Targeted Bacteria Monitoring Project
Field Investigation Final Report
Assessment Unit 1007T _01 Bintliff Ditch

Environmental Institute of Houston

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Segment Description

Bintliff Ditch is a tributary to Brays Bayou and the Segment ID is 1007T (Figure 1). This segment is 6.3km long, consists of one assessment unit (AU) of concern, AU 1007T _01, and is defined as from the confluence with Brays Bayou upstream 5.8km to the Fondren Road bridge crossing. There is one current surface water quality monitoring (SWQM) station located on this AU (station ID: 18690). This AU has been selected for targeted monitoring due to a bacteria (*Escherichia coli*) seven-year geometric mean of 5969.1 MPN/100 mL and has a current impairment category of 4a (H-GAC QAPP, 2022, TCEQ, 2022). The potential sources of bacteria impairments are non-point source pollution, urban runoff, and sanitary sewer overflows (TCEQ, 2022). This AU was monitored previously as part of the FY20-21 Targeted Monitoring Study.

The contributing watershed for this segment is 12 km^2 (Data source: H-GAC, SWRC, 2023). The soil types in the watershed have medium to very slow infiltration rates and the land cover is dominated by 99.99% developed land (Data sources: United States Department of Agriculture Hydrologic Soil Groups from gSSURGO 2016 and National Land Cover Database NLCD 2019). There are not any permitted wastewater outfalls or documented unpermitted on-site sewage facilities (OSSF) within the watershed (Data source: H-GAC). There is one documented permitted OSSF on an unnamed tributary to Bintliff Ditch (Data source: H-GAC).

Background

Clean Rivers Program (CRP) routine monitoring data are analyzed each year as part of the Houston-Galveston Area Council (H-GAC) Basin Summary/Basin Highlights Report process. Bacteria continues to be the most prevalent pollutant in the H-GAC CRP Basins (H-GAC, 2022). The Bacteria Implementation Group (BIG), formed in 2008, oversees the Total Maximum Daily Load (TMDL) Implementation Plan (I-Plan). The BIG requested that H-GAC produce a list of the water bodies with the highest bacteria concentrations in the BIG project area and conduct targeted monitoring to identify potential bacteria sources.

Houston-Galveston Area Council, using information from previous Basin Highlights/Summary Reports, BIG annual reports, and previous targeted monitoring efforts, identified and selected waterways for targeted bacteria monitoring to refine our understanding of the spatial distribution of elevated bacterial concentrations contributing to these waterways. Phase 1 of this targeted monitoring project includes an intensive desktop review of the most up to date imagery available and compilation of data from field investigations (FI) conducted in 2021. Phase 2 of this targeted monitoring project includes a FI of the entire AU conducted during dry conditions where all flowing point and non-point sources are evaluated.

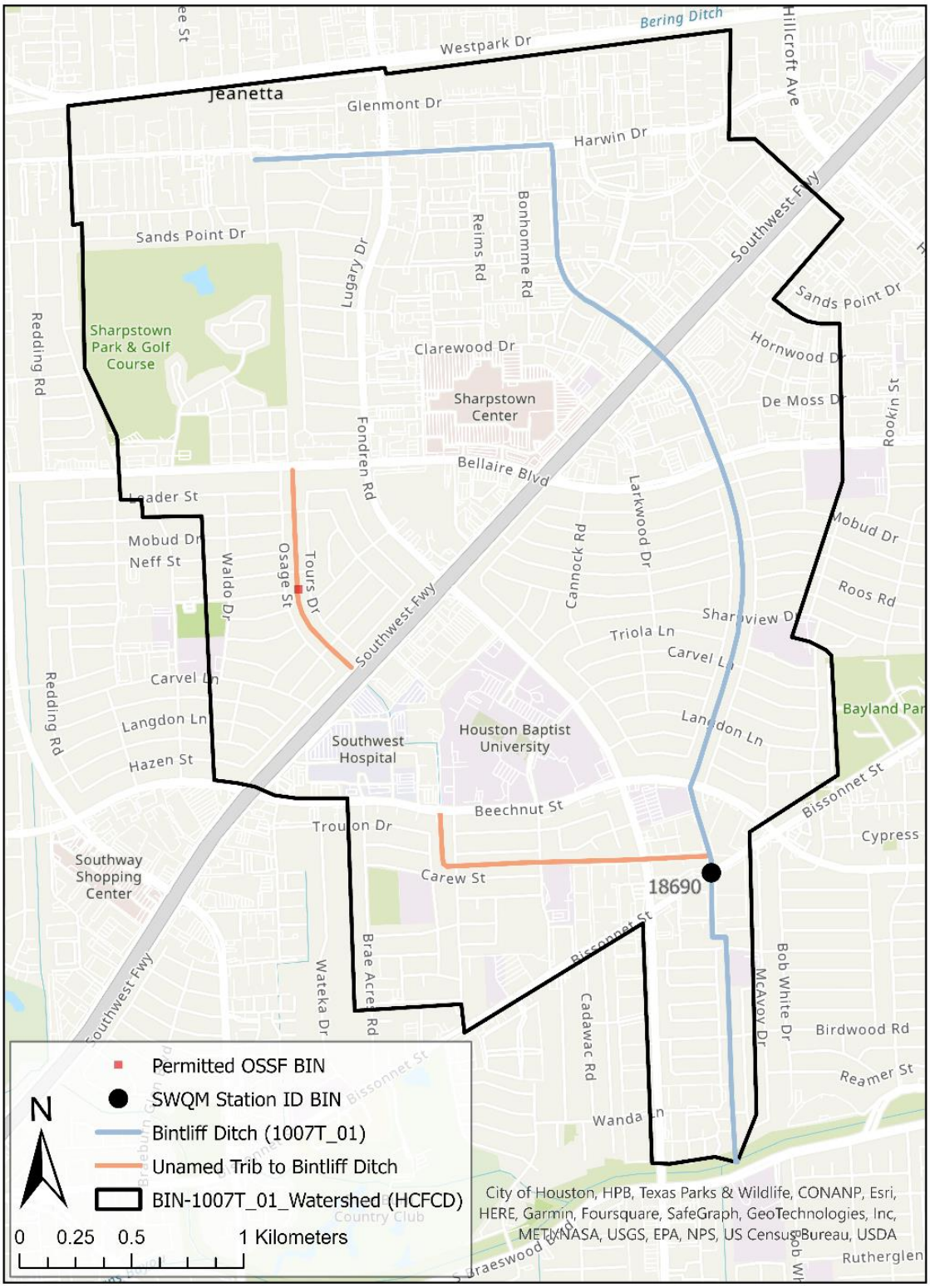

Figure 1: Watershed Map for Bintliff Ditch (Assessment Unit 1007T _01).

Desktop Review

Methods

The intensive desktop review included an evaluation of permitted discharges, outfalls, and potential sources of point and nonpoint source pollution that may contribute to bacteria loading in the AU. Using Google Earth imagery and GIS, the locations of wastewater treatment facilities, permitted on-site sewage facilities (OSSFs), and potential locations of unpermitted OSSFs were identified. If present, other potential sources such as landfills and industrial facilities were also identified. Parks were noted, as these can contribute to bacterial sources through runoff of animal wastes but also provide opportunity for contact recreation. Bridge crossings and other public entry points were identified to provide access into the stream to collect bacteriological samples. The Environmental Institute of Houston conducted this review in 2021 and AU 1007T_01 was reviewed again prior to beginning the 2023 FI.

Results

The results of the desktop review indicated that there is one unnamed tributary that runs into Bintliff Ditch via a concrete canal. The unnamed tributary runs underground under Memorial Hermann Southwest Hospital and resurfaces on the north side of Southwest Freeway. There is one documented permitted OSSF on an unnamed tributary to Bintliff Ditch. This AU runs through a highly commercial area, positioned beside multiple strip malls, residential areas, and apartment complexes potentially introducing bacteria into the water. Publicly accessible entry points into the Bintliff Ditch were identified at Fondren Road and Brays Bayou, Birdwood Road, Grape Street, Bissonnet Street, Beechnut Street, Langdon Lane, Carvel Lane, Sharpview Drive, Neff Street, and Leader Street. Publicly accessible entry points to the unnamed tributary start behind the shopping center at Bissonnet Street and Bintliff Ditch, moving west towards Fondren Road, Bonhomme Road, Braeburn Valley Drive, and finally to Beechnut Street.

Windshield Survey

Methods

Field events must take place during dry weather (after 3 or more days without significant rainfall in the watershed). This ensures that any flowing water into the segment is not stormwater. Windshield surveys (WS) of the watershed were conducted in 2021 and bacteria sampling was performed at public access points throughout the AU (primarily at bridge crossings). The survey consisted of driving the catchment area to confirm identified pollution sources found during the desktop review and to find any potential sources not identified during that review. Bridge crossings chosen for sampling were spatially distributed to provide a spatial snapshot of bacteria concentrations in the AU and identify sections of the AU where elevated bacteria concentrations were found. Those areas with elevated bacteria levels identified in the

WS monitoring were focused on during the FI of the FY20-21 study. The results from the 2021 sampling events were used to plan the 2023 FI. Therefore, a WS was not completed in 2023.

Assessment Units, sample collection and laboratory methods, and data handling practices for the 2021 study are detailed in Appendix J of the FY 2020-2021 H-GAC Multi-Basin Clean Rivers Program Quality Assurance Project Plan (H-GAC QAPP, 2020). For all WS bacteria monitoring conducted in 2021, field personnel documented the latitude and longitude of sample location. All bacteria samples were analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-Accredited laboratory.

Results

The WS was conducted on March 9, 2021 (Oakley and Lesher, 2021). At that time, it had been 8 days since the last significant rainfall in the watershed. A total of 12 samples were collected on 1007T _01 and one on a contributing tributary. Bacteria results from the ambient water samples collected during the WS ranged from 52–8660 MPN/100 mL.

Field Investigation

Methods

The following methods were conducted for the FI in 2021 and were also used for the 2023 FI. Assessment Units, collection and laboratory methods, and data handling practices for the 2023 FI are detailed in Appendix J of the FY 2022-2023 H-GAC Multi-Basin Clean Rivers Program Quality Assurance Project Plan (H-GAC QAPP, 2022). The FI was a thorough survey where a team of two either walked or paddled the entire assessment unit and sampled dry-weather flow into the segment. Water could be flowing in from a pipe, culvert, natural tributary, or earthen/concrete-lined ditch. Flowing water was categorized into two source types: permitted outfalls or unpermitted outfalls. Permitted outfalls included wastewater facilities and municipal separate storm sewer systems (MS4). Any pipe greater than 12 inches (in.) in diameter was assumed to be permitted by our field crews.

When flowing water was observed from a permitted outfall, two samples were collected. One sample was collected immediately downstream of the outfall where the flowing outfall was mixing with the ambient water. The second sample was taken upstream of the flowing outfall outside of the realm of influence from the outfall to provide the ambient bacteria levels of the assessment unit in that area. The second type of source was an unpermitted outfall, which was any other flowing source of water that was not assumed to be permitted including flowing small (<12 in. diameter) “homemade” pipes and tributaries.

When a flowing unpermitted outfall was observed, the bacteria sample was taken directly from the source. If the source was a flowing pipe, the sample was collected directly from the pipe,

before it entered the segment. If it was an open-top earthen ditch or natural tributary, the sample was collected from far enough into the inflow source that there was no mixing with the receiving water. In some cases, when no flowing permitted or unpermitted outfalls were observed in an extended section of the segment, a single ambient reference sample was taken mid-stream. Left and right bank references are oriented with the observer facing downstream.

For all FIs, the field team recorded location of the flowing outfall (latitude and longitude), the diameter, material, and water depth of the flowing outfall, and documented site conditions by taking photos and other relevant notes. All bacteria samples were collected following procedures listed in Appendix J of the FY 2022-2023 H-GAC Multi-Basin Clean Rivers Program Quality Assurance Project Plan (H-GAC QAPP, 2022)

2021 Results and Recommendations

The FI of the main stream and tributary was conducted on April 6, 2021 (nine days since last significant rainfall) and a total of 76 bacteria samples were collected. Findings from the 2021 FI indicated that there are many broken concrete and metal pipes throughout the segment and the unnamed tributary was contributing high bacteria levels into the segment. The values of the bacteria samples collected from downstream of permitted outfalls, or directly from unpermitted outfalls are illustrated in Figure 2. A total of eight referral locations with elevated *E. coli* bacteria levels measured during the FI were recommended for further investigation by the proper authorities (Oakley and Lesher 2021). Much of the segment had ambient samples with bacteria levels ≥ 24,200 MPN/100 mL making a complete assessment of this segment impossible.

Based upon the results of the 2021 FI, a subsequent FI covering the entire length of the AU and the unnamed tributary is recommended. It was recommended for a 1mL dilution to be conducted for processing 2023 samples due to the number of locations with high bacteria levels greater than the detection limit of > 24,200 MPN/100mL. This allows for a reporting window of < 100 to > 242,000 and can facilitate identifying specific areas of concern in Bintliff Ditch and the unnamed tributary.

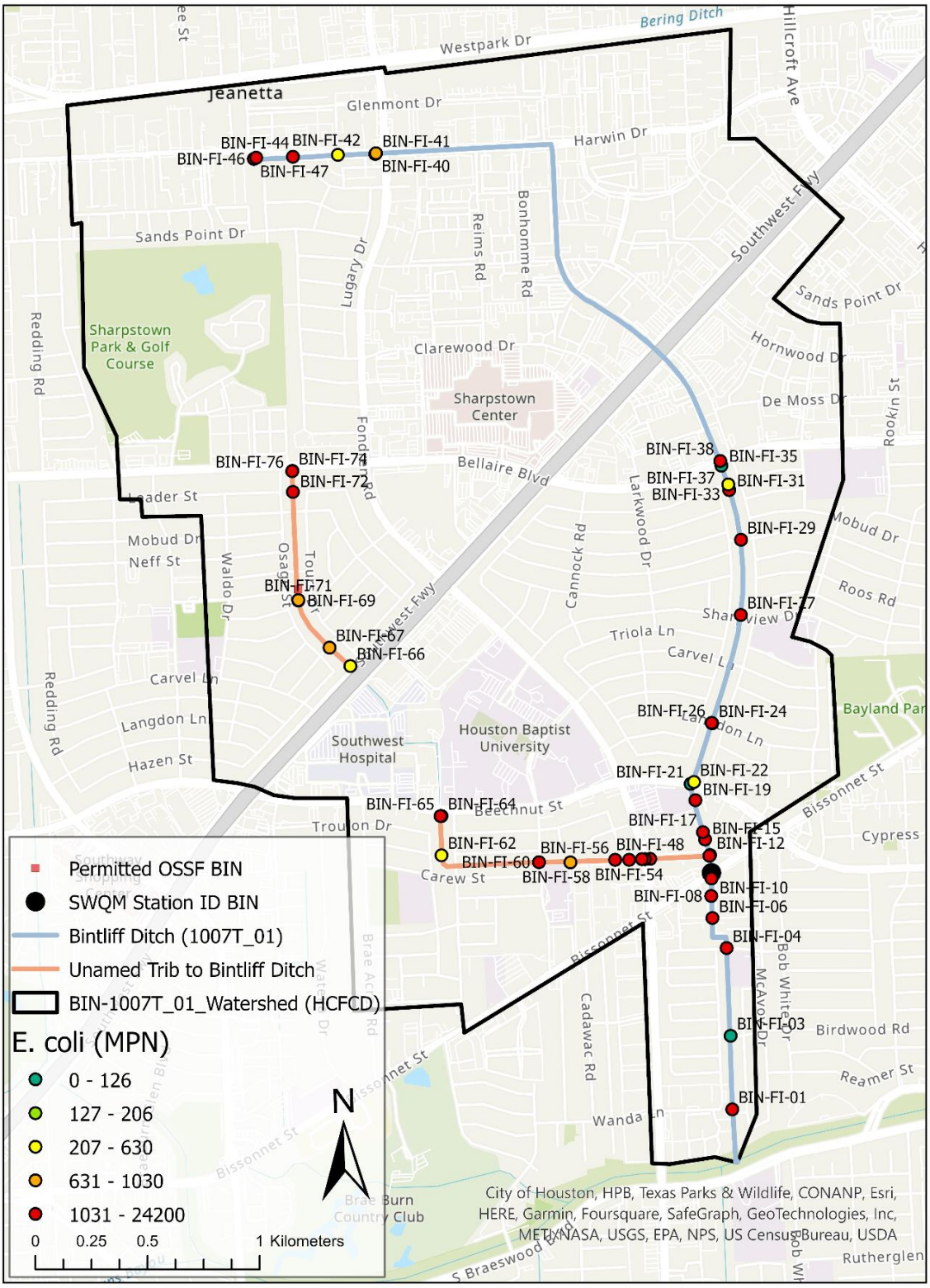

Figure 2: Field investigation bacteria sampling results from 04/06/2021 on Bintliff Ditch (AU 1007T_01).

2023 Results

The FI was conducted on April 11, 2023 (four days since last significant rainfall) and a total of 71 bacteria samples were collected. The values of the bacteria samples collected from downstream of permitted outfalls, directly from unpermitted outfalls, or as ambient samples are summarized in Table 1 and Figure 3. Based on the data collected, eight locations with elevated *E. coli* bacteria levels measured during the field investigation are recommended for high priority, and 3 locations for low priority investigation by the proper authorities. High priority sites had the highest potential bacteria loading observed and are recommended to be the areas for local authorities to focus efforts on should there be insufficient resources to address all referral sites. As time and resources allow the low priority and "investigate further" referrals also are recommended for further investigation. These locations are summarized in Table 1 (highlighted in grey) and Figure 4. In addition, three locations were flagged where ambient or upstream samples had elevated bacteria levels with no obvious explanations. Further investigation of these areas by the proper authorities are recommended. Each of these referrals are summarized by site, herein. The referrals are listed in order of priority (High, Low, then Investigate Further). Within each priority group, sites are listed from downstream to upstream.

Table 1: Field investigation bacteria results from sampling on 4/11/2023 on Bintliff Ditch (Assessment Unit 1017T_01). Referrals: N = No, Y-H = Yes – High Priority, Y-L = Yes - Low Priority, IF = Investigate Further, DS = Downstream, US = Upstream.

Sample ID	Lat	Long	DS or Direct *E. coli* Sample Results (MPN/100 mL)	US *E. coli* Sample Results (MPN/100 mL)	Difference* DS - US (MPN/100 mL)	Referral	Comments
BIN-FI2-01	29.67662	-95.50523	2,750	NA	NA	N	Ambient sample at confluence with Brays Bayou.
BIN-FI2-02-D	29.67816	-95.50527	740	1,830	-1,090	N	Weep hole mostly submerged - cloudy water coming out - right bank.
BIN-FI2-03-D	29.67870	-95.50526	5,210	1,830	3,380	Y-H	Ambient air smells of effluent. Trickle of water coming out - right bank.
BIN-FI2-04-D	29.68520	-95.50536	1,480	1,460	20	N	Trickle of water coming out - left bank.
BIN-FI2-05-D	29.68565	-95.50597	3,360	3,990	-630	N	Pipe up on concrete covered in vegetation. Distances estimated. Just a trickle coming down into ditch - right bank.
BIN-FI2-06-D	29.68645	-95.50596	4,410	7,540	-3,130	N	Diameter and distance estimated - unable to check water depth in pipe. Slow flow from pipe. - left bank.
BIN-FI2-NS-1	29.68718	-95.50594	NA	NA	NA	N	Not sampled. Slow drip from pipe.
BIN-FI2-NS-2	29.68731	-95.50596	NA	NA	NA	N	Not sampled. Slow drip from pipe.
BIN-FI2-07-D	29.68814	-95.50593	4800	4080	720	N	Lat/long not exact due to bridge interference. D: pooled water, pipe in left bank culvert; U: on other side of bridge. A sheen on water from unknown source.
BIN-FI2-08-D	29.68896	-95.50598	27,600	2,060	25,540	N	Downstream sample collected before confluence with tributary on the right bank.
BIN-FI2-09-D	29.68992	-95.50623	> 242,000	< 100	241,900	Y-H	Pipe rusted out, dripping from concrete - right bank.
BIN-FI2-10-D	29.69096	-95.50656	200	< 100	100	N	Pipe up high on concrete. Weep hole where water is flowing from on vertical concrete. Veg growing from pipe - right bank.
BIN-FI2-NS-3	29.69365	-95.50599	NA	NA	NA	N	Not sampled. Water dripping down concrete. No discernable pipe can be seen or source.

Sample ID	Lat	Long	DS or Direct *E. coli* Sample Results (MPN/100 mL)	US *E. coli* Sample Results (MPN/100 mL)	Difference* DS - US (MPN/100 mL)	Referral	Comments
BIN-FI2-11-D	29.69424	-95.50574	4,040	112,000	-107,960	N	Ambient air smells like chlorine/bleach. Pipe on left bank - significant flow.
BIN-FI2-12-D	29.69424	-95.50571	> 242,000	112,000	130,000	Y-H	Broken concrete pipe, water coming out side. Directly across from sample 11 - shares US sample w/ 11. Sudsy water; water trickling; pipe on right bank.
BIN-FI2-13-D	29.69855	-95.50421	155,000	> 242,000	-87,000	N	A fire hose is tied along concrete with one end in pipe - cannot see end of it - right bank.
BIN-FI2-14-D	29.70170	-95.50407	68,700	> 242,000	-173,300	N	Broken concrete, water going through crack - left bank.
BIN-FI2-15-D	29.70363	-95.50454	155,000	> 242,000	-87,000	IF	Weep hole on right bank – trickle.
BIN-FI2-16-D	29.70465	-95.50488	100	850	-750	N	Pipe on right bank - trickle. Segment goes underground from here.
BIN-FI2-17	29.71761	-95.52035	410	NA	NA	N	Ambient sample on upstream side of where segment re-emerges.
BIN-FI2-18-D	29.71757	-95.52207	520	100	420	Y-L	Lots of aquatic veg in ditch; left bank, US sample was not put on ice until 1535 and delivered to lab until next day, 4/12/23.
BIN-FI2-19-D	29.71757	-95.52342	630	300	330	Y-L	Pipe on left bank – flowing.
BIN-FI2-20-D	29.71758	-95.52382	630	1,340	-710	N	Pipe submerged on right bank.
BIN-FI2-21-D	29.71756	-95.52421	860	1,750	-890	N	Lots of vegetation where water enters from pipe on left bank.
BIN-FI2-22	29.71755	-95.52599	46,100	NA	NA	IF	Ambient sample taken at top of AU.
BIN-T-FI2-01	29.68893	-95.50880	5460	NA	NA	N	Ambient sample taken on DS side of bridge; sheen on water from unknown source.
BIN-T-FI2-02-D	29.68889	-95.50970	5,290	3,130	2,160	Y-H	Right bank - trickle, light brown filamentous algae.
BIN-T-FI2-03-D	29.68887	-95.51032	48,800	5,650	43,150	Y-H	Right bank - Pipe is collapsing; leaking before opening into trib. Same light brown growth.
BIN-T-FI2-04-P	29.68885	-95.51241	> 242,000	NA	NA	Y-H	Water has strong sewage odor; leaking pipe over waterway; leak flowing down left bank.

Sample ID	Lat	Long	DS or Direct *E. coli* Sample Results (MPN/100 mL)	US *E. coli* Sample Results (MPN/100 mL)	Difference* DS - US (MPN/100 mL)	Referral	Comments
BIN-T-FI2-05-D	29.68886	-95.51241	200	1,100	-900	N	Right bank - Leaking around pipe – trickle.
BIN-T-FI2-06-D	29.68887	-95.51390	520	< 100	420	Y-L	Left bank – trickle.
BIN-T-FI2-07-D	29.68928	-95.51830	< 100	< 100	0	N	Right bank – trickle.
BIN-T-FI2-08	29.69085	-95.51828	< 100	NA	NA	N	Left tunnel facing US - tunnels go underground and the main tributary reappears on NW side of Southwest Fwy. Unable to tell which tunnel is connected to main channel.
BIN-T-FI2-09	29.69089	-95.51836	200	NA	NA	N	Blue tint to water. Two tunnels that go underground and the main trib. reappears on NW side of Southwest Fwy. This tunnel is on the right (facing US). Unable to tell which tunnel is connected to main channel.
BIN-T-FI2-10	29.69694	-95.52226	2,470	NA	NA	N	Ambient sample taken on US side of underground tunnel; oil sheen on surface.
BIN-T-FI2-11-D	29.69779	-95.52319	9,090	15,200	-6,110	N	Pipe submerged - took sample within pipe - Right bank.
BIN-T-FI2-12-D	29.69972	-95.52457	> 242,000	1,580	240,420	Y-H	Left bank – trickle.
BIN-T-FI2-13-D	29.69974	-95.52460	> 242,000	1,580	240,420	Y-H	Same US sample as sample 12; pipes immediately adjacent to each other - Left bank.
BIN-T-FI2-14-D	29.70321	-95.52467	4,220	4,730	-510	N	Left bank - broken concrete around pipe.
BIN-T-FI2-15-P	29.70449	-95.52473	< 100	NA	NA	N	Weep hole on right bank – trickle.
BIN-T-FI2-16-D	29.70489	-95.52471	100	5,040	-4,940	N	Pipe on right bank.
BIN-T-FI2-17-D	29.70485	-95.52471	310	5,040	-4,730	IF	Same US sample as 16; pipes directly across from each other; pipe on left bank.

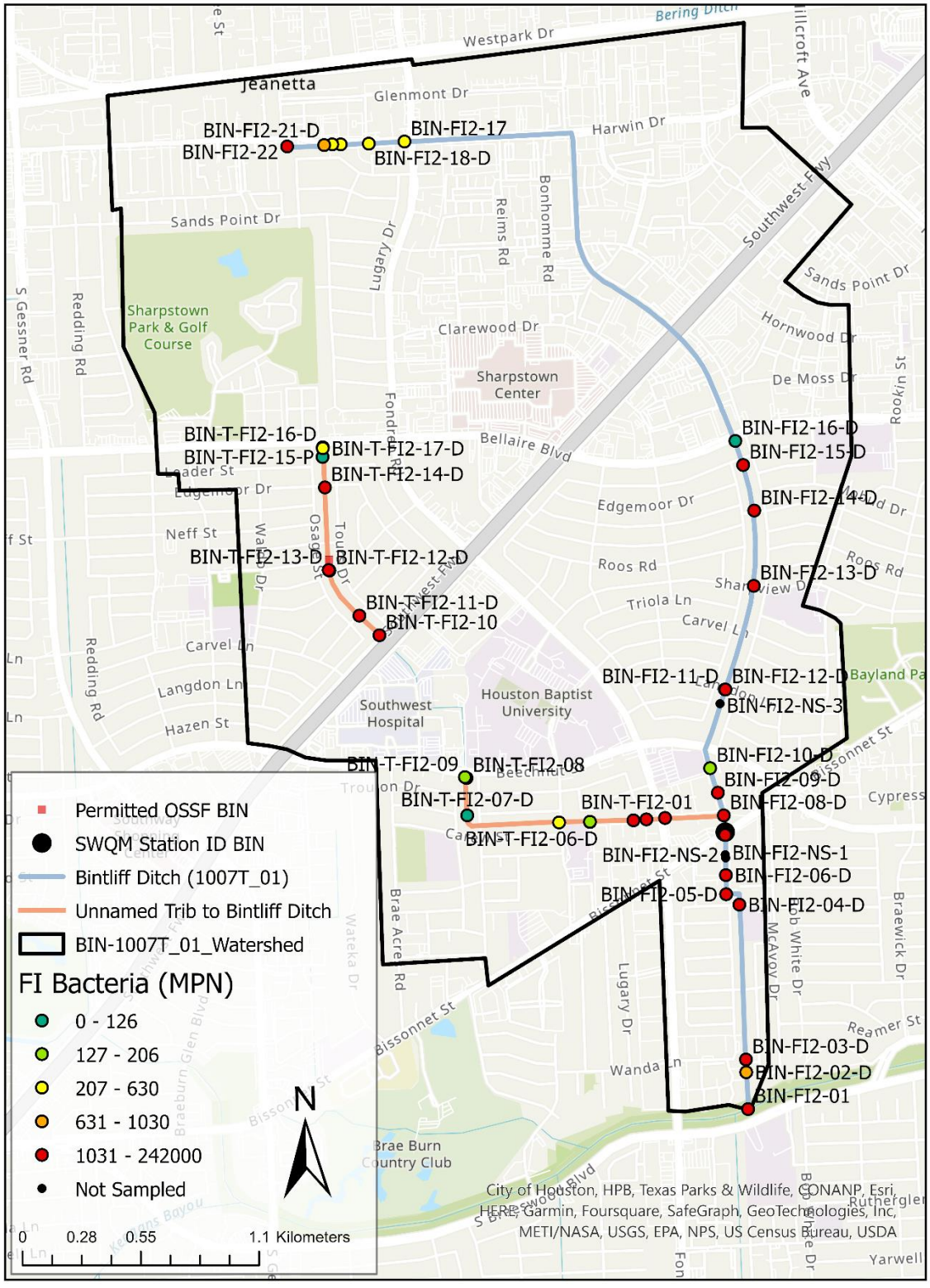

Figure 3: Field investigation bacteria sampling results from 4/11/2023 on Bintliff Ditch (Assessment Unit 1007T_01).

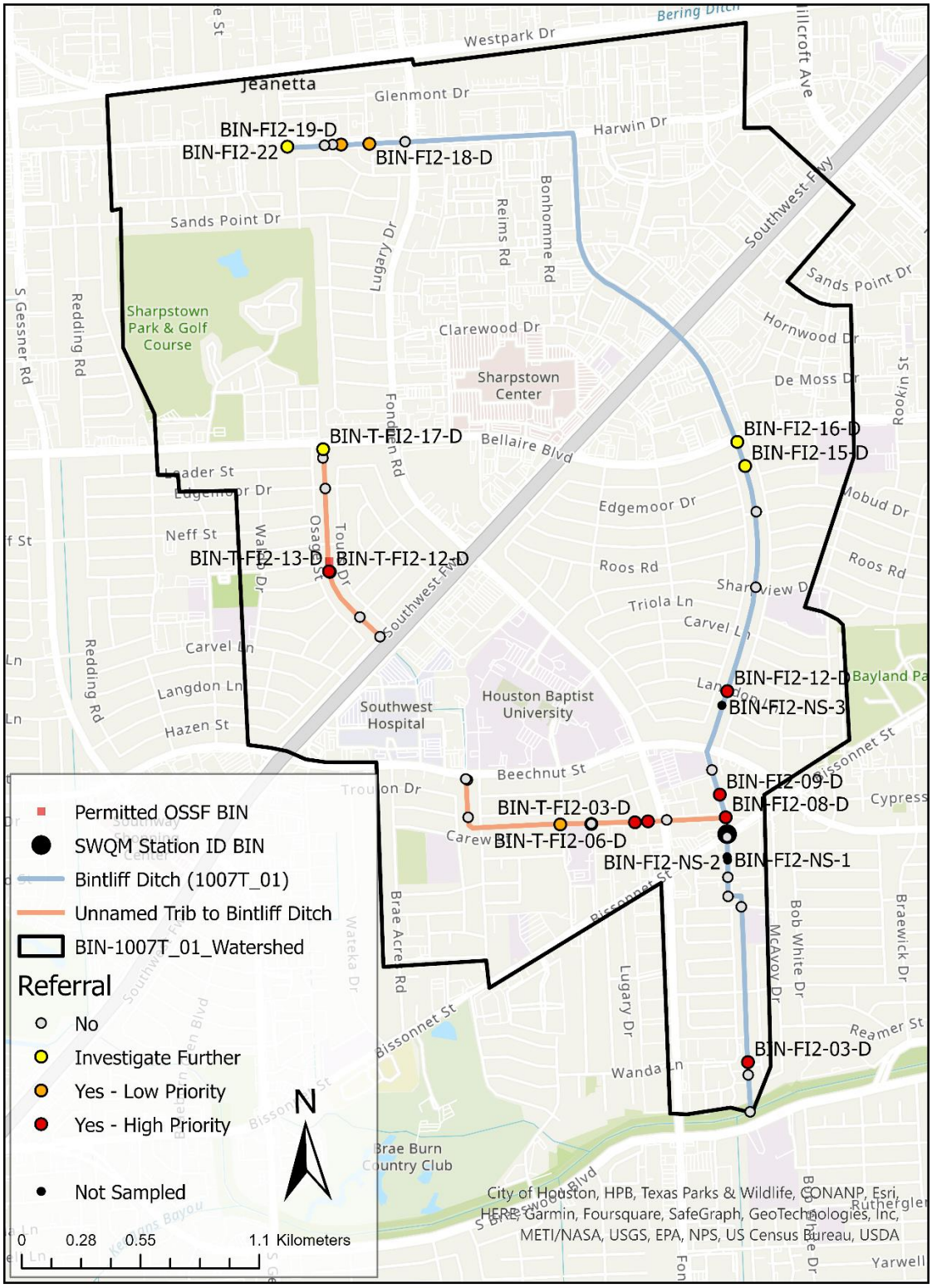

Figure 4: Field investigation sites identified for referral from 4/11/2023 to the proper authorities on Bintliff Ditch (Assessment Unit 1007T_01).

Referral site: BIN-FI2-03-D– High Priority

This is a 35 in. diameter metal pipe located on the right bank of Bintliff Ditch. Water within the pipe was 0.5 in. deep and trickling into the segment. There was a smell of effluent in the ambient air. There are apartments located in the area on the right bank. A sample taken 0.1 m downstream of the pipe had a bacteria value of 5,210 MPN/100 mL. The ambient sample collected upstream of the pipe had a bacteria value of 1,830 MPN/100 mL. This pipe is a high priority referral site for the proper local authority.

Referral site: BIN-FI2-09-D– High Priority

This is an approximately 20 in. diameter metal pipe located on the right bank of Bintliff Ditch. Water within the pipe was 0.1 in. deep and trickling into the segment. The pipe was partially collapsed and rusted through and the concrete around the pipe was broken. There are apartments located in the area on the right bank. A sample just 0.05 m downstream of the pipe had a bacteria value of > 242,000 MPN/100 mL. The ambient sample collected upstream of the pipe had a bacteria value of < 100 MPN/100 mL. This pipe is a high priority referral site for the proper local authority.

Referral site: BIN-FI2-12-D – High Priority

This is a 40 in. diameter concrete pipe located on the right bank of Bintliff Ditch. Water within the pipe was 0.1 in. deep and trickling into the segment through cracks in the cement wall. The cement pipe and the cement around the pipe was collapsed and broken. The field crew noted that the water was “sudsy”. There are single-family homes located in the area on the right bank. A sample just 0.1 m downstream of the pipe had a bacteria value of > 242,000 MPN/100 mL. The ambient sample collected upstream of the pipe had a bacteria value of 112,000 MPN/100 mL. This pipe is a high priority referral site for the proper local authority. Note: there was also a pipe located on the left bank directly across from this pipe which had significant flow and smelled like chlorine, but had a much lower downstream bacteria value of 4,040 MPN/100 mL and was not referred.

Referral site: BIN-T-FI2-02-D– High Priority

This is a 25 in. diameter metal pipe located on the right bank of the tributary to Bintliff Ditch. Water within the pipe was 0.125 in. deep and trickling into the segment. The pipe was partially collapsed and rusted through. The substrate that the water was flowing down on the cement was filamentous and light brown in color. There are apartments and commercial buildings located in the area on the right bank. A sample just 0.55 m downstream of the pipe had a bacteria value of 5,290 MPN/100 mL. The ambient sample collected upstream of the pipe had a bacteria value of 3,130 MPN/100 mL. This pipe is a high priority referral site for the proper local authority.

Referral site: BIN-T-FI2-03-D– High Priority

This is a 24 in. diameter metal pipe located on the right bank of the tributary to Bintliff Ditch. Water within the pipe was 0.125 in. deep and trickling into the segment. The pipe was rusted through and leaking behind the cement wall and a filamentous light brown substrate was observed where the water was pouring over the cement. There are apartments and commercial buildings located in the area on the right bank. A sample just 0.5 m downstream of the pipe had a bacteria value of 48,800 MPN/100 mL. The ambient sample collected upstream of the pipe had a bacteria value of 5,650 MPN/100 mL. This pipe is a high priority referral site for the proper local authority.

Referral site: BIN-T-FI2-04-P– High Priority

This is a 12 in. diameter metal pipe that crosses above the tributary to Bintliff Ditch. It was broken/leaking and flowing down the left bank (white circle in photo below). The crew noted a strong sewage odor from the water leaking from the pipe. There are single-family homes located in the area on the left bank and Sugar Grove Elementary School located on the right bank. A sample taken directly from the leaking pipe had a bacteria value of > 242,000 MPN/100 mL. This pipe is a high priority referral site for the proper local authority.

Referral site: BIN-T-FI2-12-D– High Priority

This is a 26 in. diameter cement pipe located on the left bank of the tributary to Bintliff Ditch. Water within the pipe was 0.125 in. deep and trickling into the segment. There are single-family homes located in the area on the left bank. A sample just 0.2 m downstream of the pipe had a bacteria value of > 242,000 MPN/100 mL. The ambient sample collected upstream of the pipe had a bacteria value of 1,580 MPN/10 mL. This pipe is a high priority referral site for the proper local authority. Note: the next referral site (BIN-T-FI2-13-D) is immediately upstream (approximately 1 m) of this pipe on the same bank.

Referral site: BIN-T-FI2-13-D– High Priority

This is a 26 in. diameter cement pipe located on the left bank of the tributary to Bintliff Ditch, approximately 1 m upstream of the last referral site (BIN-T-FI2-12-D). Water within the pipe was 0.125 in. deep and trickling into the segment. There are single-family homes located in the area on the left bank. A sample just 0.2m downstream of the pipe had a bacteria value of > 242,000 MPN/100 mL. The ambient sample collected upstream of the pipe had a bacteria value of 1,580 MPN/100 mL. This pipe is a high priority referral site for the proper local authority.

Referral site: BIN-FI2-18-D– Low Priority

This is a 36 in. diameter metal pipe located on the left bank of Bintliff Ditch. Water within the pipe was 0.25 in. deep and trickling into the segment through significant vegetation. There are commercial buildings located in the area on the left bank. A sample just 0.7 m downstream of the pipe had a bacteria value of 520 MPN/100 mL. The ambient sample collected upstream of the pipe had a bacteria value of 100 MPN/100 mL. This pipe is a low priority referral site for the proper local authority.

Referral site: BIN-FI2-19-D– Low Priority

This is a 21 in. diameter metal pipe located on the left bank of Bintliff Ditch. Water within the pipe was 2 in. deep and flowing into the segment over the cement wall through some vegetation. There are commercial buildings located in the area on the left bank. A sample just 1.3 m downstream of the pipe had a bacteria value of 630 MPN/100 mL. The ambient sample collected upstream of the pipe had a bacteria value of 300 MPN/100 mL. This pipe is a low priority referral site for the proper local authority.

Referral site: BIN-T-FI2-06-D– Low Priority

This is a 42 in. diameter cement pipe located on the left bank of the tributary to Bintliff Ditch. Water within the pipe was 0.5 in. deep and trickling into the segment. There are single-family homes located in the area on the left bank. A sample just 0.2 m downstream of the pipe had a bacteria value of 520 MPN/100 mL. The ambient sample collected upstream of the pipe had a bacteria value of < 100 MPN/100 mL. This pipe is a low priority referral site for the proper local authority.

Referral site: BIN-FI2-15-U – Investigate Further

This was an ambient (upstream) sample taken to accompany a sample taken at a trickling weep hole (BIN-FI2-15-D) on Bintliff Ditch. The ambient sample had a bacteria value of > 242,000 MPN/100 mL. The next upstream ambient sample taken at site BIN-FI2-16-U, just before the segment continues underground, had a bacteria value of 850 MPN/100 mL. While there were no obvious pipes flowing into the segment between these two sample points, there is a source of elevated bacteria. There are some kind of large tanks located along the left bank between these two sites as seen in the map and photo facing upstream from site BIN-FI2-15-U below. Further investigation is recommended by the proper local authority to determine the source of elevated bacteria in this small stretch of the segment.

Referral site: BIN-FI2-22 – Investigate Further

This was an ambient sample taken at the most upstream portion of the Bintliff Ditch segment before it goes underground around Osage St. A sample just downstream of the two cement pipes had a bacteria value of > 46,100 MPN/100 mL. Further investigation is recommended by the proper local authority to determine the source of elevated bacteria underground and upstream of the segment.

Referral site: BIN-T-FI2-16-U – Investigate Further

This was an ambient upstream sample which accompanied samples BIN-T-FI2-16-D and BIN-T-FI2-17-D, taken at the most upstream portion of the tributary to Bintliff Ditch before it goes underground at Bellaire Blvd. The ambient sample taken just in front of the bridge crossing had a bacteria value of 5,040 MPN/100 mL. Further investigation is recommended by the proper local authority to determine the source of elevated bacteria underground and upstream of the segment. There are apartment and single-family homes located upstream of the site as well as a golf course.

List of Acronyms and Abbreviations

AU	Assessment Unit
BIG	Bacteria Implementation Group
BIN	Bintliff Ditch 1007T_01
CRP	Clean Rivers Program
DS	Downstream
E. Coli	Escherichia coli
FI	Field Investigation
FY	Fiscal Year
GIS	Geographic Information Systems
H-GAC	Houston-Galveston Area Council
IF	Investigate Further
in.	inch
I	Implementation Plan
km	kilometer
LB	Left Bank
m	meter
mL	milliliter
MPN	Most probable number
N	No
NELAP	National Environmental Laboratory Accreditation Program
NLCD	National Land Cover Database
OSSF	On-Site Sewage Facilities
QAPP	Quality Assurance Project Plan
RB	Right Bank
SWQM	Surface Water Quality Monitoring
SWRC	Stroud Water Research Center
T or trib.	Tributary
TCEQ	Texas Commission on Environmental Quality
TMDL	Total Maximum Daily Load
US	Upstream
WS	Windshield Survey
Y-H	Yes – High Priority
Y-L	Yes-Low Priority

Literature Cited

Houston-Galveston Area Council (H-GAC). 2022. How's the Water? Basin Highlights Report. On-line resource, accessed March 21, 2023. Available from: https://www.h-gac.com/getmedia/42de64a6-36cf-4a3f-afd2-ba119322f853/How_s-the-Water_2022-FINAL-05-12-2022_1

Houston-Galveston Area Council Multi-Basin Quality Assurance Project Plan (H-GAC QAPP). 2020. Appendix J to the Houston-Galveston Area Council (H-GAC) Multi-Basin Clean Rivers Program FY 2020/2021. Targeted Monitoring in Selected Assessment Units (AUs). Houston, TX. Pp 44.

Houston-Galveston Area Council Multi-Basin Quality Assurance Project Plan (H-GAC QAPP). 2022. Appendix J to the Houston-Galveston Area Council (H-GAC) Multi-Basin Clean Rivers Program FY 2022/2023. Targeted Monitoring in Selected Assessment Units (AUs). Houston, TX. Pp 74.

Oakley, J.W. and S. Lesher. 2021. BINTLIFF DITCH (TCEQ ASSESSMENT UNIT 1007T_01) BACTERIA MONITORING REPORT. Technical Report submitted to Houston-Galveston Area Council. EIH Report, 14pp.

Stroud Water Research Center (SWRC). 2023. Model My Watershed [Software]. On-line resource, accessed March 20, 2023. Available from: https://wikiwatershed.org/

Texas Commission on Environmental Quality (TCEQ). 2012. Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods. Austin, TX. RG-415. Pp 202.

Texas Commission on Environmental Quality (TCEQ). 2022. 2022 Texas Integrated Report of Surface Water Quality for Clean Water Act Sections 305(b) and 303(d). On-line resource, accessed March 21, 2023. Available from: https://www.tceq.texas.gov/waterquality/assessment/22twqi/22txir