffuser issues. During the period of July 22 to 28, blowers tripped off periodically. During the period of August 1 to 12, blowers tripped off daily. Problems with the blowers can be attributed to high ambient temperatures and added pressure in the air distribution lines due to fouled diffusers in the aeration basins. The inconsistent and prolonged periods of oxygen deficiency caused the plant to reach septic conditions.	There is a long term plan in place to address the fouled diffusers in the aeration basins.
	1/15/2017 1/18/2017 1/20/2017	Plugged return sludge telescopes during a wet weather event caused sludge to escape over the clarifier weirs.	Debris was removed from the return telescopes.
	1/1/2017-1/31/2017 1/1-1/31/2017	A combination of blower issues and plugged returned telescopes caused incomplete removal of TSS.	Blowers were adjusted, and debris was removed from the return telescopes.
	6/1-6/30/2017 6/4-6/10/2017	Insufficient dissolved oxygen in the process due to issues with the air distribution system.	Contractors are onsite making permanent improvements to the aeration basins.
	9/1-9/30/2017	Hurricane Harvey related. Problems with blowers resulted in too little dissolved oxygen to fully treat ammonia-nitrogen. This issue was worsened by abnormally high flows and decreased detention time. In order to provide relief to the inundated West District	The blowers have been repaired. The solids inventory has been restored to normal levels.

Plant Almeda Sims

Permit Parameter	Non-Compliance Date(s)	Initial Root Cause Assessment	CORRECTIVE ACTION
2-hr peak	8/26/2017	Hurricane Harvey related. The region experienced extreme rainfall due to Hurricane Harvey. Six inches of rain were recorded at the WWTP on August 26, 2017.	Operations personnel made process adjustments, as conditions allowed, to maximize treatment.
CBOD5	4/30/2015 4/1-4/30/2015 4/26-5/2/2015	Several factors apparently contributed to the measured values reported herein, including: two out-of-service clarifiers, a temporary failure in a third clarifier due to a clogged sludge return line, and high solids inventory due to sludge processing limitations during a large maintenance project at the sludge drying facility. In some instances, heavy rainfall contributed to the noncompliance issues (April 17 and 18, 2015). The COH plans to maintain continuous operation of the treatment plant during future construction and will take all actions necessary to mitigate adverse effects.	Solids were trucked out of the plant while COH contractors were working on the sludge dryers. As of the date of this writing, the dryers and all clarifiers are operational.
CBOD5	5/5/2015 5/6/2015 5/7/2015 5/3-5/9/2015	Several factors apparently contributed to the measured values reported herein, including: two out-of-service clarifiers, a temporary failure in a third clarifier due to a clogged sludge return line, and high solids inventory due to sludge processing limitations during a large maintenance project at the sludge drying facility. In some instances, heavy rainfall contributed to the noncompliance issues (April 17 and 18, 2015). The COH plans to maintain continuous operation of the treatment plant during future construction and will take all actions necessary to mitigate adverse effects.	Solids were trucked out of the plant while COH contractors were working on the sludge dryers. As of the date of this writing, the dryers and all clarifiers are operational.
CBOD5	06/30/2015	Combination of poor settling and over-wasting of sludge. The poor settling was due to the on-going CIP construction work that involves a use of pump for direct feed to the clarifiers. The sludge over-wasting was planned to reduce the plant's solids level in preparation for expected rainfall. Rainfall of 1.0 inches on June 30, 2015 and 0.5 inches on the day before may have contributed to the problem by washing solids out of the sludge return channel. These factors caused elevated CBOD-5 level.	Solids were trucked out of the plant while COH contractors were working on the sludge dryers. As of the date of this writing, the dryers and all clarifiers are operational.
CBOD5	08/20/2015	Construction activities that limited capacity and detention time coupled with power failures during the storm experienced on August 19 and 20 caused the CBOD concentration to rise above the permitted limit.	Operations is working diligently with the contractor to plan and execute the construction so there is minimal effect on the effluent.
NH3-N	4/1/2015 4/2/2015 4/3/2015 4/4/2015 03/29 to 04/04/2015	Insufficient air in the plant due to ongoing contractor activities that required all blowers to be turned off. Limited air supply affected the treatment process and caused ammonia concentration to rise above the permit limit. Elevated ammonia concentrations affected the calculated 7-day average.	Operations staff is closely monitoring the plant and making process adjustments, as needed. City contractor continues work on all six blowers and is expected to be completed before the end of April 2015.
NH3-N	4/1/2015-4/30/2015	Several factors apparently contributed to the measured values reported herein, including: two out-of-service clarifiers, a temporary failure in a third clarifier due to a clogged sludge return line, and high solids inventory due to sludge processing limitations during a large maintenance project at the sludge drying facility. In some instances, heavy rainfall contributed to the noncompliance issues (April 17 and 18, 2015). The COH plans to maintain continuous operation of the treatment plant during future construction and will take all actions necessary to mitigate adverse effects.	Solids were trucked out of the plant while COH contractors were working on the sludge dryers. As of the date of this writing, the dryers and all clarifiers are operational.
NH3-N	6/17/2015 6/18/2015 6/20/2015 6/21/2015 06/14 to 06/20/2015	Combination of construction and over-wasting of sludge to reduce the plant's solids level in preparation for expected rainfall. Rainfall from Tropical Storm Bill of 0.5 inches on June 17, 2015 and 0.75 inches the day before may have contributed to the problem by washing solids out of the sludge return channel. These factors caused the ammonia to rise above the permitted limit for four days and exceed the calculated 7-day average.	Operations staff is closely monitoring the plant's sludge level and making process adjustments, as needed, to maintain permit compliance.
NH3-N	06/21 to 06/27/2015	Combination of poor settling and over-wasting of sludge. The poor settling was due to the on-going CIP construction work that involves a use of pump for direct feed to the clarifiers. The sludge over-wasting was planned to reduce the plant's solids level in preparation for expected rainfall. Rainfall of 1.0 inches on June 30, 2015 and 0.5 inches on the day before may have contributed to the problem by washing solids out of the sludge return channel. These factors caused elevated ammonia (NH3-N) and total suspended solids (TSS) levels.	Operations staff is closely monitoring the plant's sludge level and making process adjustments, as needed, to maintain permit compliance.
NH3-N	6/1/2015-6/30/2015	Combination of poor settling and over-wasting of sludge. The poor settling was due to the on-going CIP construction work that involves a use of pump for direct feed to the clarifiers. The sludge over-wasting was planned to reduce the plant's solids level in preparation for expected rainfall. Rainfall of 1.0 inches on June 30, 2015 and 0.5 inches on the day before may have contributed to the problem by washing solids out of the sludge return channel. These factors caused elevated ammonia (NH3-N) and total suspended solids (TSS) levels.	Operations staff is closely monitoring the plant's sludge level and making process adjustments, as needed, to maintain permit compliance.
NH3-N	8/12/2015 8/13/2015 8/14/2015 8/15/2015 08/09 to 08/15/2015	Construction activities that limited capacity and detention time coupled with a power outage on August 12 and 13, 2015 that removed two blowers from service affected the plant's ability to maintain the ammonia (NH3-N) levels below the permitted limit. The above-referenced construction activities limited the plant's ability to maintain total suspended solids (TSS) levels below the permitted limits.	Steps have been taken to ensure that an adequate number of blowers are in service. Operations staff is closely monitoring the plant's sludge level and making process adjustments to maintain permit compliance.
NH3-N	8/1/2015-8/31/2015	A combination of construction activities that limited capacity and detention time and a power failure during a storm experienced on August 19 and 20 caused elevated TSS and NH3-N concentrations throughout the month. These elevated concentrations affected the calculated daily averages.	Operations is working diligently with the contractor to plan and execute the construction so that there is minimal effect on the effluent.
NH3-N	11/22 to 11/28/2015	A combination of construction activities that limited capacity and detention time and power failures during the storm that removed aeration blowers #1 and #6 from service. The storm took place from 10/30/15 to 11/1/15 and resulted in 11.3 inches of rainfall at the WWTP.	Aeration blowers #1 and #6 were repaired.
NH3-N	12/1/2015-12/31/2015	Process capability was limited due to a combination of construction activities and power failure that took aeration blower #1 out of service due to a storm. This affected the daily average concentration for the monitoring period.	Operations is working diligently with the contractor to plan and execute construction with minimum effect to the effluent.
NH3-N	6/25/2016 6/26/2016 6/27/2016 6/1-6/30/2016 6/26/2016-7/2/2016	Sludge dryer breakdowns caused high solids in the plant, and malfunctioning aeration blowers caused limited dissolved oxygen in the aeration basins.	The aeration blowers were repaired and put back in service.
NH3-N	7/19/2017 7/20/2017 7/21/2017 7/22/2017 7/16/2017-7/22/17	High solids resulting from sludge dryer breakdowns combined with aeration blower failures caused incomplete treatment of ammonia-nitrogen.	The aeration blower was repaired, and the sludge dryers are back in service.
TSS	01/22/2015	Combination of high solids inventory and heavy rain in the service area. According to the rain gauge at the WWTP, it rained 1.9 inches on 1/22/2015. The hydraulic surge due to the severe weather caused the plant to maintain a high flow (20-40 MGD) for about five hours, allowed solids to escape out into the effluent, and resulted in a high TSS concentration.	The situation corrected itself once flow subsided.
TSS	4/10/2015 4/11/2015 4/12/2015 4/16/2015 4/17/2015 4/18/2015 4/12-4/18/2015	Combination of high solids inventory, unavailable clarifier due to an ongoing contractor activity and rain in the service area (0.1" on 4/10, 1.3" on 4/11/15, 0.15" on 4/12/15, 1.4" on 4/16, 3.3" on 4/17, 0.1 on 4/18). These factors caused the TSS concentration to rise above the permit limit.	Additional solids will be hauled out from the plant by truck during contractor activity, which is estimated to be completed within two months.
TSS	4/22/2015 4/23/2015 4/24/2015 4/25/2015 4/19-4/25/2015	Combination of high solids inventory and unavailable clarifiers (#4 & #5) due to ongoing contractor activity. These factors caused the TSS concentration to rise above the permit limit.	Contractor activity is estimated to be completed within two months.
TSS	4/27/2015 4/28/2015 4/29/2015 4/30/2015 4/26-5/2/2015	Several factors apparently contributed to the measured values reported herein, including: two out-of-service clarifiers, a temporary failure in a third clarifier due to a clogged sludge return line, and high solids inventory due to sludge processing limitations during a large maintenance project at the sludge drying facility. In some instances, heavy rainfall contributed to the noncompliance issues (April 17 and 18, 2015). The COH plans to maintain continuous operation of the treatment plant during future construction and will take all actions necessary to mitigate adverse effects.	Solids were trucked out of the plant while COH contractors were working on the sludge dryers. As of the date of this writing, the dryers and all clarifiers are operational.

TSS	4/1/2015-4/30/2015 4/1-4/30/2015	Several factors apparently contributed to the measured values reported herein, including: two out-of-service clarifiers, a temporary failure in a third clarifier due to a clogged sludge return line, and high solids inventory due to sludge processing limitations during a large maintenance project at the sludge drying facility. In some instances, heavy rainfall contributed to the noncompliance issues (April 17 and 18, 2015). The COH plans to maintain continuous operation of the treatment plant during future construction and will take all actions necessary to mitigate adverse effects.	Solids were trucked out of the plant while COH contractors were working on the sludge dryers. As of the date of this writing, the dryers and all clarifiers are operational.
TSS	5/1/2015 5/2/2015 5/3/2015 5/4/2015 5/5/2015 5/6/2015 5/7/2015 5/8/2015 5/10/2015	Several factors apparently contributed to the measured values reported herein, including: two out-of-service clarifiers, a temporary failure in a third clarifier due to a clogged sludge return line, and high solids inventory due to sludge processing limitations during a large maintenance project at the sludge drying facility. In some instances, heavy rainfall contributed to the noncompliance issues (April 17 and 18, 2015). The COH plans to maintain continuous operation of the treatment plant during future construction and will take all actions necessary to mitigate adverse effects.	Solids were trucked out of the plant while COH contractors were working on the sludge dryers. As of the date of this writing, the dryers and all clarifiers are operational.
TSS	05/03 to 05/09/2015	Several factors apparently contributed to the measured values reported herein, including: two out-of-service clarifiers, a temporary failure in a third clarifier due to a clogged sludge return line, and high solids inventory due to sludge processing limitations during a large maintenance project at the sludge drying facility. In some instances, heavy rainfall contributed to the noncompliance issues (April 17 and 18, 2015). The COH plans to maintain continuous operation of the treatment plant during future construction and will take all actions necessary to mitigate adverse effects.	Solids were trucked out of the plant while COH contractors were working on the sludge dryers. As of the date of this writing, the dryers and all clarifiers are operational.
TSS	5/1/2015-5/31/2015 5/1-5/31/2015	Several factors apparently contributed to the excursion, including: two out-of-service clarifiers, a temporary failure in a third clarifier due to a clogged sludge return line, and high solids inventory due to sludge processing limitations during a large maintenance project at the sludge drying facility. These factors caused the TSS concentration to rise above the permit limit for several days during the month of May affecting the calculated daily average concentration.	Solids were trucked out of the plant while COH contractors were working on the sludge dryers. As of May 14, 2015 the dryers and all clarifiers are operational.
TSS	6/28/2015 6/29/2015 6/30/2015 6/18-7/4/2015	Combination of poor settling and over-wasting of sludge. The poor settling was due to the on-going CIP construction work that involves a use of pump for direct feed to the clarifiers. The sludge over-wasting was planned to reduce the plant's solids level in preparation for expected rainfall. Rainfall of 1.0 inches on June 30, 2015 and 0.5 inches on the day before may have contributed to the problem by washing solids out of the sludge return channel. These factors caused elevated ammonia (NH3-N) and total suspended solids (TSS) levels.	Operations staff is closely monitoring the plant's sludge level and making process adjustments, as needed, to maintain permit compliance.
TSS	6/1/2015-6/30/2015 6/1-6/30/2015	Combination of poor settling and over-wasting of sludge. The poor settling was due to the on-going CIP construction work that involves a use of pump for direct feed to the clarifiers. The sludge over-wasting was planned to reduce the plant's solids level in preparation for expected rainfall. Rainfall of 1.0 inches on June 30, 2015 and 0.5 inches on the day before may have contributed to the problem by washing solids out of the sludge return channel. These factors caused elevated ammonia (NH3-N) and total suspended solids (TSS) levels and calculated loading.	Operations staff is closely monitoring the plant's sludge level and making process adjustments, as needed, to maintain permit compliance.
TSS	7/1/2015 7/2/2015 7/3/2015	The clarifiers experienced poor settling due to the on-going CIP construction work that involves the use of a pump for direct feed to the clarifiers.	Operations staff is closely monitoring the activities of the contractor and making process adjustments, as needed, to maintain permit compliance.
TSS	8/14/2015 8/15/2015 8/16/2015 8/9-8/15/2015	Construction activities that limited capacity and detention time coupled with a power outage on August 12 and 13, 2015 that removed two blowers from service affected the plant's ability to maintain the ammonia (NH3-N) levels below the permitted limit. The above-referenced construction activities limited the plant's ability to maintain total suspended solids (TSS) levels below the permitted limits.	Steps have been taken to ensure that an adequate number of blowers are in service. Operations staff is closely monitoring the plant's sludge level and making process adjustments to maintain permit compliance.
TSS	8/20/2015 8/16-8/22/2015	Construction activities that limited capacity and detention time coupled with power failures during the storm experienced on August 19 and 20 caused the TSS concentration to rise above the permitted limit.	Operations is working diligently with the contractor to plan and execute the construction so there is minimal effect on the effluent.
TSS	08/25/2015	Construction activities that limited capacity and detention time caused the TSS concentration to rise above the permitted limit.	Operations is working diligently with the contractor to plan and execute the construction so there is minimal effect on the effluent.
TSS	8/1/2015-8/31/2015 8/1-8/31/2015	A combination of construction activities that limited capacity and detention time and a power failure during a storm experienced on August 19 and 20 caused elevated TSS and NH3-N concentrations throughout the month. These elevated concentrations affected the calculated daily averages and daily average loading.	Operations is working diligently with the contractor to plan and execute the construction so that there is minimal effect on the effluent.
TSS	10/25/2015	A combination of construction and power failures during the storm on October 25 limited capacity and detention time. Dryer cake pump #1 broke down and limited the plant's ability to process sludge at routine volumes.	Dryer cake pump #1 was pulled for repairs or replacement. Operations is working closely with the contractor to plan and execute construction with minimal affect to effluent quality.
TSS	11/17/2015	Combination of construction and failed equipment. Ongoing construction activities limited capacity and detention time. Dryer cake pump #1 failed, removing the dryer from service and limiting sludge processing capability.	Operations is working diligently with the contractor to plan and execute construction with minimal effect to the effluent. Dryer cake pump #1 was repaired under work order #1175575.
TSS	12/13/2015	A combination of construction activities that limited capacity and detention time, power failures during the storm that dropped 2.5 inches of rain, and the failure of dryer unit #2. These factors combined to limit process capability.	Operations is working diligently with the contractor to plan and execute construction with minimum effect to the effluent.
TSS	1/6/2016	A combination of construction activities that limited capacity and detention time, power failures during storm that dropped 1.05 inches of rain, and the failure of dryer unit #2. These factors combined to limit process capability.	Operation is working diligently with the contractor to plan and execute construction with minimum effect to the effluent.
TSS	1/8/2016	A combination of rain (1 inch recorded at WWTP), high solids, and construction which limited capacity within the plant.	Operations is working diligently with the contractor to expedite construction. Additionally, solids are being removed from the plant.
TSS	1/9/2016	A combination of high solids and construction which limited capacity within the plant.	Operations is working diligently with the contractor to expedite construction. Additionally, solids are being removed from the plant.
TSS	1/3/2016-1/9/2016	A combination of rain, high solids, and construction which limited capacity in the plant.	Operations is working diligently with the contractor to expedite construction. Additionally, solids are being removed from the plant.
TSS	1/1/2016-1/31/2016 1/1-1/31/2016	Combination of construction that limited capacity and detention time, power failures during a storm (2.15 inches of rain between 1/6/16 and 1/8/16), and the mechanical failure of the #2 dryer unit. These factors caused elevated TSS levels during the first week of the month and affecting the calculated daily average and daily average loading.	Operations is working diligently with the contractor to plan and execute construction with minimal effect to the effluent. In order to reduce the solids level in the plant, sludge was processed to wet cake for transportation.
TSS	3/9/2016	A combination of construction that limited capacity and detention time, power failures during the storm that affected plant operations, and the #2 dryer unit being out of service. On March 9, 2016, 2.10 inches of rain were recorded at the WWTP.	Operations is working diligently with the contractor to plan and execute the construction with minimum effluent violations. Power was restored, and the clarifier air-lifts were started in order to reduce the high levels of solids in the clarifiers.
TSS	5/27/2016	Combination of high solid inventory in the plant, due to dryer #1 failure, and power failures during a storm (2.0 inches of rain on 5/27/2016). These factors contributed to the elevated TSS that day.	Work order #126597 was created to repair dryer #1
TSS	6/8/2016	One of the sludge dryers broke down, causing elevated solids throughout the plant; and a power failure during a lightning storm. These factors caused solids to discharge over the weirs of clarifier #2.	The maintenance group is working to repair the dryer unit and put it back in service (work order #1264778).

Permit Parameter	Non-Compliance Date(s)	Initial Root Cause Assessment	CORRECTIVE ACTION	
CBOD5	03/09/2015	Combination of hydraulic surge and high solids inventory in the plant. According to the rain gauge, it rained 1.8 inches on March 09, 2015 and 1.90 inches on the day before. The combination resulted in elevated CBOD-5 concentration.	Operations staff is closely monitoring the plant and making process adjustments, as needed.	
	1/17/2017	A combination of out of service equipment (B Train for grit/debris removal) and continuous RAS pump stoppages caused an elevated solids inventory. As a result, an elevated concentration of CBOD was discharged.	All available equipment was put into service, including B Train. NOTE: The Northside WWF discharged on January 17, 2017 and January 18, 2017.	
Copper	6/16/2015 6/30/2015 6/1-6/30/2015 6/1-6/30/2015	The source of copper in the effluent is unknown, seasonal use of copper based algacide may have contributed to the higher copper levels. All available equipment was in service.	The City was issued a draft permit on December 06, 2011. Upon issuance of the new permit, the discharge limitations for copper will be revised to: 0.039 mg/L as single grab (one/week), 0.0264 mg/L for 7-day average, and 0.013 mg/L (22 lbs/day) for daily average. The violations will not occur when the new permit is issued.	
	11/1/2016 11/8/2016 11/15/2016 11/22/2016 11/29/2016 11/1-11/30/2016	The source of copper in the effluent is unknown. The City suspects that the influent contained an abnormally high concentration of the pollutant.	The City's Industrial Waste Group has been notified of the elevated levels of copper in the effluent.	
	12/6/2016 12/1-12/31/2016	The source of copper in the effluent is unknown. The City suspects that the influent contained an abnormally high concentration of the pollutant.	The City's Industrial Waste Group has been notified of the elevated levels of copper in the effluent.	
	1/17/2017 1/1-1/31/2017 1/1-1/31/2017	The source of copper in the effluent is unknown. The City suspects that the influent contained an abnormally high concentration of the pollutant.	The City's Industrial Waste Group has been notified of the elevated levels of copper in the effluent.	
	2/7/2017 2/14/2017 2/28/2017 2/1-2/28/2017	The source of copper in the effluent is unknown. Also, seasonal use of copper-based algacide may have contributed to the higher copper levels. All available equipment was in service.	The City was issued a draft permit on July 25, 2016. Upon issuance of the new permit, the discharge limitations for copper will be revised to: 0.039 mg/L for single grab, 0.0264 mg/L for 7-day average, and 0.013 mg/L (22 lbs./day) for daily average.	
	3/7/2017 3/21/2017 3/28/2017 3/1-3/31/2017	The source of copper in the effluent is unknown. Also, seasonal use of copper-based algacide may have contributed to the higher copper levels. All available equipment was in service.	The City was issued a draft permit on July 25, 2016. Upon issuance of the new permit, the discharge limitations for copper will be revised to: 0.039 mg/L for single grab, 0.0264 mg/L for 7-day average, and 0.013 mg/L (22 lbs./day) for daily average.	
	4/4/2017 4/11/2017 4/18/2017 4/1-4/30/2017	The source of copper in the effluent is unknown. Also, seasonal use of copper-based algacide may have contributed to the higher copper levels. All available equipment was in service.	The City was issued a draft permit on July 25, 2016. Upon issuance of the new permit, the discharge limitations for copper will be revised to: 0.039 mg/L for single grab, 0.0264 mg/L for 7-day average, and 0.013 mg/L (22 lbs./day) for daily average.	
	8/1/2017 8/8/2017 8/1-8/31/2017 8/1-8/31/2017	The source of copper in the effluent is unknown. Also, seasonal use of copper-based algacide may have contributed to the higher copper levels. All available equipment was in service.	The City was issued a draft permit on July 25, 2016. Upon issuance of the new permit, the discharge limitations for copper will be revised to: 0.039 mg/L for single grab, 0.0264 mg/L for 7-day average, and 0.013 mg/L (22 lbs./day) for daily average.	
	10/3/2017 10/31/2017 10/1-10/31/2017	The source of copper in the effluent is unknown. Also, seasonal use of copper-based algacide may have contributed to the higher copper levels. All available equipment was in service.	The City was issued a draft permit on July 25, 2016. Upon issuance of the new permit, the discharge limitations for copper will be revised to: 0.039 mg/L for single grab, 0.0264 mg/L for 7-day average, and 0.013 mg/L (22 lbs./day) for daily average.	
	11/7/2017 11/1-11/30/2017	The source of copper in the effluent is unknown. Also, seasonal use of copper-based algacide may have contributed to the higher copper levels. All available equipment was in service.	The City was issued a draft permit on July 25, 2016. Upon issuance of the new permit, the discharge limitations for copper will be revised to: 0.039 mg/L for single grab, 0.0264 mg/L for 7-day average, and 0.013 mg/L (22 lbs./day) for daily average.	
	2/6/2018 2/1-2/28/2018	The source of copper in the effluent is unknown.	The City was issued a draft permit on July 25, 2016. Upon issuance of the new permit, the discharge limitations for copper will be revised to: 0.039 mg/L for single grab, 0.0264 mg/L for 7-day average, and 0.013 mg/L (22 lbs./day) for daily average.	
	7/24/2018 7/1-7/31/2018	The source of copper in the effluent is unknown.	The City was issued a draft permit on July 25, 2016. Upon issuance of the new permit, the discharge limitations for copper will be revised to: 0.039 mg/L for single grab, 0.0264 mg/L for 7-day average, and 0.013 mg/L (22 lbs./day) for daily average.	
	NH3	1/21/2015	Combination of hydraulic surge and out of service equipment. COH contractor for the Northside Relief Tunnel Rehab construction project opened the bypass gate, causing the Clinton Dr. lift station to start all pumps; this created a hydraulic surge to the plant. Train "F" was out of service for repair. The inadequate detention time resulting from multiple factors resulted in an elevated NH3-N concentration.	Operations staff is closely monitoring the plant and making process adjustments, as needed. The contractor was notified to avoid any action that may cause further recurrence.
	NH3	4/11-4/30/2015	Combined out-of-service equipment (B train) and high solids due to sludge processing capabilities. Heavy rainfall of 2.35 inches on April 17, 2015 and 2.30 inches the day before may have contributed. These issues resulted in elevated NH3-N concentrations for several days which affected the calculated daily average concentration.	Operations staff is closely monitoring the plant and making process adjustments, as needed. Train B was put back in service.
	NH3	5/1-5/31/2015	Combination of construction and equipment failure. Heavy rain during the month of May and historic flooding were also factors. Ongoing rehabilitation of Northside Relief Tunnel and out of service clarifiers (1B, 1D, and 1E) contributed to the problem. These factors affected the treatment process, resulting in elevated NH3-N concentrations for several days and accordingly the calculated daily average.	Operations staff is closely monitoring the plant and making process adjustments, as needed. Clarifiers 1D and 1E were put back in service.
NH3	6/1-6/30/2015	Combination of construction and equipment failure. Heavy rainfall had occurred several times during the month of June 2015 may have contributed to the problem. Ongoing rehabilitation of Northside Relief Tunnel and out of service B train and wasting pumps 2C/D, 2E and 2G. These factors affected the treatment process, resulting in elevated NH3-N concentrations for several days and accordingly the calculated daily average.	B train was put back into service and wasting pumps are scheduled for repair. Operations staff is closely monitoring the plant and making process adjustments, as needed.	
NH3	7/05 to 7/11/2015	A combination of construction (installation of a suction valve on CSP #2, B Train out of service for installation of new electrical equipment), equipment failure (1D and 1H clarifiers down for repairs), and complete power failure to the WWTP (138 electrical sub-station power failure) caused elevated ammonia-nitrogen levels throughout the week.	Power was restored to the facility. Repairs were made to 1D and 1H clarifiers, and they were put back into service.	
NH3	7/1-7/31/2015	Ongoing rehabilitation of the Northside Relief Tunnel and numerous active construction projects throughout the plant in combination with complete power failure on 7/11/2015. Heavy rain in the service area, during the month of July, may have contributed to the problem. These factors caused elevated ammonia-nitrogen levels throughout the month of July.	Operations staff is closely monitoring the plant and making process adjustments, as needed.	
NH3	9/1-9/30/2015	Ongoing rehabilitation of the Northside Relief Tunnel and numerous active construction projects throughout the plant. Periods of heavy rain in the service area may have contributed to the problem. These factors caused elevated ammonia concentrations throughout the month, affecting the calculated daily average.	Operations staff is closely monitoring the plant and making process adjustments, as needed.	
NH3	2/6/2016	A combination out-of-service equipment (D train) and excessive flow released from the Clinton lift station due to the removal of the stop logs at the ongoing tunnel rehabilitation construction project. These issues affected the treatment process and resulted in an elevated NH3-N concentration.	Plant was placed in feed forward mode to handle excessive flow.	
NH3	3/24/2016	Equipment failure. The hydraulic valve system failed at the main lift, the H Train was out of service so contractors could perform work, and the removal of the stop logs at the ongoing rehabilitation of the Northside Relief Tunnel contributed to the exceedance. Heavy rainfall in the service area (1.2 inches recorded at the WWTP) may have also contributed to the exceedance.	The oxygen feed was increased.	
NH3	4/24/2016 4/27/2016 4/28/2016	Equipment failure. One of the clarifier skimmer arms malfunctioned, and RAS pumps had stoppages. The onsite oxygen plant also failed. These factors affected the treatment process and resulted in an elevated NH3-N concentration.	Maintenance removed the stoppages from the RAS pumps, and the malfunctioning clarifier was drained for repairs. NOTE: The Northside WWF did not discharge.	
	4/24-4/30/2016 4/1-4/30/2016	Equipment failure. One of the clarifier skimmer arms malfunctioned and RAS pumps had stoppages. The onsite oxygen plant also failed. These factors affected the treatment process and resulted in an elevated NH3-N concentration through the first week of May 2016.	Maintenance removed stoppages from the RAS pumps, and the malfunctioning clarifier was drained for repairs.	
NH3	5/13/2016 5/14/2016 5/8-5/14/2016	Combination of equipment failure, RAS pumps had stoppages, and ongoing rehabilitation of the northside relief tunnel. 0.88 inch of rain in the service area may have contributed to the problem. These factors affected the treatment process and resulted in an elevated NH3-N concentration.	Maintenance groups are working for removing stoppages from the RAS pumps, and the malfunctioned clarifiers were drained for repairs.	
NH3	5/25/2016	Combination of equipment failure, RAS pumps had stoppages, ongoing rehabilitation of the northside relief tunnel, and insufficient oxygen feed to 2G and 2H reactors due to contractor work to replace oxygen feed lines. These factors affected the treatment process and resulted in an elevated NH3-N concentration.	Maintenance groups are working for removing stoppages from the RAS pumps, and the malfunctioned clarifiers were drained for repairs.	
NH3	5/26/2016 5/27/2016 5/22-5/28/2016	Combination of equipment failure, RAS pumps had stoppages, ongoing rehabilitation of the northside relief tunnel, and insufficient oxygen feed to 2G and 2H reactors due to contractor work to replace oxygen feed lines. Multiple rain events (1.9 inches on 5/26 and 2.9" on 5/27/2016) during that week may have contributed to the problem. These factors affected the treatment process and resulted in the elevation of NH3-N concentrations for several days that affected the 7-day average.	Maintenance groups are working for removing stoppages from the RAS pumps, and the malfunctioned clarifiers were drained for repairs. New oxygen feed lines installation was completed.	

NH3	5/1-5/31/2016 5/1-5/31/2016	A combination of equipment failure, RAS pump stoppages, ongoing rehabilitation of the Northside Relief Tunnel, a filtration system problem, and heavy rainfall affected the treatment process and resulted in an elevated NH3-N concentration throughout the month. This affected the calculated daily average concentration.	The maintenance group is working to remove stoppages from the RAS pumps, and the malfunctioning clarifiers were drained for repairs. New oxygen feed line installation has been completed.
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NH3	5/29-6/4/2016	A combination of equipment failure, RAS pump stoppages, ongoing rehabilitation of the Northside Relief Tunnel, a filtration system problem, and heavy rainfall affected the treatment process and resulted in elevated NH3-N concentrations during the first week of June.	The maintenance group is working to remove the stoppages from the RAS pumps, and the malfunctioning clarifiers were drained for repairs. New oxygen feed line installation has been completed.
NH3	6/1-6/30/2016 6/1-6/30/2016	A combination of equipment failure (RAS pumps) and oxygen plant problems caused elevated NH3-N loadings during June.	Air Products continues to haul in oxygen to supply the reactors. The maintenance group is removing stoppages from the RAS and WAS pumps. NOTE: The Northside WWF did not discharge.
NH3	6/1/2016 6/2/2016 6/7/2016 6/5-6/11/2016	A combination of equipment failure, RAS pump stoppages, ongoing rehabilitation of the Northside Relief Tunnel, a filtration system problem, and heavy rainfall affected the treatment process and resulted in an elevated NH3-N concentration.	The maintenance group is working to remove stoppages from the RAS pumps, and the malfunctioning clarifiers were drained for repairs. New oxygen feed line installation has been completed.
NH3	6/27/2016 6/28/2016	A combination of equipment failures (RAS pumps) and oxygen plant problems caused incomplete NH3-N treatment.	Air Products continues to haul in oxygen to supply the reactors. The maintenance group is removing stoppages from the RAS and WAS pumps. NOTE: The Northside WWF did not discharge.
NH3	6/26-7/1/2016	A combination of equipment failures (RAS pumps), oxygen plant problems, and temporary elevated BOD loading from Anheuser Busch caused elevated NH3-N concentrations during the first week of July.	Air Products continues to haul in oxygen to supply the reactors. The maintenance group is removing stoppages from the RAS and WAS pumps. NOTE: The Northside WWF did not discharge.
NH3	7/2/2016 7/3/2016 7/5/2016 7/10/2016 7/7/2016 7/14/2016 7/3-7/9/2016 7/10-7/16/2016 7/1-7/31/2016	A combination of equipment failures (RAS pumps), oxygen plant problems, and temporary elevated BOD loading from Anheuser Busch caused an elevated NH3-N concentration.	Air Products continues to haul in oxygen to supply the reactors. The maintenance group is removing stoppages from the RAS and WAS pumps. NOTE: The Northside WWF did not discharge.
NH3	8/1-8/31/2016	A combination of oxygen plant failure, RAS/WAS pump stoppages, and heavy rainfall affected the treatment process and caused elevated NH3-N concentrations throughout the month.	Stoppages continue to be removed from the RAS and WAS pumps.
NH3	9/24/2016 9/18-9/24/2016 9/1-9/30/2016	A combination of equipment failure (mixers) and high solids due to stoppages in RAS and WAS pumps affected the treatment process and resulted in an elevated ammonia concentration.	Maintenance personnel removed stoppages from RAS and WAS pumps. Three mixer motors were also removed and sent out for repairs.
NH3	10/12/2016 10/13/2016 10/14/2016 10/15/2016 10/18/2016 10/19/2016 10/20/2016 10/21/2016 10/23/2016 10/24/2016 10/25/2016 10/27/2016 10/28/2016 10/29/2016 10/30/2016 10/1-10/31/2016 10/1-10/31/2016 10/16-10/22/2016 10/23-10/29/2016 10/30-11/5/2016 10/9-10/15/2016	A number of equipment failures (WAS lift station, RAS pump stoppages, sludge dryers) caused high solids in the WWTP, affecting the treatment process and resulting in an elevated ammonia concentration.	Maintenance removed WAS pumps for maintenance and repairs. Maintenance is also continuously removing stoppages from the RAS and WAS pumps.
NH3	11/4/2016 11/5/2016 11/18/2016 11/21/2016 11/22/2016 11/23/2016 11/6-11/12/2016 11/20-11/26/2016 11/1-11/30/2016	A number of equipment failures (WAS lift station, RAS pump stoppages, sludge dryers) caused high solids in the WWTP, affecting the treatment process and resulting in an elevated ammonia concentration.	Maintenance removed WAS pumps for maintenance and repairs. Maintenance is also continuously removing stoppages from the RAS and WAS pumps.
NH3	1/29-2/4/2017	A combination of out of service equipment (B Train for grit/debris removal) and continuous RAS pump stoppages caused an elevated solids inventory. As a result, an elevated concentration of NH3-N was discharged.	All available equipment was put into service, included B Train. NOTE: The Northside WWF did not discharge.
NH3	2/3/2017 2/4/2017 2/5/2017 2/6/2017 2/7/2017 2/8/2017 2/9/2017 2/10/2017 2/11/2017 2/5-2/11/2017	A combination of out of service equipment (B Train for grit/debris removal) and continuous RAS pump stoppages caused an elevated solids inventory. As a result, an elevated concentration of NH3-N was discharged.	All available equipment was put into service, included B Train. NOTE: The Northside WWF did not discharge.
NH3	2/14/2017 2/16/2017 2/17/2017 2/18/2017 2/19/2017 2/1-2/28/2017 2/12-2/18/2017 2/19-2/25/2017 2/26-3/4/2017	A combination of equipment failure (1G clarifier drive failure), out of service equipment (C Train for grit/debris removal), and continuous stoppages in the WAS/RAS pumps caused and elevated concentration of NH3-N in the effluent. Heavy rain in the service area may have contributed.	All available equipment was put into service, including the C Train which was out of service for maintenance. Maintenance is continuing to clear stoppages in the RAS/WAS pumps. NOTE: The Northside WWF did not discharge.

NH3	3/10/2017, 3/18/2017 3/19/2017, 3/22/2017 3/23/2017, 3/24/2017 3/25/2017, 3/26/2017 3/27/2017, 3/28/2017 3/31/2017, 3/5-3/11/2017 3/12-3/18/2017 3/19-3/25/2017 3/1-3/31/2017 3/26-4/1/2017 4/1/2017; 4/2/2017 4/3/2017; 4/4/2017 4/5/2017; 4/6/2017 4/8/2017; 4/9/2017 4/10/2017 4/2-4/8/2017; 4/9-4/15/2017; 4/1-4/30/2017;	A combination of out of service equipment (C Train for grit/debris removal) and continuous stoppages in the WAS/RAS pumps caused an elevated concentration of NH3-N in the effluent. Heavy rain (6.9 inches at the WWTP between March 5 and 11) in the service area may have contributed to the problem.	All available equipment was put into service, including the C Train which was out of service for maintenance. Maintenance is continuing to clear stoppages in the RAS/WAS pumps. NOTE: The Northside WWF did not discharge.
NH3	6/1-6/30/2017	A combination of RAS pump failures, out of service reactors for grit removal, and WAS pump stoppages caused incomplete treatment.	WAS pump stoppages were cleared, two RAS pumps were replaced, and contractors completed grit removal activities on A train reactors and placed the train back in service.
NH3	7/7/2017 7/8/2017 7/9/2017 7/2-7/8/2017 7/9-7/15/217 7/23-7/29/2017 7/1-7/31/2017	The sludge handling facility was out of service, preventing adequate wasting. In addition, the H Train was out of service for grit and debris removal, and the WAS/RAS pumps were experiencing continuous stoppages.	All available equipment was put into service. Maintenance continues to remove stoppages from WAS/RAS pumps.
NH3	8/27-9/2/2017	Hurricane Harvey related. Hydraulic overload for an extended period of time prevented complete nitrification.	All available equipment was put into service.
NH3	9/23/2017 9/24-9/30/2017 9/1-9/30/2017	The Clinton Drive lift station was out of service from 6:00 pm on 9/21/17 to 3:30 pm on 9/22/17, causing the raw wastewater in the wet well to become septic. When the Clinton Drive lift station came back online, a large amount of septic waste entered the WWTP at one time, disrupting the nitrification process. In addition, the F Train is out of service for grit/debris removal and some WAS/RAS pumps experienced stoppages.	All available equipment was put into service.
NH3	10/1-10/31/2017	A combination of high solids inventory (sludge drying facility operating on limited dryers), equipment failure (wasting station was down for two days), and reactors out of service (E and F trains down for grit/debris removal) affected the treatment process's ability to completely treat NH3-N.	Cleaning operations on the F train were completed, and the units were put back into service. The wasting station was repaired and put back in service. Additional dryers were put into service to process additional solids.
NH3	3/16/2018 3/17/2018	The E Train was out of service for inspection and bull gear repairs. Eight aeration mixers were out of service for repairs to the gearboxes. The sludge drying facility was operating at a limited capacity, resulted in a high solids inventory. These factors caused an elevated ammonia-nitrogen concentration.	Repairs are pending.
NH3	3/18/2018 3/19/2018 3/21/2018 3/24/2018 3/18-3/24/2018 3/25-3/31/2018 3/1-3/31/2018	Eight aeration mixers were out of service for repairs to the gearboxes. The sludge drying facility was operating at a limited capacity, resulted in a high solids inventory. These factors caused an elevated ammonia-nitrogen concentration.	Repairs are pending. An additional sludge dryer was put online 3/24/17
NH3	4/3/2018 4/4/2018 4/5/2018 4/6/2018 4/7/2018 4/8/2018 4/13/2018 4/27/2018 4/28/2018 4/29/2018 4/1-4/30/2018 4/1-4/30/2018 4/1-4/7/2018 4/8-4/14/2018 4/22-4/28/2018	Eight aeration mixers were out of service for repairs to the gearboxes. The sludge drying facility was operating at a limited capacity, resulting in a high solids inventory. These factors caused an elevated ammonia-nitrogen concentration.	Gearbox repairs are pending. Maintenance and contractors are working on equipment so that more sludge dryers can be put in service.
NH3	5/1/2018 5/2/2018 5/4/2018 4/29-5/5/2018	A series of equipment failures and out of service equipment in April caused elevated ammonia concentrations. The WWTP is still recovering from those issues.	Gearbox repairs are pending.
NH3	5/12/2018	The E Train is out of service due to damage to the clarifier bull gear, and eight aeration mixers were removed and sent for repair to the gearboxes. ***Review of laboratory data on 6/12/18 showed that the result is 10 mg/L.***	The sludge drying facility placed additional dryers in service. Mixers from the E Train were moved to replace the damaged mixers that are out for repairs.
NH3	5/19/2018 5/6-5/12/2018 5/13-5/19/2018 5/20-5/26/2018 5/1-5/31/2018	The E Train is out of service due to damage to the clarifier bull gear, and eight aeration mixers were removed and sent for repair to the gearboxes.	The sludge drying facility placed additional dryers in service. Mixers from the E Train were moved to replace the damaged mixers that are out for repairs.
NH3	6/1-6/30/2018 6/17-6/23/2018 6/24-6/30/2018	Excessive solids in the process caused by limited sludge plant production prevented complete treatment of ammonia-nitrogen.	Repairs to the sludge dryers are ongoing. Operations continues to make adjustments to balance the distribution of solids.
NH3	7/1-7/31/2018	High solids inventory due to limitations at the sludge drying facility caused elevated NH3-N concentrations throughout the month.	Maintenance and contractors working on repairs to sludge drying equipment. Sludge is being wet-hauled to reduce the solids inventory. NOTE: The Northside WWF discharged on July 4, 2018.
TSS	3/9/2015 3/08 - 3/14/2015	Combination of hydraulic surge and high solids inventory in the plant. According to the rain gauge, it rained 1.8 inches on March 09, 2015 and 1.90 inches on the day before. The combination resulted in elevated TSS concentration, which affected the calculated 7-day average.	Operations staff is closely monitoring the plant and making process adjustments, as needed.
TSS	4/11/2015 4/16/2015 4/17/2015 04/12- 04/18/2015	Combination of hydraulic surge and high solids inventory in the plant. According to the rain gauge, it rained 1.9 inches on April 11, 2015 and 0.31 inches on the day before. It rained 2.35 inches on April 17, 2015 and 2.30 on April 16, 2015. 4/16 and 4/17: B train was out of service for repair. The combination resulted in elevated TSS concentrations in two days during the week, which affected the calculated 7-day average.	Operations staff is closely monitoring the plant and making process adjustments, as needed.
TSS	5/22-5/28/2016 5/29-6/4/2016	A combination of equipment failure, RAS pump stoppages, ongoing rehabilitation of the Northside Relief Tunnel, a filtration system problem, and 2.9 inches of heavy rain affected the treatment process and resulted in an elevated TSS concentration	The maintenance group is working to remove stoppages from the RAS pumps, and the malfunctioning clarifiers were drained for repairs. New oxygen feed line installation has been completed.

TSS	06/16/2015	Combination of construction and equipment failure. Heavy rainfall of 2.8 inches on June 16, 2015 and 0.74 inches the day before may have contributed to the problem. Ongoing rehabilitation of Northside Relief Tunnel and out of service B train and wasting pumps 2C/D, 2E and 2G. These factors affected the treatment process, resulting in elevated TSS concentration.	B train was put back in service and wasting pumps are scheduled for repair. Operations staff is closely monitoring the plant and making process adjustments, as needed.
TSS	10/24/2015	Severe rain in the service area. According to the rain gauge, it rained 8.8 inches on October 24. This resulted in elevated TSS concentration.	Operations staff is closely monitoring the plant and making process adjustments, as needed.
TSS	1/6/2016	Combination of removal of the stop logs at the ongoing rehabilitation of the Northside Relief Tunnel, B Train being down for contractors to inspect the drive on clarifier 1B, and heavy rain in the area (1.6 inches recorded at the 69th Street WWTP) may have contributed to the problem.	Operations staff is closely monitoring the plant and making process adjustments as needed.
TSS	3/24/2016	Equipment failure. The hydraulic valve system failed at the main lift, the H Train was out of service so contractors could perform work, and the removal of the stop logs at the ongoing rehabilitation of the Northside Relief Tunnel contributed to the exceedance. Heavy rainfall in the service area (1.2 inches recorded at the WWTP) may have also contributed to the exceedance.	Wasting rates were adjusted and are being monitored.
TSS	4/18/2016	A combination of equipment failure (RAS pumps) and the removal of the stop logs at the ongoing rehabilitation of the Northside Relief Tunnel. Heavy rainfall during the flooding on April 18, 2016 may have contributed. These factors affected the treatment process, resulting in an elevated TSS concentration in the effluent.	Operations and maintenance cleared the stoppages in the RAS pumps and equipment was placed back in service. On April 18, 2016, Governor Greg Abbott issued a Disaster Proclamation for Harris County and other areas of southeast Texas.
TSS	4/27/2016	Equipment failure. One of the clarifier skimmer arms malfunctioned, and RAS pumps had stoppages. The onsite oxygen plant also failed. These factors affected the treatment process and resulted in an elevated TSS concentration.	Maintenance removed stoppages from the RAS pumps, and the malfunctioning clarifier was drained for repairs. NOTE: The Northside WWF did not discharge.
TSS	5/27/2016	Combination of equipment failure, RAS pumps still have stoppages, ongoing rehabilitation of the northside relief tunnel, filtration system problem. 2.9 inches of heavy rain may have contributed to the problem. These factors affected the treatment process and resulted in an elevated TSS concentration.	Maintenance groups are working for removing stoppages from the RAS pumps, and the malfunctioned clarifiers were drained for repairs. New oxygen feed lines installation is completed.
TSS	6/2/2016 6/3/2016	A combination of equipment failure, RAS pump stoppages, ongoing rehabilitation of the Northside Relief Tunnel, a filtration system problem, and heavy rainfall affected the treatment process and resulted in an elevated TSS concentration.	The maintenance group is working to remove stoppages from the RAS pumps, and the malfunctioning clarifiers were drained for repairs. New oxygen feed line installation has been completed.
TSS	11/5/2016 11/6/2016 11/23/2016 12/2/2016 12/4/2016 11/13-11/19/2016 11/20-11/26/2016 11/27-12/3/2016 12/4-12/10/2016 11/1-11/30/2016 12/1-12/31/2016	A number of equipment failures (WAS lift station, RAS pump stoppages, sludge dryers) caused high solids in the WWTP, affecting the treatment process and resulting in an elevated ammonia concentration.	Maintenance removed WAS pumps for maintenance and repairs. Maintenance is also continuously removing stoppages from the RAS and WAS pumps.
TSS	1/17/2017 1/18/2017	A combination of equipment failure and excessive sludge returning back into the filtration system from the sludge overflow line. In addition, the B Train is out of service for grit and debris removal and the WAS and RAS pumps are experiencing continuous stoppages. Heavy rain may have contributed to the problem.	All available equipment was put into service, including the B Train. NOTE: The Northside WWF discharged on January 17, 2017 and January 18, 2017.
TSS	1/20/2017 2/10/2017 2/11/2017	A combination of out of service equipment (B Train for grit/debris removal) and continuous RAS pump stoppages caused an elevated solids inventory. As a result, an elevated concentration of TSS was discharged.	All available equipment was put into service, included B Train. NOTE: The Northside WWF did not discharge.
TSS	1/15-1/21/2017 1/1-1/31/2017 1/1-1/31/2017	A combination of out of service equipment (B Train for grit/debris removal) and continuous RAS pump stoppages caused an elevated solids inventory. As a result, an elevated concentration of TSS was discharged.	All available equipment was put into service, included B Train.
TSS	2/5-2/11/2017	A combination of out of service equipment (B Train for grit/debris removal) and continuous RAS pump stoppages caused an elevated solids inventory. As a result, an elevated concentration of TSS was discharged.	All available equipment was put into service, included B Train. NOTE: The Northside WWF did not discharge.
TSS	2/14/2017 2/15/2017 2/16/2017 2/12-2/18/2017	A combination of equipment failure (1G clarifier drive failure), out of service equipment (C Train for grit/debris removal), and continuous stoppages in the WAS/RAS pumps caused and elevated concentration of TSS in the effluent. Heavy rain in the service area may have contributed.	All available equipment was put into service, including the C Train which was out of service for maintenance. Maintenance is continuing to clear stoppages in the RAS/WAS pumps. NOTE: The Northside WWF did not discharge.
TSS	2/1-2/28/2017	A combination of equipment failure (1G clarifier drive failure), out of service equipment (B and C Train for grit/debris removal), and continuous stoppages in the WAS/RAS pumps caused and elevated concentration of TSS in the effluent.	All available equipment was put into service, including the B and C Trains which were out of service for maintenance. Maintenance is continuing to clear stoppages in the RAS/WAS pumps. NOTE: The Northside WWF did not discharge.
TSS	3/5-3/11/2017 3/12-3/18/2017 3/19-3/25/2017 3/26-4/1/2017 4/2-4/8/2017 3/1-3/31/2017 3/1-3/31/2017 4/1-4/30/2017	A combination of out of service equipment (C Train for grit/debris removal) and continuous stoppages in the WAS/RAS pumps caused an elevated concentration of TSS in the effluent. Heavy rain (6.9 inches at the WWTP from March 5 to 11) in the service area may have contributed to the problem.	All available equipment was put into service, including the C Train which was out of service for maintenance. Maintenance is continuing to clear stoppages in the RAS/WAS pumps. NOTE: The Northside WWF did not discharge.
TSS	3/5/2017 3/11/2017	A combination of out of service equipment (C Train for grit/debris removal) and continuous stoppages in the WAS/RAS pumps caused an elevated concentration of TSS in the effluent. Heavy rain (4.5 inches at the WWTP on March 5 and 1.5 inches at the WWTP on March 11) in the service area may have contributed to the problem.	All available equipment was put into service, including the C Train which was out of service for maintenance. Maintenance is continuing to clear stoppages in the RAS/WAS pumps. NOTE: The Northside WWF did not discharge.
TSS	3/16/2017 3/31/2017	A combination of out of service equipment (C Train for grit/debris removal) and continuous stoppages in the WAS/RAS pumps caused an elevated concentration of TSS in the effluent.	All available equipment was put into service, including the C Train which was out of service for maintenance. Maintenance is continuing to clear stoppages in the RAS/WAS pumps. NOTE: The Northside WWF did not discharge.
TSS	4/2/2017	A combination of out of service equipment (C Train for grit/debris removal) and continuous stoppages in the WAS/RAS pumps caused an elevated concentration of NH3-N in the effluent.	All available equipment was put into service, including the C Train which was out of service for maintenance. Maintenance is continuing to clear stoppages in the RAS/WAS pumps. NOTE: The Northside WWF did not discharge.
TSS	6/24/2017	A combination of equipment failure, out of service equipment (A Train for grit/debris removal), and continuous stoppages in the WAS/RAS pumps caused poor settling in the clarifiers.	All available equipment was put into service, including the A Train.
TSS	7/13/2017	The sludge handling facility was out of service, preventing adequate wasting. In addition, the H Train was out of service for grit and debris removal, and the WAS/RAS pumps were experiencing continuous stoppages.	All available equipment was put into service. Maintenance continues to remove stoppages from WAS/RAS pumps.
TSS	12/16/2017	A hydraulic surge temporarily caused the contents of the main wet well to flow back up the filter return line.	All available equipment was put into service.
TSS	2/9/2018, 2/10/2018 2/4-2/10/2018 2/1-2/28/2018	A hydraulic surge temporarily caused the contents of the main wet well to flow back up the filter return line.	All available equipment was put into service, and process adjustments were made to minimize the effects.
TSS	4/22/2018	A hydraulic surge temporarily caused the contents of the main wet well to flow back up the filter return line.	All available equipment was put into service, and process adjustments were made to minimize the effects.

Plant Sagemont			
Permit Parameter	Non-Compliance Date(s)	Initial Root Cause Assessment	CORRECTIVE ACTION
E.Coli	5/13/2015	Near the sample collection time, there was sudden drop in flow from 15 MGD to 1.6 MD as operations made adjustments to accommodate wet weather conditions in the plant. The drop in flow affected the chlorine residual and detention time. The combination may have contributed to the E. coli violation.	Work order #1122357 was created for the chlorination group to thoroughly inspect the chlorination system to ensure proper operation.
	11/12/2015	Power failure in the plant. This caused insufficient bleach in the effluent impacting the E.Coli value.□ **This is a revision of a report submitted on November 19, 2015. The laboratory provided updated results on December 7, 2015.	Chlorination system was checked to ensure proper operation. Disinfectant levels were restored to adequate ranges.
	6/16/2016	Insufficient bleach feed in the chlorine contact basin due to communication failure with the control center to notify the operator on time to correct the problem. This caused the elevation of the E.coli value.	Work orders #1267679 and #1268019 were issued to check and repair the communication system.
	6/28/2016	Unknown. At the time of sampling, the SCADA trends indicate adequate chlorination.	The chlorination system was checked for problems. No issues were found.
	7/19/2016	The bleach pumps malfunctioned, causing insufficient chlorination.	The bleach pumps were repaired under Work Order 1278868.
	7/26/2016	Undetermined. According to SCADA trends, the chlorine residual was within an acceptable range for disinfection at the time of sample collection.	The chlorination system was checked for malfunction but was found to be working properly.
	11/3/2016	The bleach pump lost prime, resulting in inadequate disinfection.	The chlorination group was notified of the problem and troubleshooted the disinfection system.
NH3	10/12/2015	Insufficient air in the aeration basins due to electrical problem in one of the blowers. This resulted in an increased NH3-N in the effluent.	Work order # 1171925 was created to repair the blower. Operations staff is closely monitoring the aeration system to keep adequate aeration blowers in service.
	2/1/2016	The plant has been experiencing continuous issues with the aeration blowers, causing slightly elevated NH3-N concentrations throughout the month. This caused the daily average to exceed the permitted limit.	The blowers are being repaired under work order numbers 1219847 and 1219848.
	3/13/2016	The plant lost power from 4:00 pm on March 13, 2016 to 2:30 am on March 14, 2016. As a result there was no air to the plant for 10 hours.	Operations is working to improve the air supply to the plant.
	4/17/2016	The aeration blower tripped off, limiting the air supply to the plant.	The blower was repaired under work order #1247506.
	6/12/2016	The aeration blower tripped off, limiting the air supply to the plant. This caused elevated NH3-N concentration.	The blower was checked and the power was restored.
	6/1/2016	The aeration blower tripped off, limiting air supply to the plant and causing elevated NH3-N concentrations during the month of June.	The blower was checked, and power was restored.
	7/1/2016	A combination of air flow restrictions associated with old air filters and multiple air leaks in the distribution system caused elevated ammonia concentrations during the month of July.	Air filters will be replaced by Operations personnel. Air leaks are scheduled to be addressed under Work Order 934987.
	1/8/2017 1/9/2017	One of the blowers tripped off resulting in limited air supply for an undetermined period of time.	A work order was created to address the equipment failure.
	9/6/2017	Hurricane Harvey related. One of the blowers tripped off during the storm. The facility was flooded for several days, preventing access to the backup blower.	The backup blower was put into service, and the damaged blower is scheduled to be repaired.
	10/15/2017	A failure of the lift pump controls at the onsite lift station created a surge in flow when the lift pumps were activated again.	An electrician repaired the lift station controls.
	10/30/2017	The aeration blower tripped off, resulting in an inadequate air supply.	A work order was written, and a contractor repaired the blower.
	5/1/2018	Inadequate dissolved oxygen caused by a mechanical problem with a blower.	The contractor made repairs to the blower.
	5/27/2018	A power outage that occurred after hours caused the blowers to shut off.	The operator was called out by the Control Center. Power to the clarifiers and blowers was reset.
	5/28/2018	The previous day, a power outage that occurred after hours caused the blowers to shut off.	The operator was called out by the Control Center. Power to the clarifiers and blowers was reset.
	5/1/2018	Mechanical issues with a blower at the beginning of the month and a power outage at the end of the month combined to impact the daily average.	The blower was repaired. The Control Center called out an operator to reset blowers after the power outage.

Plant Northeast

Permit Parameter	Non-Compliance Date(s)	Initial Root Cause Assessment	CORRECTIVE ACTION
Enterococ	3/24/2015	The cause of the enterococci bacteria exceedance is unknown. According to the SCADA trends, the chlorine residual was in range during sample collection time.	Chlorination system was checked and evaluated under WO #1104944, and found working properly.
	05/13/2015	The cause of the enterococci bacteria exceedance is unknown. According to the records, the chlorine residual was at 2.3 mg/L during sample collection time. Rain events on May 11 (1.6 inches) and May 12 (3.45 inches) may have contributed to the Enterococci violation.	Work order #1122497 was generated for the chlorination group to thoroughly inspect the chlorination system to ensure proper operation.
	05/26/2015	Insufficient bleach feed in the system during severe thunderstorms in the Houston area that produced about 11 inches of rain on May 26, 2015 and 6.49 inches on the day before. These events contributed to the chlorine deficiency in the contact basin, allowing the Enterococci value to rise above the permitted amount.	None. Disinfection system was working normally.
	07/01/2015	Unknown. According to SCADA trends and operator logs, the chlorine residual was maintained above 1.0 mg/L and flows were normal at the time of sample collection.	None. Disinfection system was working normally.
	08/19/2015	Unknown. According to SCADA trends and operator logs, the chlorine residual was maintained above 1.0 mg/L, flows were stable, and the bleach feed was working properly at the time of sample collection.	The chlorination group was notified of the violation. After analysis, it was determined that the chlorination system was working properly.
	10/13/2015 10/21/2015	Unknown. According to the SCADA trends and flow reports, the flow conditions and chlorination feed were normal. The chlorine residual was at an acceptable level at the time of sample collection.	Operations and chlorination were informed of the violation. The disinfection system was checked for operational issues.
	1/7/2016	Unknown. The chlorination feed was performing normally, and the chlorine residual was within an acceptable range.	Operations and the chlorination group were notified of the violation. Both groups investigated, but the disinfection system was found to be operating properly.
	2/23/2016	Undeterminable. A review of the SCADA trends showed that at the time of sample collection the chlorination feed was working properly and the chlorine residual was in range. Heavy rainfall (2.13 inches at the WWTP on 2/22/16 and 2/23/16) in the area elevated the flow and may have contributed to the problem.	Operations and the chlorination group were notified of the violation. Both groups investigated, but the disinfection system was found to be operating properly.
	3/10/2016	Unknown. The SCADA trends at the sample collection time indicate that the chlorine feed and chlorine residual were in the normal range. Heavy rainfall on March 9, 2016 (3.5 inches recorded at the WWTP) elevated the flow and may have contributed to the Enterococci result.	Operations and the chlorination group were notified of the violation. Both groups investigated, by the disinfection system was found to be operating properly.
	1/18/2017	Undetermined. At the time of sample collection, the chlorine residual was within an acceptable range for disinfection. Elevated flow due to heavy rainfall may have contributed.	The chlorination system was troubleshooted but was found to be working properly.
	12/20/2017	The chlorine residual was not adequate for disinfection at the time of sample collection due to a chlorine leak on pump #1 and the loss of prime on pump #2.	The chlorination group was dispatched to make repairs on the leaking chlorine line.
	3/29/2018	Undetermined. According to SCADA trends, the flow conditions and chlorination feed were normal. The chlorine residual was within an appropriate range for disinfection.	The chlorination group troubleshooted the chlorination system.
	9/11/2018	Undetermined. At the time of sample collection, the chlorine residual was within an adequate range for disinfection. The disinfection system was operating normally.	The disinfection system was troubleshooted and found to be working properly.

Appendix F

List of SOPs

Appendix F

List of Standard Operating Procedures (SOPs)

1	Collection and Conveyance Management Plan
2	Lift/Pump Stations SOP
3	How to Create WMS Work Orders
4	Infrastructure Management System SOP
5	Facility Maintenance and Inspection SOP
6	Inflow and Infiltration Control Plan
7	IWS System to Track Compliance of Requirements (LINKO software)
8	Collection and Conveyance Plan with Sanitary Sewer Overflow (SSO) Plan
9	WWO SOP for Alarm Testing
10	PWE APP Safety Plan
11	Wastewater Treatment Plant Operation & SOP Manual
12	SOP 69th Street & Southwest Wastewater Treatment Plant Operating Manuals
13	Wet Weather Facilities Operating Manual
14	Alameda Sims Sludge Facility Operations Manual
15	WWTP Preventive Maintenance Schedule
16	SOP on Sludge Processing Facilities
17	Industrial Pretreatment Program
18	PUD SOP Wet Weather
19	Residuals Management Spill Control Plan
20	SOP Residual Management Aerobic Digesters Facilities
21	COH Policy 2-21, Employee Safety and Health
22	Collection System Repair Response to Stoppages
23	Collection System Repair Response to Sanitary Sewer Overflows
24	Clarifier solids

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I. Cover

Cover shall state that the report covers Consent Decree activities undertaken between July 1, XXXX and June 30, XXXX.

II. Certification Declaration

[Required certification, with language specified by the Consent Decree, signed by a responsible official of the City]

III. Table of Contents

[List of sections, tables, figures and appendices included in this report]

IV. SSO Reporting

The City shall provide a tabular summary of SSO information as described in Paragraph 63 generally in accordance with the column headings of the tables following:

Summary of Total Annual SSOs Occurring After the Effective Date

Fiscal Year	# of SSOs Caused by Grease	# of SSOs Caused by Capacity Constraints	# of SSOs Caused by Roots	# of SSOs Caused by Lift Station Failure	# of SSOs Caused by Other Factors	Total # of SSOs
XX	XX	XX	XX	XX	XX	XX
XX	XX	XX	XX	XX	XX	XX

Summary of Annual SSO Discharge Locations

Fiscal Year	# of SSOs discharging into/adjacent to waters ⁽¹⁾	# of SSOs that do not reach into or adjacent to waters ⁽²⁾	Total # of SSOs
XX	XX	XX	XX
XX	XX	XX	XX
	⁽¹⁾	As defined in Paragraph 83 of the Consent Decree	
	⁽²⁾	As defined in Paragraph 84 of the Consent Decree	

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Summary of Information Regarding SSOs Occurring After the Effective Date

Fiscal Year	Total SSO Discharge Volume	# of Media Reports Issued	# of repeat SSO locations ⁽¹⁾
XX	XX	XX	XX
XX	XX	XX	XX
⁽¹⁾ – Repeat SSOs as defined in Paragraph 63(e) of the Consent Decree			

Summary of SSOs and WWTP/WWF Effluent Reports of No Violation Pursuant to Affirmative Defense Under Tex. Water Code § 7.251

Fiscal Year	Date	Type of Report	Report ID#
XX	XX	XX	XX
XX	XX	XX	XX

V. Early Action Program

The City shall provide a tabular summary of the status of each Early Action Project (Lift Station, Force Main, Consolidation, and WWTP Early Action Projects) as described in Paragraph 64 and listed in Appendix B of the Consent Decree.

VI. Capacity Assessment

A. Capacity Remedial Measures Plan Progress

In Annual Reports following the approval of the Capacity Remedial Measures Plan(s), the City shall identify progress made in the previous year toward completing the remedial measures identified in the Capacity Remedial Measures Plan(s) as described in a format generally in accordance with the column and row headings of the table following:

Capacity Project Name and Area #	Project Start Date	Narrative of Project Status and Progress Made during Fiscal Year	EPA Approved Project Completion Deadline

B. Capacity Remedial Summary

The City shall identify areas with potential capacity constraints, provide remedial alternatives analysis for each area in the provide a tabular summary of results of

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the identification of WCTS assets with potential capacity constraints generally in accordance with the column and row headings of the table following:

Potential Capacity Constraints Summary

Criteria	List of Assets Identified Meeting Criteria
Total wet weather volume from any single WCTS asset over the prior 3 years > 100,000 gallons	X
3 or more wet weather SSOs occur from any single WCTS asset over the prior 3 years	X

The City shall provide a list and map of new areas with capacity constraints generally in accordance with the column and row headings of the table following:

New Capacity Constraint Areas

Area Number	WCTS Assets in Area
X	X
X	X

For each new Capacity Constraint Area, the City shall provide the remedial alternative analysis, if complete, and timeline for completion of each remedial action taken or to be taken.

C. Capacity-Related Sewer Segment Replacements

The City shall identify all Sewer Segments renewed or replaced in the previous Fiscal Year due to capacity constraints and all Sewer Segments that are scheduled for renewal or replacement in the following year due to capacity constraints, generally in accordance with the column and row headings of the table following:

Capacity-Related Sewer Segment Replacements

Fiscal Year	Sewer Segment List
(Previous)	X
(Next)	X

D. Sanitary Sewer System Hydraulic Model Updates

The City shall provide a list of sanitary sewer system hydraulic models updated.

VII. Wet Weather Facilities

The City shall provide a summary of all activities performed in the previous Fiscal Year including, as appropriate, a summary of pilot study activities, LOA activities, sampling results and analysis, status of Pilot Testing Result Report, status of Full Scale Treatment Plan, and status of the Remedial Measures Plan. In addition, the City shall specify any non-effluent maintenance-related permit violations involving the WWFs. After any applicable deadline specified in Paragraphs 21(a) or 24(b), the City shall provide the number of discharges from the Scott Street WWF, if any.

	Date of Discharge(s), if any	Non-effluent permit violation(s), if any	Narrative of activity taken toward pilot study implementation, full-scale treatment implementation, or discharge elimination
WWF Name	X	X	

VIII. Condition Assessment

A. Condition Assessment Summary

The City shall provide a tabular summary of Gravity Sewer Mains and Manholes, Force Mains, and Lift Stations inspected generally in accordance with the column and row headings of the tables following:

Gravity Sewer Main Inspection Summary

Total Gravity Sewer miles	Unique miles inspected in Fiscal Year X	Cumulative unique miles inspected from Effective Date	Unique miles of inspections scheduled for next Fiscal Year	Unique miles remaining to be inspected within 10 years or (if after 10 years) within 15 years from Effective Date
XX	XX	XX	XX	XX

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Manhole Inspection Summary

Total manholes	Unique manholes inspected in Fiscal Year X	Cumulative unique manholes inspected from Effective Date	Unique manholes remaining to be inspected within 10 years or (if after 10 years) within 15 years from Effective Date
XX	XX	XX	XX

Early Year Targeted Inspection Summary

Total unique miles inspected in Fiscal Year X	Has requirement to inspect 1,500 unique miles within 2 years of Effective Date been met?
XX	Yes, No, or cumulative total from Effective Date

Preventive Inspection Summary

Total (repeat) miles inspected in Fiscal Year X	Has requirement to re-inspect 82.5 Miles been met?
XX	Yes or No

B. Force Main Assessment Program

The City shall provide a tabular summary of force main inspections performed in the Fiscal Year in accordance with the elements included in the following table:

Force Main Inspection Summary

Unique miles inspected in Fiscal Year X	Cumulative unique miles inspected from Effective Date	Miles of inspections scheduled for next Fiscal Year	Miles of inspections to be completed within 10 Years of Effective Date
XX	XX	XX	XX

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C. Lift Station Assessment Program

The City shall provide a tabular summary of the lift stations inspected in the Fiscal Year generally in accordance with the column and row headings of the following table:

Lift Station Inspection Summary

	Inspections completed in Fiscal Year X	Cumulative inspections completed from Effective Date	Inspections scheduled for next Fiscal Year	Inspections to be completed within 10 Years of Effective Date
Number of Lift Stations	XX	XX	XX	XX

D. Condition Assessment Results

The City shall provide a tabular summary of results of the condition assessments by type of asset performed in the Fiscal Year generally in accordance with the column and row headings of the following table:

Condition Categorization Summary in Fiscal Year X

Condition Category	Miles of Gravity Sewer Mains	Number of Manholes
NASSCO Grade 1 – Very Good	XX	XX
NASSCO Grade 2 – Good	XX	XX
NASSCO Grade 3 – Fair	XX	XX
NASSCO Grade 4 – Poor	XX	XX
NASSCO Grade 5 – Very Poor	XX	XX

**Provide a list of the Force Main and Lift Station defects identified during the Fiscal Year, and a list and locational map of identified Category 4 and 5 Gravity Sewer Mains and manholes.*

Assets to be remediated based upon Condition Categorization Summary

	Miles of Gravity Sewer Main	Number of manholes	Miles of Force Mains	Number of Lift Stations
Fiscal Year	XX	XX	XX	XX

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E. Condition Remedial Summary

The City shall provide a tabular summary of condition remedial measures completed and WCTS assets identified for condition remedial measures generally in accordance with the column and row headings of the tables following:

WCTS Asset Remedial Measures Completed

Miles of Gravity Sewer Mains	Number of Manholes	Miles of Force Mains	Number of Lift Stations
Fiscal Year	XX	XX	XX
Next Fiscal Year	XX	XX	XX

**Provide a list of the Force Main and Lift Station defects remediated during the Fiscal Year, and a list and locational map of remediated Category 4 and 5 Gravity Sewer Mains and manholes.*

Gravity Sewer and Lift Station Remediation Requirements

Percent of all Gravity Sewer Mains Remediated/Replaced in Fiscal Year X	Met CD Paragraph 36 requirement (2.5%)?	Percent of all Lift Stations Remediated/Replaced in Fiscal Year X	Met CD Paragraph 37 requirement (5%)?
XX	Y/N	XX	Y/N

IX. Wastewater Treatment Plants (WWTPs)

Provide a tabular summary of WWTP corrective actions scheduled and WWTP corrective actions completed during the previous Fiscal Year generally in accordance with the column and row headings of the tables following:

WWTP Corrective Actions Scheduled

WWTP	Corrective Action	Scheduled Date for Completion
XX	XX	XX

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WWTP Corrective Actions Completed

WWTP	Corrective Action	Scheduled Date for Completion	Completion Date
XX	XX	XX	XX

X. CMOM

A. Sewer Cleaning

The City shall provide a tabular summary of Sewer Cleaning activities performed in the Fiscal Year generally in accordance with the column and row headings of the tables following:

Small Diameter System-Wide Program Cleaning Summary

Total Small Diameter miles	Unique miles cleaned in Fiscal Year X	Cumulative unique miles cleaned from Effective Date	Unique miles remaining to be cleaned within 10 years or (if after 10 years) within 15 years from Effective Date	Percent of Small Diameter miles cleaned during Fiscal Year X
XX	XX	XX	XX	XX

Large Diameter System-Wide Program Cleaning Summary

Total Large Diameter Miles	Unique miles inspected in Fiscal Year X	Unique miles cleaned in Fiscal Year X	Unique Miles Remaining to be Inspected within 10 years or (if after 10 years) within 15 years from Effective Date	Percent of Large Diameter miles cleaned during Fiscal Year X
XX	XX	XX	XX	XX

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Preventive Cleaning Summary

Total miles cleaned in Fiscal Year X (repeat cleaning)	Has requirement to annually re-clean 275 miles in addition to Program Cleaning been met?
XX	Yes or No

Early Year Targeted Cleaning Summary

Total unique miles cleaned in Fiscal Year X	Has requirement to clean 1,500 unique miles within 2 Years of Effective Date been met?
XX	Yes, No, or Cumulative Total from Effective Date

B. Root Control

The City shall describe its yearly root control activities, including a map identifying Sewer Segments where root control activities were conducted.

C. Fats, Oils, and Grease (FOG) Program

The City shall provide a tabular summary of the FOG Program activities performed in the Fiscal Year generally in accordance with the column headings of the table following:

FOG Program Inspections and Enforcement Actions

Number of Permitted FOG Generators at End of FY	Number of FOG Program Interceptor Inspections During FY	Number of FOG Generators Not Inspected During Previous 3 FYs	Number of Enforcement Actions Initiated During FY
XX	XX	XX	XX

D. CMOM – Private Laterals

The City shall provide a tabular summary regarding Private Lateral wastewater releases that impact or threaten to impact the MS4 generally in accordance with the column and row headings of the table below:

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Private Lateral Wastewater Releases

Location of Private Lateral	Date of Wastewater Release
XX	XX
XX	XX

Private Lateral Wastewater Releases Remediated

Private Laterals Remediated from written/verbal Notification	Private Laterals Remediated from Inspections by HHD or BCE	Private Laterals Remediated from a Fine	Private Laterals Remediated from Suspension of Service	Private Laterals Not Remediated Despite City Efforts
XX	XX	XX	XX	XX

E. Standard Operating Procedures (SOPs)

The City shall provide copies of SOPs that were substantively updated in the Fiscal Year, if any, as described in Paragraph 88 of the Consent Decree.

F. Advanced Sewer System Monitoring

	Number of advanced Sewer System monitors installed during FY	Total number of advanced Sewer System monitors installed since Effective Date	Total number of advanced Sewer System monitors currently maintained by City
Fiscal Year	X	X	X

XI. Inaccessible/Nonexistent or Unlocatable Assets

The City shall provide a list identifying assets that the City was unable to inspect or clean because the asset was inaccessible, nonexistent, or not located.

XII. Modifications

The City shall provide a summary of written agreements pursuant to Section XXI of the Consent Decree.