Amendment # 1 to the Houston-Galveston Area Council (H-GAC) Multi-Basin Clean Rivers Program FY 2020/2021 QAPP

Prepared by the H-GAC in Cooperation with the Texas Commission on Environmental Quality (TCEQ)

Effective: Immediately upon approval by all parties

Questions concerning this QAPP should be directed to:
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CRP Quality Assurance Officer
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Justification

This amendment is needed because there have been some personnel changes within some of the local partner agencies. Several of the A7.1 tables have been changed due to methodology changes or new parameter accreditations within laboratories. Plus, the Eastex Lab Chain of Custody (COC) was converted into an electronic form which all partners are now using. All information on the COC is the same, only the location of the information has changed and COC is only one-sided now.

Detail of Changes

Each proposed change is described in the table below.

Section/Figure/Table	Page	Change	Justification
A4	17	Added words 'and/or QAO' to end of third sentence in first paragraph (under Daisy James).	Making language more correct. Those types of activities are frequently coordinated with H-GAC's QAO and not H-GAC PM.
A4	17	Replace Lisa Montemayor with Nguyen Ly as the CRP QAO for HHD.	Nguyen Ly will now be the CRP QAO.
A4	17	Added words '/or' in second sentence of second paragraph (under Nguyen Ly).	Making language more correct. Those types of activities are frequently coordinated with H-GAC's QAO and not H-GAC PM.
A4	17	Replace Lisa Montemayor with Blanca Hinojosa as the Data Manager for HHD.	Blanca Hinojosa will now be the Data Manager.
A4	18	Replace Shubha Thakur with Narendra Joshi as the new Lab QA Manager, CRP QAO, and Lab Data Manager. Remove the word 'Acting'.	Shubha Thakur was promoted to Lab Director and they hired a new person to take her previous responsibilities. He is not 'Acting' but has taken on full responsibilities.
A4	20	Replace Kaitlen Gary with Ashley Morgan-Olvera as CRP QAO, CRP Field Supervisor and CRP Data Manager.	Ashley Morgan-Olvera is the new TRIES CRP QAO, Field Supervisor, and Data Manager. Per request and review of job description, the word 'Field' was removed from 'CRP ~~Field~~ QAO'.
Figure A4.1c	24	Replace Lisa Montemayor with Nguyen Ly in two places in the Organizational Chart for HHD.	Nguyen Ly is now the CRP QAO & Field Supervisor.

Section/Figure/Table	Page	Change	Justification
Figure A4.1c	24	Replace Lisa Leija with Blanca Hinojosa in one place in the Organizational Chart for HHD.	Blanca Hinojosa is now the CRP Data Manager.
Figure A4.1d	25	Replace Shubha Thakur with Narendra Joshi in in the Organizational Chart for DWO. Remove 'Acting' from the same boxes.	Narendra Joshi is now the Lab QA Manager and the CRP Lab Data Manager for DWO.
Figure A4.1e	26	Replace Shubha Thakur with Narendra Joshi in in the Organizational Chart for DWO. Remove 'Acting' from the same boxes.	Narendra Joshi is now the Lab QA Manager and the CRP Lab Data Manager for DWO.
Figure A4.1g	28	Replace Kaitlen Gary with Ashley Morgan-Olvera the Organizational Chart for TRIES.	Ashley Morgan-Olvera is the new TRIES CRP QAO, Field Supervisor, and Data Manager.
A6	31	Remove statements about Total Copper and Selenium.	SJRA has decided to stop collecting metals with The Woodlands samples.
A6	32	Insert 'and/or QAO' to three paragraphs on this page.	Better described the H-GAC process of creating amendments and planning special projects.
Table A8.1	34	Replace Kaitlen Gary with Ashley Morgan-Olvera as the CRP Designated Trainer for TRIES.	Ashley Morgan-Olvera is the new TRIES CRP QAO, Field Supervisor, and Data Manager.
Table A9.2	40	Replace ACCESS with EXCEL as the software used by HCPCS to submit data to H-GAC	Updated process.
Table B2.1a Sample Storage, Preservation and Handling Requirements of H-GAC	41	Change preservation method for total phosphorus from 'H2SO4 to pH <2' to 'Acidified at lab.'	Eastex checked with EPA and learned that HNO3 is the correct acid to use when running method 200.7 on the IC.
Table B2.1a Sample Storage, Preservation and	41	Change "Four or five" to "Three" tests in footnote 3 for table B2.1a.	Eastex requested that sample collectors change which bottle the Total Phosphorus sample is

Section/Figure/Table	Page	Change	Justification
Handling Requirements of H-GAC			taken from.
Table B2.1a Sample Storage, Preservation and Handling Requirements of H-GAC	41	Add footnote 6 below table B2.1a	Eastex checked with EPA and learned that HNO3 is the correct acid to use when running method 200.7 on the IC. Also, after the words '…in a separate bottle', added 'to a pH of <2.'
Table B2.1c Sample Storage, Preservation and Handling Requirements of HHD	42	Add parameter 'Nitrite' to table B2.1c.	HHD received accreditation for this parameter on 1/28/2020.
Table B2.1d Sample Storage, Preservation and Handling Requirements of DWO	43	Remove parameter 'Nitrate-Nitrite' from the table. Add 'Nitrite-N' to the table.	DWO was accredited for Nitrite by method EPA 300.0 on 1/1/2020.
Table B2.1e Sample Storage, Preservation and Handling Requirements for SJRA Samples Collected from Lake Conroe and Analyzed by DWO Laboratory	43/44	Replace the holding time for 'Nitrate-N' from 28 days to 48 hours	This was a typographical error that was not caught in the original Multi-Basin QAPP. Changed footnote 3 to read "…collected, specified volumes withdrawn for analysis."
Table B2.1f Sample Storage, Preservation and Handling Requirements for SJRA Samples Collected from The Woodlands and Analyzed by Eastex Environmental Laboratory	44	Change preservation method for total phosphorus from 'H_2SO_4 to pH <2' to 'Acidified at lab.'	Eastex checked with EPA and learned that HNO_3 is the correct acid to use to acidify the sample to pH <2 when running method 200.7 on the IC.
Table B2.1f	44	Remove 'Copper, Total'	SJRA dropped metals

Section/Figure/Table	Page	Change	Justification
Sample Storage, Preservation and Handling Requirements for SJRA Samples Collected from The Woodlands and Analyzed by Eastex Environmental Laboratory		and 'Selenium, Total' from table B2.1f. and associated original footnote #4.	monitoring.
Table B2.1f Sample Storage, Preservation and Handling Requirements for SJRA Samples Collected from The Woodlands and Analyzed by Eastex Environmental Laboratory	44	Re-numbered footnotes 5 & 6 to footnotes 4 & 5.	Original footnote 4 was removed from Table B2.1f. Fixed all footnote citations within the table.
Table B2.1f Sample Storage, Preservation and Handling Requirements for EIH. Samples Analyzed by Eastex Environmental Laboratory	44	"3. One 1 L plastic container is used to collect these ~~three~~four parameters."	Recounted the correct number of parameters taken from one 1-liter bottle. Should have been four instead of three.
Table B2.1f Sample Storage, Preservation and Handling Requirements for SJRA Samples Collected from The Woodlands and Analyzed by Eastex Environmental Laboratory	44	Add new footnote but numbered as 6 instead of 7 below table B2.1f '6. T. phosphorus sample taken out of TSS 1-liter and preserved at the lab with Nitric Acid (HNO_3) in separate bottle to a pH of <2.'	Eastex checked with EPA and learned that HNO_3 is the correct acid to use to acidify the sample to pH <2 when running method 200.7 on the IC.
Table B2.1g Sample Storage,	45	Change preservation method for total	Eastex checked with EPA and learned that HNO_3 is the

Section/Figure/Table	Page	Change	Justification
Preservation and Handling Requirements for EIH. Samples Analyzed by Eastex Environmental Laboratory		phosphorus from 'H_2SO_4 to pH <2' to 'Acidified at lab.'	correct acid to use to acidify the sample to pH <2 when running method 200.7 on the IC.
Table B2.1g Sample Storage, Preservation and Handling Requirements for EIH. Samples Analyzed by Eastex Environmental Laboratory	45	Add footnote 6 below table B2.1g '6. T. phosphorus sample taken out of TSS 1-liter and preserved at the lab with Nitric Acid (HNO_3) in separate bottle to a pH of <2.'	Eastex checked with EPA and learned that HNO_3 is the correct acid to use to acidify the sample to pH <2 when running method 200.7 on the IC.
Table B2.1h Sample Storage, Preservation and Handling Requirements for TRIES. Etc.	45/46	Remove 'period' at end of sentence and the words 'Requirements for TRIES' Samples Analyzed by the TRIES Laboratory and Eastex Environmental Laboratory	Clarified language.
Table B2.1h Sample Storage, Preservation and Handling Requirements for TRIES. Etc.	45/46	Replace the word 'and' in second sentence with the word 'or'. Should now read 'Samples Analyzed by the TRIES Laboratory or Eastex Environmental Laboratory	Clarified language.
Table B2.1h Sample Storage, Preservation and Handling Requirements for TRIES. Etc.	45/46	Add the words 'at the lab' after pH <2	Clarified language.
Section B2 Sample Containers	47/48	Remove bullet about 'New, certified pre-cleaned, plastic bottles…'	SJRA dropped metals monitoring.
Section B2 Processes to Prevent Contamination	47/48	Removed phrases, '; and clean sampling techniques for metals' AND 'Field QC samples for metals…has	SJRA dropped metals monitoring.

Section/Figure/Table	Page	Change	Justification
		not occurred.'	
Section B5 Quality Control; Sampling Quality Control Requirements and Acceptability Criteria	52	Remove 3 paragraphs under 'Field blank' sections. Also, removed last two sentences from first paragraph.	SJRA dropped metals monitoring.
Section B5 Quality Control; Quality Control or Acceptability Deficiencies and Corrective Actions	55	Remove two phrases in first paragraph – 'Field blanks for trace… very closely.' AND 'Equipment blanks… scrutinized very closely.'	SJRA dropped metals monitoring.
Appendix A Table A7.1c Measurement Performance Specifications for H-GAC	This should be whatever page it is in the original document.	Replace TKN methodology 'SM 4500-Norg B or C and SM 4500-NH3 C' with 'EPA 351.2'.	Eastex Environmental Laboratory was recently accredited for EPA 351.2 on 6/28/2020.
Appendix A Table A7.2b Measurement Performance Specifications for HCPCS		Replace TKN methodology 'SM 4500-Norg B or C and SM 4500-NH3 C' with 'EPA 351.2'.	Eastex Environmental Laboratory was recently accredited for EPA 351.2 on 6/28/2020.
Appendix A Table A7.3c Measurement Performance Specifications for HHD		Replace TKN methodology 'SM 4500-Norg B or C and SM 4500-NH3 C' with 'EPA 351.2'. ADD 'Nitrite Nitrogen, Total' to A7.3 table.	Eastex Environmental Laboratory was recently accredited for EPA 351.2 on 6/28/2020. HHD received accreditation for this parameter on 1/28/2020.
Appendix A Table A7.4c Measurement Performance Specifications for DWO		Add new parameter 'Nitrite Nitrogen, Total' to A7 table for DWO.	DWO was accredited for Nitrite by method EPA 300.0 on 1/1/2020.
Appendix A Table A7.4c Measurement Performance Specifications for		Replace TKN methodology 'SM 4500-Norg B or C and SM 4500-NH3 C' with 'EPA 351.2	Eastex Environmental Laboratory was accredited for method EPA 351.2 on 6/28/2020.

Section/Figure/Table	Page	Change	Justification
DWO			
Appendix A Table A7.5b Measurement Performance Specifications for SJRA-LC		Add new parameter 'Nitrite Nitrogen, Total' to A7 table for DWO.	DWO was accredited for Nitrite by method EPA 300.0 on 1/1/2020.
Appendix A Table A7.5b Measurement Performance Specifications for SJRA-LC		Replace TKN methodology 'SM 4500-Norg B or C and SM 4500-NH3 C' with 'EPA 351.2'.	Eastex Environmental Laboratory was recently accredited for EPA 351.2 on 6/28/2020.
Appendix A Table A7.6c Measurement Performance Specifications for SJRA-W		Add new field parameter: Wind Intensity (1 thru 4)	This parameter was accidentally left out of the original QAPP A7 table for SJRA-W.
Appendix A Table A7.6c Measurement Performance Specifications for SJRA-W		Add new field parameter: Water Surface (1 thru 4)	This parameter was accidentally left out of the original QAPP A7 table for SJRA-W.
Appendix A Table A7.6c Measurement Performance Specifications for SJRA-W		Replace TKN methodology 'SM 4500-Norg B or C and SM 4500-NH3 C' with 'EPA 351.2	Eastex Environmental Laboratory was recently accredited for EPA 351.2 on 6/28/2020.
Appendix A Table A7.6e Measurement Performance Specifications for SJRA-W		Delete Table A7.6e.	SJRA dropped metals monitoring.
Appendix A Table A7.7c Measurement Performance Specifications for		Replace TKN methodology 'SM 4500-Norg B or C and SM 4500-NH3 C' with 'EPA 351.2'.	Eastex Environmental Laboratory was recently accredited for EPA 351.2 on 6/28/2020.

Section/Figure/Table	Page	Change	Justification
EIH			
Appendix B		Update Table B1.1	Added 2 events of field, conventionals & bacteria to site 11490.
Appendix B		Update Table B1.1	Add 2 events of conventionals & bacteria to site 11493.
Appendix E COC forms	No page number	Replace COC for Eastex.	Eastex Environmental Laboratory remade their COC so that all information found on the back of the form is now located on the front of the form making it one-page, single sided. ONLY the Eastex COC was changed. All others are included to keep the Appendix complete and only 1 file is needed to find the most current information.

Distribution

QAPP Amendments and Revisions to Appendices will be distributed to all personnel on the distribution list maintained by the H-GAC.

These changes will be incorporated into the QAPP document and TCEQ, the H-GAC, and all local partners and subcontractors will acknowledge and accept these changes by signing this amendment.

Texas Commission on Environmental Quality

Water Quality Planning Division

Electronically Approved *8/18/2020*
Kelly Rodibaugh Date
Project Quality Assurance Specialist
Clean Rivers Program

Electronically Approved *8/14/2020*
Kyle Girten, Acting CRP Work Lead Date
Clean Rivers Program

Electronically Approved *8/18/2020*
Kelly Rodibaugh, Project Manager Date
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Electronically Approved *8/14/2020*
Cathy Anderson, Team Leader Date
Data Management and Analysis

Monitoring Division

Electronically Approved *8/17/2020*
Dana Squires Date
Lead CRP Quality Assurance Specialist
Laboratory and Quality Assurance Section

Houston-Galveston Area Council (H-GAC)

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H-GAC Project Manager		H-GAC Quality Assurance Officer	

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Electronically Approved *8/17/2020*
Bryan Kosler Date
HCPCS Field Quality Assurance Officer

Electronically Approved *8/17/2020*
Michael Cantu Date
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Electronically Approved *8/14/2020*
Ericka Jackson Date
HCPCS Quality Assurance Officer

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Electronically Approved *8/14/2020*
Daisy James Date
CRP Project Manager

Electronically Approved *8/17/2020*
Nguyen Ly Date
HHD Field Quality Assurance Officer

Electronically Approved *8/14/2020*
Roger Sealy Date
HHD BLS Lab Manager

Electronically Approved *8/14/2020*
Kimyattia Smith Date
HHD BLS Lab Quality Assurance Officer

City of Houston, Drinking Water Operations (DWO)

Electronically Approved *8/17/2020*
Shubha Thakur Date
CRP Project Manager & DWO Laboratory Director

Electronically Approved *8/18/2020*
Harold Longbaugh Date
DWO Laboratory Manager

Electronically Approved *8/14/2020*
Narendara Joshi Date
DWO Laboratory Quality Assurance Officer

Electronically Approved *8/17/2020*
Desta Takie Date
DWO Field Quality Assurance Officer

San Jacinto River Authority (SJRA)

David Sidney for Shane Simpson
Electronically Approved 8/17/2020
Shane Simpson Date
SJRA CRP Project Manager and
Field Quality Assurance Officer

Environmental Institute of Houston, University of Houston – Clear Lake (EIH)

Electronically Approved *8/14/2020*
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Texas Research Institute for Environmental Studies (TRIES)

Electronically Approved 8/17/2020
Dr. Chad Hargrave Date
TRIES CRP Project Manager

Electronically Approved 8/14/2020
Ashley Morgan-Olvera Date
TRIES CRP Quality Assurance Officer

Electronically Approved 8/14/2020
Dr. Rachelle Smith Date
TRIES Laboratory Manager & Quality Assurance Officer

Eastex Environmental Laboratory, Inc. (Coldspring, TX)

Electronically Approved *8/14/2020*
Natalia Bondar Date
Eastex Lab Technical Director

Electronically Approved *8/14/2020*
Tiffany Guerrero Date
Eastex Lab Quality Assurance Officer

City of Houston – Houston Health Department (HHD)

Daisy James
CRP Project Manager
Responsible for conducting routine monitoring in support of the QAPP. Responsible for implementing and monitoring CRP requirements in QAPPs and QAPP amendments and appendices. Coordinates basin planning activities with the H-GAC Project Manager and/or QAO. Ensures H-GAC Quality Assurance Officer is notified of deficiencies and corrective actions, and that issues are resolved

~~*Lisa Montemayor*~~ *Nguyen Ly*
CRP QAO
Responsible for coordinating the implementation of the QA program and for coordinating with the H-GAC QA staff to resolve QA-related issues. Notifies the CRP Project Manager and/or H-GAC QA staff of circumstances which may adversely affect the quality of data. Coordinates and monitors deficiencies and corrective actions. Coordinates the research and review of technical QA material and data related to water quality monitoring system design and analytical techniques. Ensures that field staff is properly trained and that training records are maintained.

~~*Lisa Leija*~~ *Blanca Hinojosa*
CRP Data Manager
Responsible for ensuring that field data are properly reviewed and verified. Formats and delivers data in in the format described in the most recent version of the DMRG to the H-GAC CRP Data Manager. Responsible for sending hard copies of field data sheets and COC forms to H-GAC CRP Data Manager.

City of Houston – Houston Health Department – Bureau of Laboratory Services (HHD-BLS)

Roger Sealy
HHD-BLS Lab Manager
Responsible for overall performance, administration, and reporting of analyses performed by HHD-BLS. Responsible for supervision of laboratory personnel involved in generating analytical data for the project. Ensures that laboratory personnel have adequate training and a thorough knowledge of this QAPP and related SOPs. Communicates QA issues to HHD CRP QAO, HHD CRP Data Manager, and HGAC staff. Responsible for oversight of all laboratory operations ensuring that all QA/QC requirements are met, documentation is complete and adequately maintained, and results are reported accurately. Responsible party for ensuring that laboratory staff are trained and that training records are maintained. Additionally, the lab manager will review and verify all laboratory data for integrity and continuity, reasonableness and conformance to project requirements, and will confirm data is validated against the data quality objectives listed in Appendix A of this QAPP. Provides a final review of lab data against Appendix A of this QAPP, NELAC standards and method requirements prior to submission to HGAC.

Kimyattia Smith
HHS-BLS Lab Quality Assurance Officer
Responsible for the overall quality control and quality assurance of analyses performed by HHD-BLS. Monitors the implementation of the QM/QAPP within the laboratory to ensure complete compliance with QA data quality objectives, as defined by the QAPP. Conducts in-house audits to ensure compliance with written SOPs and to identify potential problems. Responsible for supervising and verifying all aspects of the QA/QC in the laboratory. Coordinates and monitors deficiencies and corrective actions. Validates data against the quality objectives listed in Appendix A of this QAPP.

City of Houston – Drinking Water Operations (DWO)

Shubha Thakur
CRP Project Manager / Laboratory Director
Responsible for implementing and monitoring CRP requirements in contracts, QAPPs and QAPP amendments and appendices. Coordinates basin planning activities and work of basin partners. Ensures monitoring systems audits are conducted to ensure QAPPs are followed by City of Houston Drinking Water Operations Laboratory, participants and that projects are producing data of known quality. Ensures CRP project managers and /or QA Specialists are notified of deficiencies and corrective actions, and that issues are resolved.

Harold Longbaugh
Laboratory Manager
Responsible overall performance, administration and reporting of analyses by City of Houston Drinking Water Operations Laboratory. Responsible for supervision of laboratory personnel involved in generating analytical data for the project. Ensures that laboratory personnel have adequate training and a thorough knowledge of this QAPP and related SOPs. Responsible for oversight of all laboratory operations ensuring that all QA/QC requirements are met, documentation is complete and adequately maintained, and results are reported accurately. Responsible for reviewing & validating field data submitted on COCs & laboratory data against raw data entered in BTLIMS.

~~*Shubha Thakur*~~ *Narendra Joshi*
'~~Acting'~~ Lab QA Manager / '~~Acting'~~ CRP QAO / '~~Acting'~~ Lab Data Manager
Responsible for overall quality control and quality assurance of analyses performed by City of Houston Drinking Water Operations Laboratory. Monitors the implementation of the QM/QAPP within the laboratory to ensure complete compliance with QA data quality objectives, as defined by the QAPP. Conducts in-house audits to ensure compliance with written SOPs and to identify potential problems. Responsible for supervising and verifying all aspects of the QA/QC in the laboratory. Responsible for training and keeping record of lab personnel to produce quality analytical data. Communicates any QA issues with laboratory manager and laboratory director. Responsible for coordinating and monitoring deficiencies and corrective actions. Responsible for coordinating with the TCEQ QAS to resolve QA-related issues. Notifies the City of Houston Drinking Water Operations Project Manager and laboratory manager of particular circumstances which may adversely affect the quality of data. Responsible for reviewing at least 10% of laboratory data against raw data entered in BTLIMS. Coordinates and maintain records of data verification and validation. Responsible for sending analytical data with required QA/QC and Data Review Checklist to HGAC CRP Data Manager.

Desta Takie
Field Supervisor / CRP Field QAO / CRP Field Data Manager
Responsible for supervising the collection, preservation, handling and delivery of samples. Responsible for ensuring that field measurements, sample custody, and documentation follow procedures described in the this QAPP. Notifies the DWO Lab QAO of particular circumstances which may adversely affect the quality of data. Responsible for verifying and validating data files against measurement performance specifications and other requirements in the QAPP. Formats and delivers field data in the format described in the most recent revision of the DMRG to H-GAC CRP Data Manager. Submits hard copies of field sheets, chain-of custody reports and Data Review Checklist to HGAC CRP Data Manager. Trains all field monitoring personnel and maintains training records.

Texas Research Institute for Environmental Studies (TRIES)

Dr. Chad Hargrave
CRP Project Manager
Responsible for conducting routine monitoring in support of this QAPP. Responsible for implementing and monitoring CRP requirements in QAPPs, and QAPP amendments and appendices. Coordinates basin planning activities with the H-GAC. Ensures H-GAC CRP project manager and/or QAO are notified of deficiencies and corrective actions, and that issues are resolved.

~~*Kaitlen Gary*~~ *Ashley Morgan-Olvera*
CRP ~~Field~~ QAO / CRP Field Supervisor / CRP Data Manager
Responsible for supervising the collection, preservation, handling and delivery of samples. Responsible for ensuring that field measurements, sample custody, and documentation follow procedures described in this QAPP. Notifies the H-GAC QAO of particular circumstances which may adversely affect the quality of data. Responsible for verifying and validating field and laboratory data against measurement performance specifications and other requirements in this QAPP. Formats and delivers data in the format described in the DMRG, most recent version, to H-GAC CRP Data Manager. Trains all field monitoring personnel and maintains training records.

Dr. Rachelle Smith
CRP Lab Manager / Lab QAO
Responsible for the overall quality control and quality assurance of analyses performed by TRIES Lab. Monitors the implementation of the QM/QAPP within the laboratory to ensure complete compliance with QA data quality objectives, as defined by this QAPP. Coordinates and monitors deficiencies and corrective actions. Conducts in-house audits to ensure compliance with written SOPs and to identify potential problems. Responsible for supervising and verifying all aspects of the QA/QC in the laboratory.

Figure A4.1c. The City of Houston, Health Department (HHD) CRP Organizational Chart.

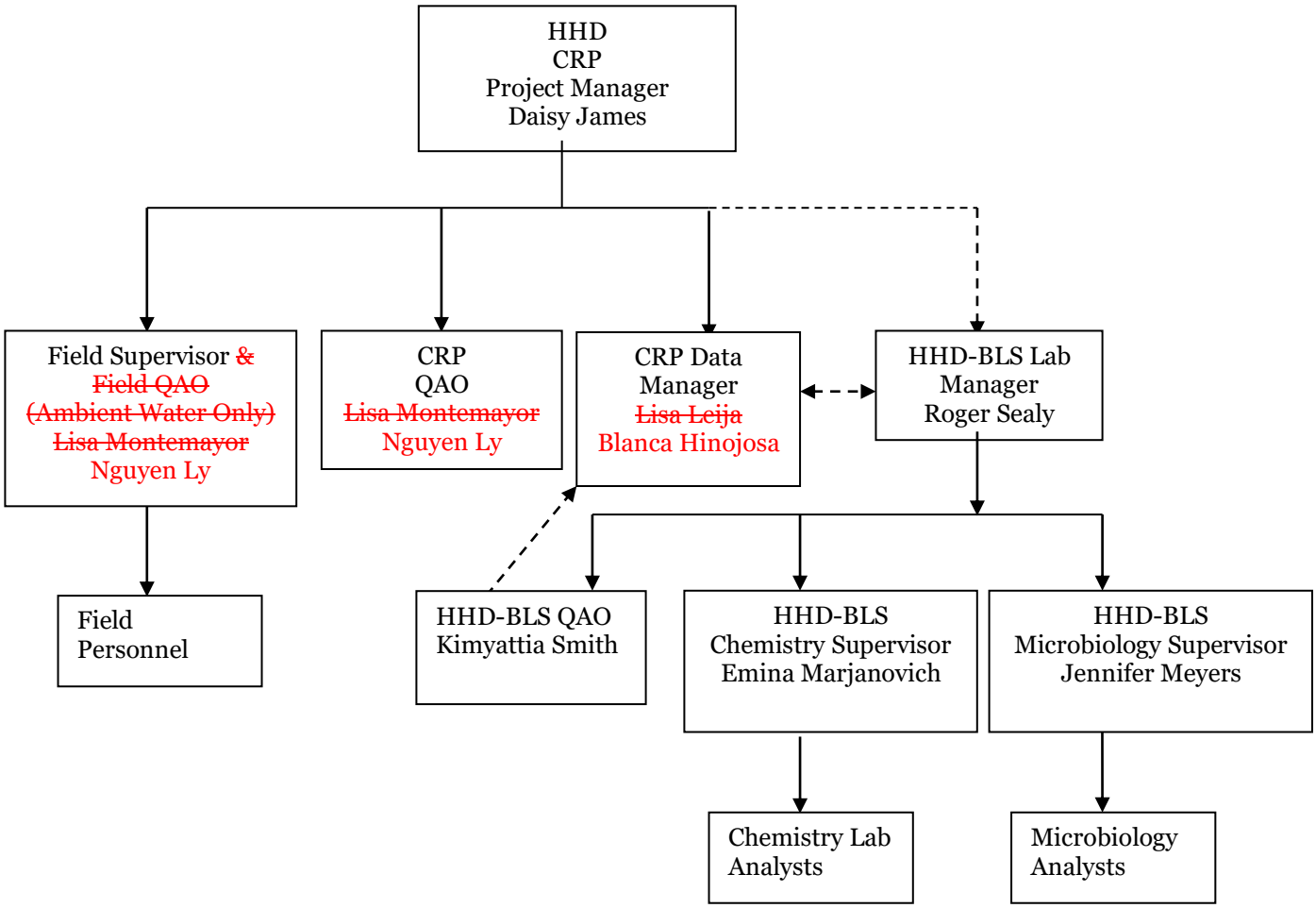


Figure A4.1d. The City of Houston, Drinking Water Operations (DWO) CRP Organizational Chart.

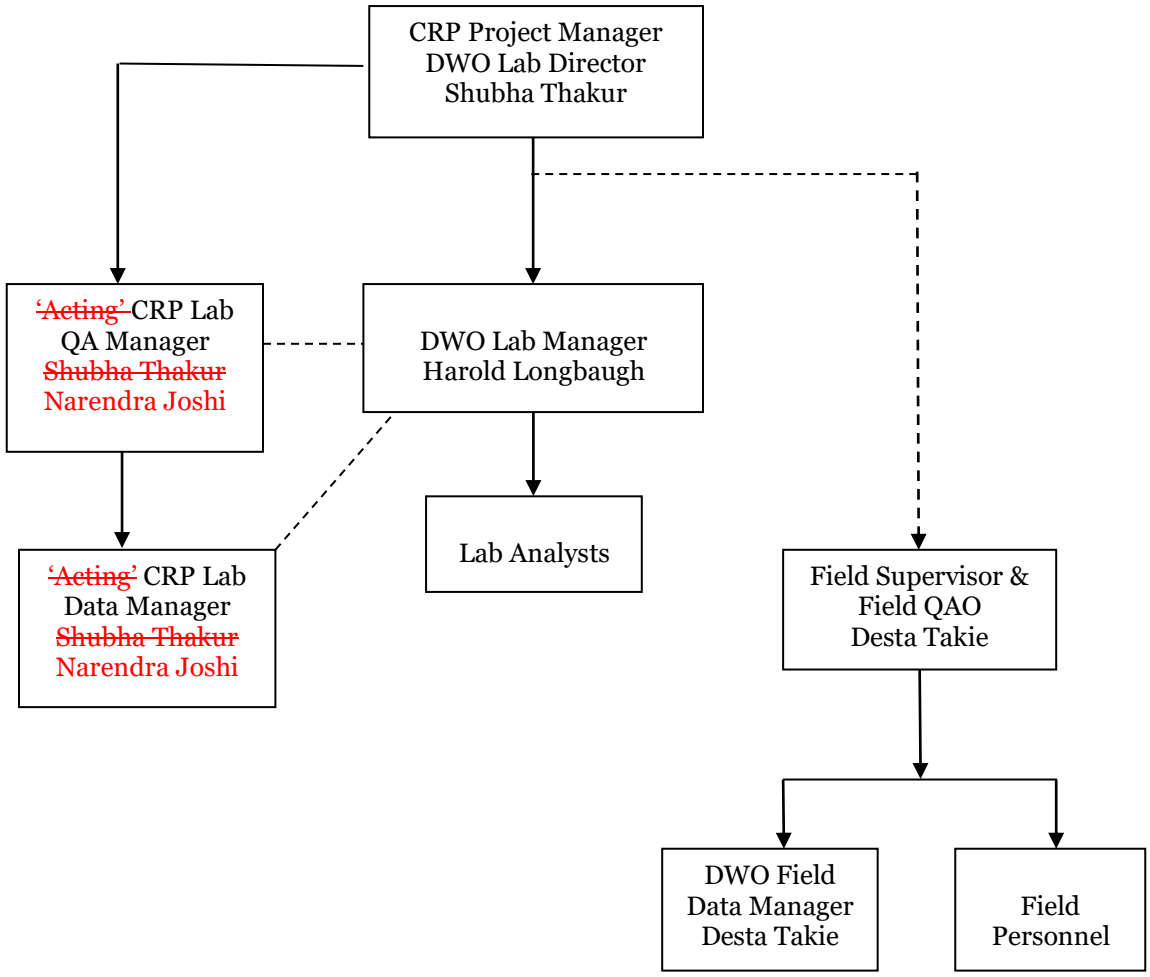


Figure A4.1e. San Jacinto River Authority (SJRA) CRP Organizational Chart.

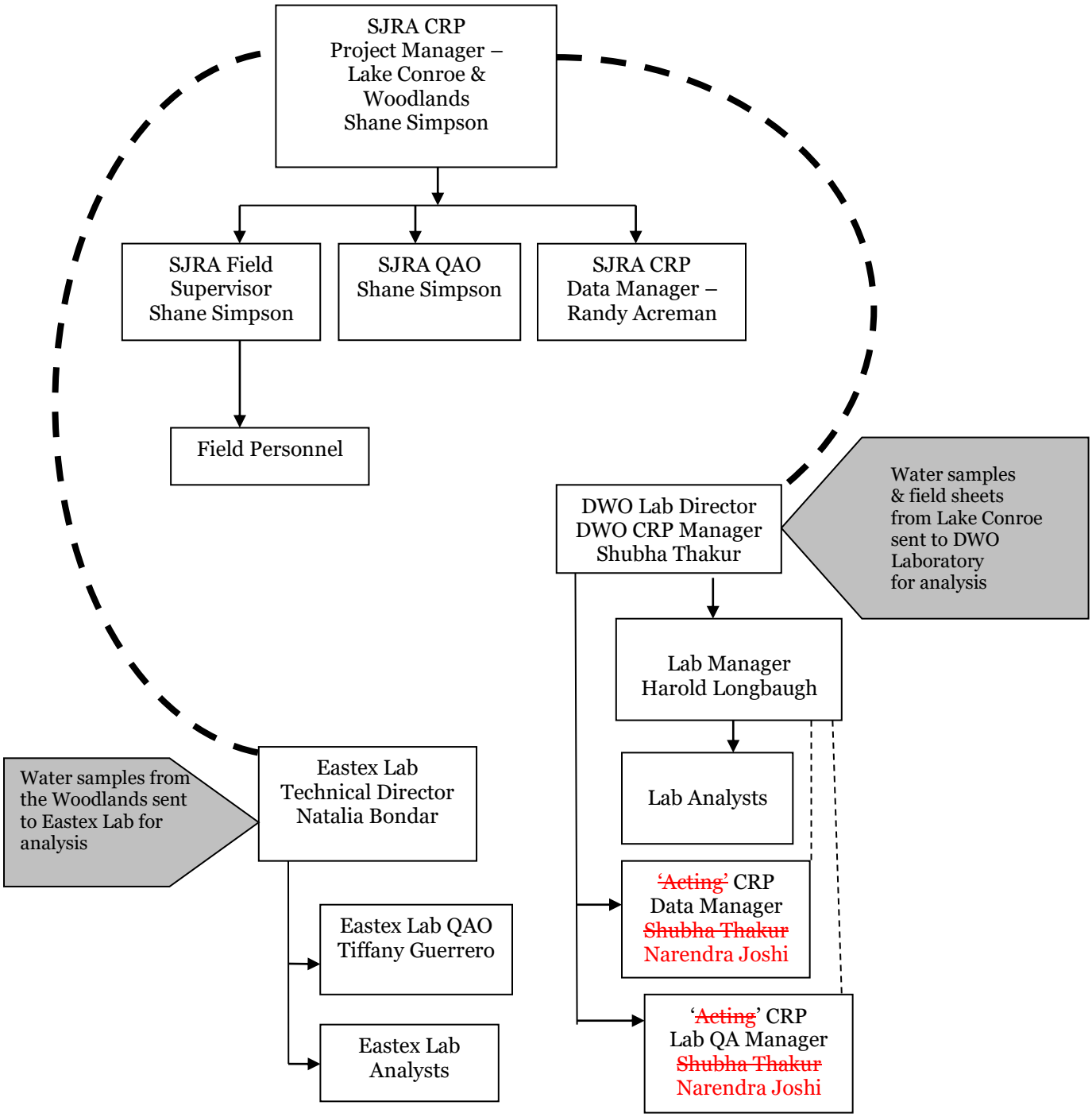
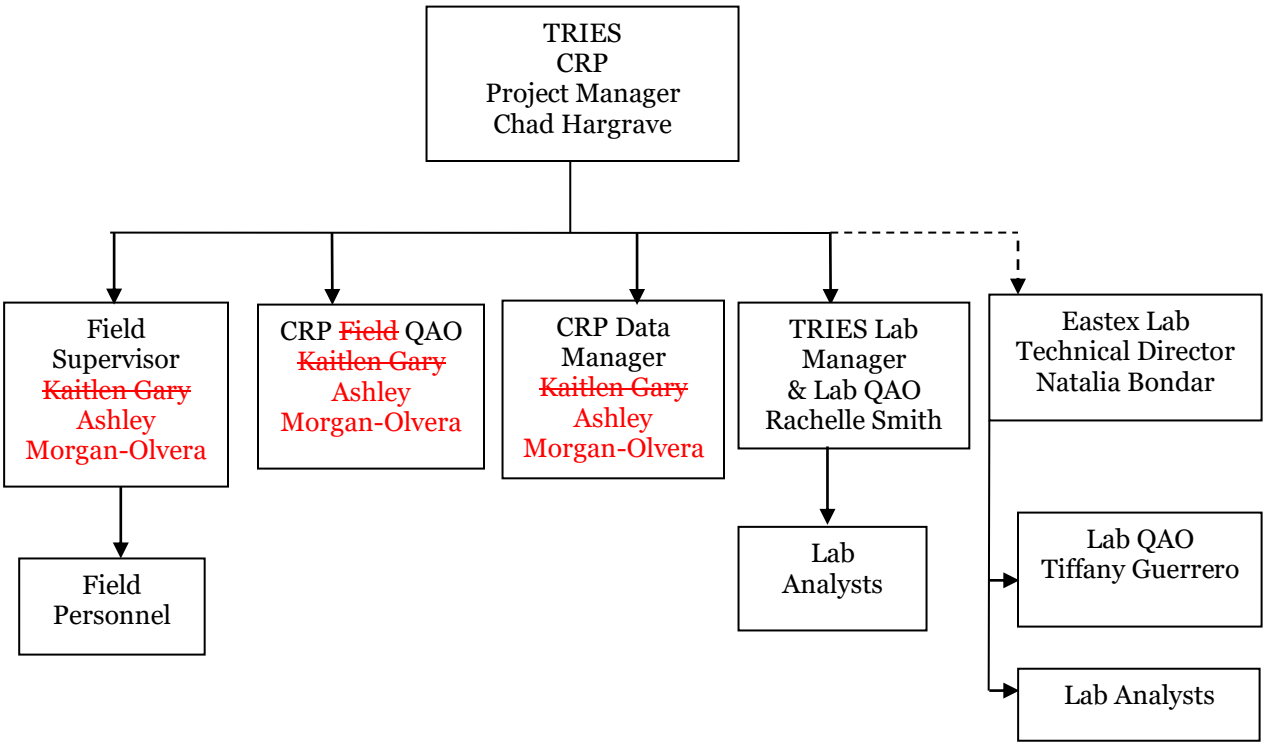


Figure A4.1g. Texas Research Institute for Environmental Studies (TRIES) CRP Organizational Chart.



information for Lake Woodlands, Panther Branch and Bear Branch – tributaries of Spring Creek. That data is also shared with the Clean Rivers Program as detailed in this QAPP. Field parameters are monitored monthly while conventional, flow, and bacteriological parameters are analyzed quarterly. ~~Total Copper and Selenium in water samples are collected and analyzed twice a year to look for changes in the concentrations of these metals in the water body over time.~~ Data is submitted to H-GAC on a quarterly basis.

Environmental Institute of Houston is contracted by H-GAC to monitor surface water quality locations in the San Jacinto-Brazos Coastal Basin, the Brazos-Colorado Coastal Basin, Trinity-San Jacinto Coastal Basin, and the Bays and Estuaries (Basin 24). Data is collected for the Clean Rivers Program on a quarterly basis for a total of four events at each site per year.

The **Texas Research Institute for Environmental Studies** is contracted by H-GAC to monitor ambient surface water quality on the Upper East Fork San Jacinto River and Winters Bayou watersheds. Data collected at these sites will supplement data currently collected in this watershed at four active CRP monitoring stations, all of which were previously established by H-GAC and the City of Houston Drinking Water Operations.

Routine monitoring is scheduled at varying frequencies, which are determined by the parameters of concern for individual streams. Water bodies are also selected for baseline monitoring if there is high public interest; if it has a high potential for impairment; or there is a need for continuous up-to-date water quality information. Frequencies vary from quarterly for some partners and parameters to monthly in more highly impacted areas (see coordinated monitoring schedule in Appendix B).

Data collected through routine monitoring is designed to characterize water quality trends and monitor progress in protecting and restoring water quality. This monitoring will provide an overall view of water quality throughout the river and coastal basins. Baseline monitoring will include the collection of basic field parameters at all sites and the collection of bacteria, flow, and conventional chemical parameters at sites where indicated. All monitoring procedures and methods will follow the guidelines prescribed in H-GAC QAPP and the most current versions of TCEQ's *Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).*

24-Hour Dissolved Oxygen (DO) monitoring by the Houston-Galveston Area Council and the Environmental Institute of Houston.
Numerous segments and unclassified waterbodies in H-GAC region have dissolved oxygen (DO) impairments or concerns for depressed DO. Using the most recent Texas Integrated Report, H-GAC identified segments and/or unclassified waterbodies which have been listed in the 303(d) List as being impaired or having DO concerns. Additional data is needed to confirm DO impairments on these segments and/or unclassified waterbodies. All data collected and summarized will be submitted to the TCEQ. H-GAC and/or EIH will conduct 24-hour DO monitoring at up to four monitoring sites quarterly during the two-year contract period. Monitoring events will be planned and conducted according to the most current version of TCEQ's *Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).*

The sites are located on segments/unclassified segments:

- Site 21965 – (1010C) – Spring Branch at Shakey Hollow west of Woodbranch Village in Montgomery County
- Site 11490 – (1110_01) – Oyster Creek at Hwy 35 west of Angleton in Brazoria County
- Site 11493 – (1110_03) – Oyster Creek at FM 1462 west of Rosharon in Brazoria County

Permit Support monitoring by the Houston-Galveston Area Council (H-GAC) and the Environmental Institute of Houston (EIH).
During FY2020, H-GAC and EIH will collect field parameters and discharge measurements at three stations in segment 1004 - the West Fork San Jacinto River, and three stations in segment 1110 – Oyster Creek Above Tidal. At least ten monitoring events will be conducted at each station with a goal of collecting 12 events at each location.

- Site 11181 – (1004D – Crystal Creek at FM 1314 southeast of Conroe
- Site 11243 – (1004) – West Fork San Jacinto River immediately upstream of SH 242
- Site 16626 – (1004E) – Stewarts Creek 175 meters downstream of SH Loop 336 southeast of Conroe
- Site 11491 – (1110_02) – Oyster Creek at Sims Road (CR 30) at Holiday Lakes in Brazoria County

- Site 11493 – (1110_03) – Oyster Creek at FM 1462 west of Rosharon in Brazoria County

See Appendix B for the project-related work plan tasks and schedule of deliverables for a description of work defined in this QAPP.

See Appendix B for sampling design and monitoring pertaining to this QAPP.

Amendments to the QAPP

Revisions to the QAPP may be necessary to address incorrectly documented information or to reflect changes in project organization, tasks, schedules, objectives, and methods. Requests for amendments will be directed from the H-GAC Project Manager and/or QAO to the CRP Project Manager electronically. The H-GAC will submit a completed QAPP Amendment document, including a justification of the amendment, a table of changes, and all pages, sections, and attachments affected by the amendment. Amendments are effective immediately upon approval by the H-GAC Project Manager, the H-GAC QAO, the CRP Project Manager, the CRP Lead QA Specialist, the TCEQ QA Manager or designee, the CRP Project QA Specialist, and additional parties affected by the amendment. Amendments are not retroactive. No work shall be implemented without an approved QAPP or amendment prior to the start of work. Any activities under this contract that commence prior to the approval of the governing QA document constitute a deficiency and are subject to corrective action as described in section C1 of this QAPP. Any deviation or deficiency from this QAPP which occurs after the execution of this QAPP will be addressed through a Corrective Action Plan (CAP). An Amendment may be a component of a CAP to prevent future recurrence of a deviation.

Amendments will be incorporated into the QAPP by way of attachment and distributed to personnel on the distribution list by the H-GAC Project Manager or designee. If adherence letters are required, the H-GAC will secure an adherence letter from each sub-tier project participant (e.g., subcontractors, sub-participant, or other units of government) affected by the amendment stating the organization's awareness of and commitment to requirements contained in each amendment to the QAPP. The H-GAC will maintain this documentation as part of the project's QA records, and ensure that the documentation is available for review.

Special Project Appendices

Projects requiring QAPP appendices will be planned in consultation with the H-GAC PM and/or QAO and the TCEQ Project Manager and TCEQ technical staff. Appendices will be written in an abbreviated format and will reference the Multi-Basin QAPP where appropriate. Appendices will be approved by the H-GAC Project Manager, the H-GAC QAO, the Laboratory (as applicable), and the CRP Project Manager, the CRP Project QA Specialist, the CRP Lead QA Specialist and additional parties affected by the Appendix, as appropriate. Copies of approved QAPP appendices will be distributed by the H-GAC to project participants before data collection activities commence. H-GAC will secure written documentation from each sub-tier project participant (e.g., subcontractors, subparticipants, other units of government) stating the organization's awareness of and commitment to requirements contained in each special project appendix to the QAPP. The H-GAC will maintain this documentation as part of the project's QA records, and ensure that the documentation is available for review.

A7 Quality Objectives and Criteria

The purpose of routine water quality monitoring is to collect surface water quality data that can be used to characterize water quality conditions, identify significant long-term water quality trends, support water quality standards development, support the permitting process, and conduct water quality assessments in accordance with TCEQ's Guidance for Assessing and Reporting Surface Water Quality in Texas, June 2015 or most recent version (https://www.tceq.texas.gov/assets/public/waterquality/swqm/assess/14txir/2014_guidance.pdf). These water quality data, and data collected by other organizations (e.g., United States Geological Survey (USGS), TCEQ, etc.), will be subsequently reconciled for use and assessed by the TCEQ.

The measurement performance specifications to support the project purpose for a minimum data set are specified in Appendix A.

period (March 15- October 15). Although data may be collected during varying regimes of weather and flow, the data sets will not be biased toward unusual conditions of flow, runoff, or season. The goal for meeting maximum representation of the water body will be tempered by funding availability.

Comparability

Confidence in the comparability of routine data sets for this project and for water quality assessments is based on the commitment of project staff to use only approved sampling and analysis methods and QA/QC protocols in accordance with quality system requirements as described in this QAPP and in TCEQ guidance. Comparability is also guaranteed by reporting data in standard units, by using accepted rules for rounding figures, and by reporting data in a standard format as specified in the Data Management Plan in Section B10.

Completeness

The completeness of the data describes how much of the data are available for use compared to the total potential data. Ideally, 100% of the data should be available. However, the possibility of unavailable data due to accidents, insufficient sample volume, broken or lost samples, etc. is to be expected. Therefore, it will be a general goal of the project(s) that 90% data completion is achieved.

A8 Special Training/Certification

Before new field personnel independently conduct field work, the local partner designated trainer (See table A8.1 below) trains him/her in proper instrument calibration, field sampling techniques, and field analysis procedures. The QA officer (or designee) will document the successful field demonstration. The QA Officer (or designee) will retain documentation of training and the successful field demonstration in the employee's personnel file (or other designated location) and ensure that the documentation will be available during monitoring systems audits.

Local partners, contractors and subcontractors must ensure that laboratories analyzing samples under this QAPP meet the requirements contained in The NELAC Institute Standard (2009) Volume 1, Module 2, Section 4.5.5 (concerning Subcontracting of Environmental Tests).

Table A8.1 The Designated Trainer for each Local Partner.

Local Partner Agency	Designated Trainer
Houston-Galveston Area Council	Jean Wright
Harris County Pollution Control Services	Bryan Kosler
City of Houston – Houston Health Department	Lisa Montemayor
City of Houston – Drinking Water Operations	Desta Takie
San Jacinto River Authority	Jean Wright
Environmental Institute of Houston	Jenny Oakley
Texas Research Institute for Environmental Studies	~~Kaitlen Gary~~ Ashley Morgan-Olvera

A9 Documents and Records

The documents and records that describe, specify, report, or certify activities are listed. The list below is limited to documents and records that may be requested for review during a monitoring systems audit.

The data manager reformats the data to create an input dataset for SAS processing and saves it in a separate folder as a "working" file. Unaltered copies of submitted data are retained in the raw data folder. Partner-specific SAS code has been written to create Access tables for review; identify outliers and possible errors, and automate the correction, deletion, or acceptance of suspect data values; and to create properly formatted text files to be submitted to TCEQ. Many tasks previously performed manually are now performed as part of SAS processing and additional improvements to the data management process are made on an ongoing basis. While many data validation and verification tasks are now part of routine processing, data sets are still reviewed manually by H-GAC's QAO to identify issues not found during routine processing. The data processing, verification, and review process is described in H-GAC's Data Management Procedures (Appendix H).

The following table outlines how data is received from each local partner or sub-tier participant. All local partner data is submitted with a Data Review Checklist. The Checklist includes specific information regarding each data set. As H-GAC performs data processing and management tasks, the Data Manager compiles a Data Summary report (see example in Appendix G) that is submitted with the Event/Results text files. The Data Summary Report/Sheet will include information from the local partner Data Review Checklists as well as information about any changes to or deletions of data by H-GAC before it was submitted to TCEQ.

Table A9.2 The Software used by Local Partners to Submit Data to H-GAC.

Sub-Tier Participants	Software
HCPCS	MS ~~Access~~ Excel
HHD	MS Access
DWO	MS Excel
SJRA	MS Excel
EIH	MS Excel
TRIES	MS Excel
Eastex Environmental Lab	MS Excel

Data will be submitted electronically to the TCEQ in the Event/Result file format described in the most recent version of the DMRG, which can be found at https://www.tceq.texas.gov/waterquality/data-management/dmrg_index.html. A completed Data Summary (see Appendix F) will be submitted with each data submittal.

B1 Sampling Process Design

See Appendix B for sampling process design information and monitoring tables associated with data collected under this QAPP.

B2 Sampling Methods

Field Sampling Procedures

Field sampling will be conducted in accordance with the latest versions of the TCEQ Surface Water Quality Monitoring Procedures Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2012 (RG-415) and Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416), collectively referred to as "SWQM Procedures." Updates to SWQM Procedures are posted to the Surface Water Quality Monitoring Procedures website (https://www.tceq.texas.gov/waterquality/monitoring/swqm_guides.html), and shall be incorporated into H-GAC's procedures, QAPP, SOPs, etc., within 60 days of any final published update. Additional aspects outlined in Section B below reflect specific requirements for sampling under CRP and/or provide additional clarification.

Table B2.1a Sample Storage, Preservation and Handling Requirements for H-GAC Samples Analyzed by Eastex Environmental Laboratory

Parameter	Matrix	Container	Preservation	Sample Volume	Holding Time
TSS	water	Plastic	Cool to <6°C but not frozen	1 L	7 days
Sulfate	water	Plastic	Cool to <6°C but not frozen	100 mL[2]	28 days
Chloride	water	Plastic	Cool to <6°C but not frozen	100 mL[2]	28 days
E. coli IDEXX Colilert	water	Sterile Plastic w/ sodium thiosulfate	Cool to <6°C but not frozen	120 mL[4]	8 hours[1]
TKN	water	Plastic	Cool to <6°C but not frozen H_2SO_4 to pH <2	500 mL[3]	28 days
Ammonia-N	water	Plastic	Cool to <6°C but not frozen H_2SO_4 to pH <2	125 mL[3]	28 days
Nitrite + nitrate-N	water	Plastic	Cool to <6°C but not frozen, H_2SO_4 to pH <2	125 mL[3 and 5]	28 days
Nitrate-N	water	Plastic	Cool to <6°C but not frozen	100 mL[2 and 5]	48 hours
Nitrite-N	water	Plastic	Cool to <6°C but not frozen	100 mL[2 and 5]	48 hours
Phosphorus-P, total	water	Plastic	Cool to <6°C but not frozen ~~H_2SO_4 to pH <2~~Acidified at lab[6]	125 mL[6]	28 days

1. *E.coli* samples should always be processed as soon as possible and incubated no later than 8 hours from time of collection. When transport conditions necessitate sample incubation after 8 hours from time of collection, the holding time may be extended and samples must be processed as soon as possible and within 30 hours.
2. One 500 mL plastic container is used to collect these four parameters.
3. ~~Four or five~~ Three tests are analyzed from one 1L plastic bottle.
4. Maximum volume analyzed for E. coli is 50 ml allowing duplicate analyses from 1 container.
5. Eastex will run IC speciation (100 mL samples) but will analyze Nitrite+Nitrate (125 mL sample) by cadmium reduction method if IC equipment is down
6. T. phosphorus sample taken out of TSS 1-liter and preserved at the lab with Nitric Acid (HNO_3) in separate bottle to a pH of <2.

Table B2.1c Sample Storage, Preservation and Handling Requirements for HHD

Parameter	Matrix	Container	Preservation	Sample Volume	Holding Time
TSS	water	Plastic	Cool to <6°C but not frozen	700 mL[3]	7 days
Sulfate	water	Plastic	Cool to <6°C but not frozen	100 mL[3]	28 days
Chloride	water	Plastic	Cool to <6°C but not frozen	100 mL[3]	28 days
E. coli IDEXX Colilert-18	water	Sterile Plastic w/ sodium thiosulfate	Cool to <6°C but not frozen	120 mL/250 mL	8 hours[1]
Enterococci IDEXX Enterolert	water	Sterile Plastic w/ sodium thiosulfate	Cool to <6°C but not frozen	120 mL	8 hours
TKN	water	Plastic	Cool to <6°C but not frozen H_2SO_4 to pH <2	250 mL	28 days[2]
Ammonia-N	water	Plastic	Cool to <6°C but not frozen H_2SO_4 to pH <2	100 mL[4]	28 days
Nitrite-N	water	Plastic	Cool to <6°C but not frozen	100 mL[3]	48 hours
Nitrate-N	water	Plastic	Cool to <6°C but not frozen	100 mL[3]	48 hours
Phosphorus-P, total	water	Plastic	Cool to <6°C but not frozen H_2SO_4 to pH <2	100 mL[4]	28 days

1. E. coli samples analyzed by SM 9223-B should always be processed as soon as possible and incubated no later than 8 hours from time of collection. When transport conditions necessitate sample incubation after 8 hours from time of collection, the holding time may be extended and samples must be processed as soon as possible and within 30 hours.
2. Eastex Environmental Lab will pick up and analyze sample(s).
3. Multiple tests are collected from one 1-liter plastic cubitainer that has not been acidified.
4. Multiple tests are conducted out of one 1 liter plastic cubitainer which has been preserved with acid.

Table B2.1d Sample Storage, Preservation and Handling Requirements for DWO

Parameter	Matrix	Container	Preservation	Sample Volume	Holding Time
TSS	water	Plastic	Cool to <6°C but not frozen	1000 mL	7 days
Sulfate	water	Plastic	Cool to <6°C but not frozen	50 mL[3]	28 days
Chloride	water	Plastic	Cool to <6°C but not frozen	50 mL[3]	28 days
E. coli IDEXX Colilert	water	Sterile Plastic w/ sodium thiosulfate	Cool to <6°C but not frozen	120 mL[4]	8 hours[1]
TKN	water	Plastic	Cool to <6°C but not frozen H_2SO_4 to pH <2	500 mL	28 days[2]
Ammonia-N	water	Plastic	Cool to <6°C but not frozen H_2SO_4 to pH <2	500 mL	28 days
~~Nitrate-Nitrite~~	~~water~~	~~Plastic~~	~~Cool to <6°C but not frozen~~	~~50 mL[3]~~	~~48 hours~~
Nitrite-N	water	Plastic	Cool to <6°C but not frozen	50 mL[3]	48 hours
Nitrate-N	water	Plastic	Cool to <6°C but not frozen	50 mL[3]	48 hours
Phosphorus-P, total	water	Brown, glass bottle	Cool to <6°C but not frozen H_2SO_4 to pH <2	125 mL	28 days
Chlorophyll-*a*	water	Brown plastic	Dark & iced before filtration; Dark & frozen after filtration	4 L	Filtered w/in 48 hours; after filtered, then frozen up to 24 days[2]
Alkalinity, Total	water	Plastic	Cool to <6°C but not frozen	50 mL[3]	14 days

1. E. coli samples analyzed by SM 9223-B should always be processed as soon as possible and incubated no later than 8 hours from time of collection. When transport conditions necessitate sample incubation after 8 hours from time of collection, the holding time may be extended and samples must be processed as soon as possible and within 30 hours.
2. Eastex Environmental Lab will pick up and analyze sample(s).
3. All tests are collected in one 500 mL plastic bottle.
4. Maximum volume analyzed for E. coli is 50 ml allowing duplicate analyses from 1 container.

Table B2.1e Sample Storage, Preservation and Handling Requirements for SJRA Samples Collected from Lake Conroe and Analyzed by DWO Laboratory

Parameter	Matrix	Container	Preservation	Sample Volume	Holding Time
TSS	water	Plastic	Cool to <6°C but not frozen	1000 mL	7 days
Sulfate	water	Plastic	Cool to <6°C but not frozen	50 mL[3]	28 days
Chloride	water	Plastic	Cool to <6°C but not frozen	50 mL[3]	28 days
E. coli IDEXX Colilert	water	Sterile Plastic w/ sodium thiosulfate	Cool to <6°C but not frozen	120 mL[4]	8 hours[2]
TKN[2]	water	Plastic	Cool to <6°C but not frozen H_2SO_4 to pH <2	500 mL	28 days[2]
Ammonia-N	water	Plastic	Cool to <6°C but not frozen H_2SO_4 to pH <2	500 mL	28 days
Nitrite-N	water	Plastic	Cool to <6°C but not frozen	50 mL[3]	48 hours

Nitrate-N	water	Plastic	Cool to <6°C but not frozen	50 mL[3]	~~28 days~~ 48 hours
Phosphorus-P, total	water	Brown, glass bottle	Cool to <6°C but not frozen H_2SO_4 to pH <2	125 mL	28 days
Chlorophyll-*a*[2]	water	Brown plastic	Dark & iced before filtration; Dark & frozen after filtration	4 L	Filtered w/in 48 hours; after filtered, then frozen up to 24 days[2]
Alkalinity, Total	water	Plastic	Cool to <6°C but not frozen	50 mL[3]	14 days

1. E. coli samples analyzed by SM 9223-B should always be processed as soon as possible and incubated no later than 8 hours from time of collection. When transport conditions necessitate sample incubation after 8 hours from time of collection, the holding time may be extended and samples must be processed as soon as possible and within 30 hours.
2. Eastex Environmental Lab will pick up and analyze sample(s).
3. One 500 mL plastic bottle is collected, specified volumes withdrawn for analysis.
4. Maximum volume analyzed for E. coli is 50 ml allowing duplicate analyses from 1 container.

Table B2.1f Sample Storage, Preservation and Handling Requirements for SJRA Samples Collected from The Woodlands and Analyzed at Eastex Environmental Laboratory

Parameter	Matrix	Container	Preservation	Sample Volume	Holding Time
TSS	water	Plastic	Cool to <6°C but not frozen	1 L	7 days
Sulfate	water	Plastic	Cool to <6°C but not frozen	100 ml[3]	28 days
Chloride	water	Plastic	Cool to <6°C but not frozen	100 mL[3]	28 days
E. coli IDEXX Colilert	water	Sterile Plastic w/ sodium thiosulfate	Cool to <6°C but not frozen	120 mL[5]	8 hours[1]
Ammonia-N	water	Plastic	Cool to <6°C but not frozen Add H_2SO_4 to pH <2	125 mL[2]	28 days
TKN	water	Plastic	Cool to <6°C but not frozen Add H_2SO_4 to pH <2	500 mL	28 days
Nitrite-N	water	Plastic	Cool to <6°C but not frozen	100 mL[3] and ~~5~~6	48 hours
Nitrate-N	water	Plastic	Cool to <6°C but not frozen,	100 mL[3] and ~~5~~6	48 hours
Nitrite+Nitrate-N	water	Plastic	Cool to <6°C but not frozen Add H_2SO_4 to pH <2	125 mL[2] and ~~5~~6	28 days
Phosphorus-P, total	water	Plastic	Cool to <6°C but not frozen ~~H_2SO_4 to pH <2~~Acidified at lab[6]	125 mL[2]	28 days
Chlorophyll-*a*	water	Brown plastic	Dark & iced before filtration; Dark & frozen after filtration	4 L	Filtered w/in 48 hours; after filtered, then frozen up to 24 days[2]
Hardness, Total	water	Plastic	Cool to <6°C but not frozen Add H_2SO_4 to pH <2	100 mL	28 days
~~Copper, Total~~	~~water~~	~~Plastic~~	~~Cool to <6°C but not frozen Add HNO_3 to pH <2~~	~~100 mL[4]~~	~~6 months~~
~~Selenium, Total~~	~~water~~	~~Plastic~~	~~Cool to <6°C but not frozen Add HNO_3 to pH <2~~	~~100 mL[4]~~	~~6 months~~

1. E. coli samples should always be processed as soon as possible and incubated no later than 8 hours from time of collection. When transport conditions necessitate sample incubation after 8 hours from time of collection, the holding time may be extended and samples must be processed as soon as possible and within 30 hours.
2. Nutrient tests are collected from one 1 L plastic bottle.
3. One 1 L plastic container is used to collect these ~~three~~four parameters.
~~4. All three "Total Metals" related parameters are collected in one 1-L plastic container and split at the lab for the various parameters.~~
4~~5~~. Maximum volume analyzed for E. coli is 50 ml allowing duplicate analyses from 1 container.
5~~6~~. Eastex will run IC speciation (100 mL samples) first but will analyze Nitrite+Nitrate (125 mL sample) by cadmium reduction method if IC equipment is down.
6. T. phosphorus sample taken out of TSS 1-liter and preserved at the lab with Nitric Acid (HNO_3) in separate bottle to a pH of <2.

Table B2.1g Sample Storage, Preservation and Handling Requirements for EIH. Samples Analyzed by Eastex Environmental Laboratory

Parameter	Matrix	Container	Preservation	Sample Volume	Holding Time
TSS	water	Plastic	Cool to <6°C but not frozen	1 L	7 days
Sulfate	water	Plastic	Cool to <6°C but not frozen	100 ml[3]	28 days
Chloride	water	Plastic	Cool to <6°C but not frozen	100 mL[3]	28 days
E. coli IDEXX Colilert	water	Sterile Plastic w/ sodium thiosulfate	Cool to <6°C but not frozen	120 mL[4]	8 hours[1]
Enterococci IDEXX Enterolert	water	Sterile Plastic w/ sodium thiosulfate	Cool to <6°C but not frozen	120 mL[4]	8 hours
TKN	water	Plastic	Cool to <6°C but not frozen H_2SO_4 to pH <2	500 mL[2]	28 days
Ammonia-N	water	Plastic	Cool to <6°C but not frozen H_2SO_4 to pH <2	125 mL[2]	28 days
Nitrite-N	water	Plastic	Cool to <6°C but not frozen	100 mL[2 and 5]	48 hours
Nitrate-N	water	Plastic	Cool to <6°C but not frozen	100 mL[2 and 5]	48 hours
Nitrite + nitrate-N	water	Plastic	Cool to <6°C but not frozen, H_2SO_4 to pH <2	125 mL[3 and 5]	28 days
Phosphorus-P, total	water	Plastic	Cool to <6°C but not frozen ~~H_2SO_4 to pH <2~~Acidified at lab[6]	125 mL[2]	28 days
Chlorophyll-*a*	water	Brown plastic	Dark & iced before filtration; Dark & frozen after filtration	4 L	Filtered w/in 48 hours; after filtered, then frozen up to 24 days

1. *E. coli* samples should always be processed as soon as possible and incubated no later than 8 hours from time of collection. When transport conditions necessitate sample incubation after 8 hours from time of collection, the holding time may be extended and samples must be processed as soon as possible and within 30 hours.
2. Five tests are analyzed from one 1L plastic bottle.
3. One 500 mL plastic container is used to collect these three samples.
4. Maximum volume analyzed for bacteria analysis is 50 ml allowing duplicate analyses from 1 container.
5. Eastex will run IC speciation (100 mL samples) first but will analyze Nitrite+Nitrate (125 mL sample) by cadmium reduction method if IC equipment is down.
6. T. phosphorus sample taken out of TSS 1-liter and preserved at the lab with Nitric Acid (HNO_3) in separate bottle to a pH of <2.

Table B2.1h Sample Storage, Preservation, and Handling Requirements for TRIES~~. Requirements for TRIES~~ Samples Analyzed by the TRIES Laboratory ~~and~~ or Eastex Environmental Laboratory

Parameter	Matrix	Container	Preservation	Sample Volume	Holding Time
TSS	water	Plastic	Cool to <6°C but not frozen	1 L	7 days
Sulfate	water	Plastic	Cool to <6°C but not frozen	100 mL[2]	28 days
Chloride	water	Plastic	Cool to <6°C but not frozen	100 mL[2]	28 days
E. coli IDEXX Colilert	water	Sterile Plastic w/ sodium thiosulfate	Cool to <6°C but not frozen	120 mL[4]	8 hours[1]
Ammonia-N	water	Plastic	Cool to <6°C but not frozen H_2SO_4 to pH <2	125 mL[3]	28 days
Nitrate-N	water	Plastic	Cool to <6°C but not frozen	125 mL[3 and 6]	48 hours

Nitrite-N	water	Plastic	Cool to <6°C but not frozen	125 mL[3 and 6]	48 hours
Nitrite + Nitrate-N	water	Plastic	Cool to <6°C but not frozen, H_2SO_4 to pH <2	125 mL[3 and 6]	28 days[5]
Phosphorus-P, total	water	Plastic	Cool to <6°C but not frozen HNO_3 to pH <2 at the lab	125 mL[3]	28 days

1. E.coli samples analyzed by SM 9223-B should always be processed as soon as possible and incubated no later than 8 hours from time of collection. When transport conditions necessitate sample incubation after 8 hours from time of collection, the holding time may be extended and samples must be processed as soon as possible and within 30 hours.
2. One 500 mL plastic container is used to collect these two samples.
3. Four or five tests are analyzed from one 1L plastic bottle.
4. Maximum volume analyzed for E. coli is 50 ml allowing duplicate analyses from 1 container.
5. Eastex Environmental Lab will pick up and analyze sample(s) if necessary.
6. TRIES & Eastex can both run IC speciation but Eastex will analyze Nitrite+Nitrate by cadmium reduction method if TRIES IC equipment is down

Sample Containers

Certificates from sample container manufacturers are maintained in a notebook by each of the monitoring partners as appropriate. Information about the various sample containers for each local partner is described below.

Houston-Galveston Area Council (H-GAC)
All sample containers are provided to H-GAC by their contract lab, Eastex. The lab performs and tracks required QC procedures for all bottles purchased.

- Plastic, disposable sample containers are used for conventional parameters.
- Sterile, sealed, 120 mL plastic, disposable bottles with a sodium thiosulfate tablet added, are used for bacteriological samples.
- When preservation is required for particular parameters, the acid is added to the container in the field by field personnel immediately after samples are collected.

Harris County Pollution Control Services (HCPCS)
All sample containers are purchased by the HCPCS Lab except as noted below. The labs perform and track all required QC procedures for the bottles they purchased and provide to the field crew.

- Pre-cleaned, plastic, disposable sample containers are used for conventional parameters.
- Sterile, sealed, 120 mL plastic, disposable bottles with a sodium thiosulfate tablet added, are used for bacteriological samples.
- Brown, polyethylene, 4-liter cubitainers are used routinely for chlorophyll-*a* samples and are provided by H-GAC's contract lab, Eastex.
- Pre-cleaned, plastic, disposable sample containers for the TKN samples are also provided by H-GAC's contract lab, Eastex.
- When preservation is required for particular parameters, the bottles are pre-acidified at the lab. Containers are never dipped underwater but are filled using a white or opaque, plastic pitcher and water sample are collected from the required depth as specified in the SWQM Procedures Volume 1 manual.

City of Houston - Health Department (HHD)
All sample containers are purchased by the Bureau of Pollution Control and Prevention except as noted below. All containers are received at the field office located on Park Place. Before containers are used by field crews, a specified number of containers are pulled out for delivery to the HHD-BLS Lab where all QC checks and documentation are performed. The HHD-BLS Lab QAO reviews and tracks the results of all QC testing.

- Pre-cleaned, plastic, disposable sample containers are used for conventional parameters.
- Sterile, sealed, 120 or 250 mL plastic, disposable bottles with sodium thiosulfate tablet added, are used for the microbiological samples.
- Pre-cleaned, plastic, disposable sample containers for the TKN samples are provided by H-GAC's contract lab, Eastex Environmental Lab.
- When preservation is required, the preservative is added to the container in the field by field personnel immediately after the samples are collected.

City of Houston - Drinking Water Operations (DWO) **and** San Jacinto River Authority – Lake Conroe samples
All disposal sample containers are purchased by the DWO Lab except as noted below. Each lab cited below performs and tracks all required QC procedures for all bottles they purchase. SJRA-Lake Conroe samples are analyzed by the City of Houston Drinking Water Operations Lab (DWO).

- Pre-cleaned, plastic, disposable sample containers are used for conventional parameters.
- Sterile, sealed, 120 mL plastic, disposable bottles with sodium thiosulfate added, are used for bacteriological samples.
- Amber glass bottles are used to collect total phosphorus samples. These containers are thoroughly cleaned for re-use. See washing procedure following this list.
- Brown, polyethylene, 4-liter cubitainers are used routinely for chlorophyll-*a* samples and are provided by H-GAC's contract lab, Eastex.
- Pre-cleaned, plastic, disposable sample containers for the TKN samples are provided by H-GAC's contract lab, Eastex Environmental Lab.
- When preservation is required for particular parameters, the bottles are pre-acidified at the office. Bottles are never filled by dipping. Rather, bottles are filled by pouring from a sample collection container that has been pre-rinsed 3 times at each monitoring location.

DWO container washing procedures (excluding bacteria bottles): The bottles are sent through a mechanical wash cycle followed by an acid rinse. The procedure is as follows: The bottles are placed in a dish washing machine where it goes through a pre-wash cycle with distilled water, a wash cycle with phosphate-free soap, a deionized water (DI) rinse cycle, then an acid rinse cycle. Next, the bottles are rinsed with DI water several times making sure there is at least a three (3) volume exchange of water. Lastly, the bottles are air dried. Afterwards, the bottles are sealed prior to storage for their next use.

San Jacinto River Authority – The Woodlands samples
Eastex Environmental Lab is the contract lab for samples collected from The Woodlands. The lab performs and tracks required QC procedures for all bottles purchased.

- Plastic, disposable sample containers are used for conventional parameters.
- Sterile, sealed, 120 mL plastic, disposable bottles with a sodium thiosulfate tablet added, are used for bacteriological samples.
- Brown, polyethylene, 4-liter cubitainers are used for chlorophyll-*a* samples.
- When preservation is required for particular parameters, the containers are pre-acidified by the lab before being given to field personnel.
- ~~New, certified pre-cleaned, plastic bottles are used for all "metals-in-water" samples. The vendor provides certificates for the bottles which are maintained on file by the laboratory and the lab tests at least one bottle from each box purchased as part of QC.~~
- Pre-cleaned, plastic, disposable sample containers for the TKN samples are provided by H-GAC's contract lab, Eastex Environmental Lab.

Environmental Institute of Houston (EIH)
All sample containers are provided to H-GAC by their contract lab, Eastex. The lab performs and tracks required QC procedures for all bottles purchased.

- Pre-cleaned, plastic, disposable sample containers are used for conventional parameters.
- Sterile, sealed, 120 mL plastic, disposable bottles with a sodium thiosulfate tablet added, are used for bacteriological samples.
- Brown, polyethylene, 4-liter cubitainers are used for chlorophyll-*a* samples and are provided by H-GAC's contract lab, Eastex.
- When preservation is required for particular parameters, the acid is added to the container in the field by field personnel immediately after samples are collected.

The TRIES Analytical Lab provides all sample containers for sample collection. The lab performs and tracks required QC procedures for all bottles purchased.

- Pre-cleaned, plastic, reusable sample containers are used for conventional parameters.
- Sterile, sealed, 120 mL plastic, disposable bottles with a sodium thiosulfate tablet added, are used for bacteriological samples.

- When preservation is required for particular parameters, the acid is added to the container in the field by field personnel immediately after samples are collected.

TRIES container washing procedures (excluding bacteria bottles): The bottles are sent through a mechanical wash cycle. The procedure is as follows: The bottles are placed in a dish washing machine where it goes through a pre-wash cycle with distilled water, a wash cycle with phosphate-free soap, and then a deionized water (DI) rinse cycle. Next, the bottles are allowed to air dry. Afterwards, the bottles are sealed prior to storage for their next use.

Processes to Prevent Contamination

SWQM Procedures outline the necessary steps to prevent contamination of samples, including: direct collection into sample containers, when possible.~~; and clean sampling techniques for metals~~. Several local partners collect samples from a bridge and must use the bucket method. All those partners practice the triple rinse procedure to eliminate or at least minimize the chance of carry-over from one site to the next. ~~Field QC samples for metals testing (identified in Section B5) are collected to verify that contamination has not occurred.~~

Documentation of Field Sampling Activities

Field sampling activities are documented on field data sheets as presented in Appendix D. Flow worksheets, aquatic life use monitoring checklists, habitat assessment forms, field biological assessment forms, and records of bacteriological analyses (if applicable) are part of the field data record. The following will be recorded for all visits:

- Station ID
- Sampling Date
- Location
- Sampling Depth
- Sampling Time
- Sample Collector's name
- Values for all field parameters collected

Notes containing detailed observational data not captured by field parameters, including;

- Water appearance
- Weather
- Biological activity
- Unusual odors
- Pertinent observations related to water quality or stream uses
- Watershed or instream activities
- Specific sample information
- Missing parameters

Recording Data

For the purposes of this section and subsequent sections, all field and laboratory personnel follow the basic rules for recording information as documented below:

- Write legibly, in indelible ink
- Make changes by crossing out original entries with a single line strike-out, entering the changes, and initialing and dating the corrections.
- Close-out incomplete pages with an initialed and dated diagonal line.

submitted with the corresponding data set, and a corrective action plan (as described in section C1) may be necessary.

B5 Quality Control

Sampling Quality Control Requirements and Acceptability Criteria

The minimum field QC requirements, and program-specific laboratory QC requirements, are outlined in SWQM Procedures. ~~Specific requirements are outlined below. Field QC sample results are submitted with the laboratory data report (see Section A9.).~~

~~*Field blank*~~
~~Field blanks are required for total metals in water samples when collected without sample equipment (i.e., as grab samples). For other types of samples, they are optional. A field blank is prepared in the field by filling a clean container with pure deionized water and appropriate preservative, if any, for the specific sampling activity being undertaken. Field blanks are used to assess contamination from field sources, such as airborne materials, containers, or preservatives. The minimum frequency requirement for field blanks for total metals in water samples is specified in the SWQM Procedures. For SJRA, metals are collected twice a year.~~

~~The analysis of field blanks should yield values lower than the LOQ. When target analyte concentrations are high, blank values should be lower than 5% of the lowest value of the batch, or corrective action will be implemented.~~

~~Field blanks are associated with batches of field samples. In the event of a field blank failure for one or more target analytes, all applicable data associated with the field batch may need to be qualified as not meeting project QC requirements, and these qualified data will not be reported to the TCEQ. These data include all samples collected on that day during that sample run and should not be confused with the laboratory analytical batch.~~

Laboratory Measurement Quality Control Requirements and Acceptability Criteria

Batch
A batch is defined as environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A preparation batch is composed of one to 20 environmental samples of the same NELAP-defined matrix, meeting the above-mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 25 hours. An analytical batch is composed of prepared environmental samples (extract, digestates, or concentrates) which are analyzed together as a group. An analytical batch can include prepared samples originating from various environmental matrices and can exceed 20 samples.

Method Specific QC requirements
QC samples, other than those specified later this section (e.g., sample duplicates, surrogates, internal standards, continuing calibration samples, interference check samples, positive control, negative control, and media blank), are run as specified in the methods and in SWQM Procedures. The requirements for these samples, their acceptance criteria or instructions for establishing criteria, and corrective actions are method-specific.

Detailed laboratory QC requirements and corrective action procedures are contained within the individual laboratory quality manuals (QMs). The minimum requirements that all participants abide by are stated below.

Comparison Counting
For routine bacteriological samples, repeat counts on one or more positive samples are required, at least monthly. If possible, the analyst will compare counts with another analyst who also performs the analysis. Replicate counts by the same analyst should agree within 5 percent, and those between analysts should agree within 10 percent. The analyst(s) will record the results.

- Harris County Pollution Control Services (HCPCS) The measurement performance specification for matrix spikes is recovery between 75 and 125 percent. If a spike recovery is outside this range, the result is qualified in the QC narrative contained in the data submittal checklist. In addition, the laboratory applies control chart techniques to monitor performance, and establishes updated internal control limits for matrix spike recovery on an annual basis.

- The City of Houston, HHD BLS Lab has a matrix spike recovery requirement of 80-120 percent unless specifically stated for the parameter. A spike that falls outside laboratory limits is reanalyzed. If the spike fails a second time, another sample within the same set is prepared as a spike and analyzed. When several different matrix spikes fall outside stated limits, matrix interference is likely. If the required matrix spike recovery is not met, the data affected are qualified and flagged as exceeding control limits.

- The City of Houston, DWO Lab The recovery of matrix spikes for the samples analyzed in DWO laboratory is between 80 to 120 percent. If a spike recovery is outside this range, the result is qualified in the QC narrative contained in the data submittal checklist. In addition, the laboratory applies control chart techniques to monitor performance.

- Eastex uses matrix spike recovery limits of 80-120 for parameters where a spike solution is available. These recoveries are monitored with QC charts to help determine interferences or detect trends. Matrix spikes that fail to meet these guidelines are reanalyzed, if possible. An alternate sample may be used to help determine whether the problem was specific to that sample. If matrix spikes are not achievable within 80-120 % recovery then this recovery is flagged as exceeding the control limit on the QC report.

- TRIES Lab uses matrix spike recovery limits of 75-125 percent which are published in the mandated test method where a spike solution is required. Matrix spikes that fail to meet these guidelines are reanalyzed, if possible, or an alternate sample may be used to help determine whether the problem was specific to that sample. If matrix spikes are not achievable within method acceptance criteria, the data are reported with appropriate data qualifying codes on the analytical report. Control Charts are monitored for laboratory performance.

Method blank

A method blank is a sample of matrix similar to the batch of associated samples (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as the samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses. The method blank is used to document contamination from the analytical process. The analysis of method blanks should yield values less than the LOQ. For very high-level analyses, the blank value should be less than 5% of the lowest value of the batch, or corrective action will be implemented. Samples associated with a contaminated blank shall be evaluated as to the best corrective action for the samples (e.g. reprocessing, data qualifying codes). In all cases the corrective action must be documented.

The method blank shall be analyzed at a minimum of one per preparation batch. In those instances for which no separate preparation method is used (e.g., VOA) the batch shall be defined as environmental samples that are analyzed together with the same method and personnel, using the same lots of reagents, not to exceed the analysis of 20 environmental samples.

Quality Control or Acceptability Requirements Deficiencies and Corrective Actions

Sampling QC excursions are evaluated by the H-GAC Project Manager, in consultation with the H-GAC QAO and/or H-GAC Data Manager. In that differences in sample results are used to assess the entire sampling process, including environmental variability, the arbitrary rejection of results based on pre-determined limits is not practical. Therefore, the professional judgment of the H-GAC Project Manager, QAO and Data Manager will be relied upon in evaluating results. ~~Field blanks for trace elements are scrutinized very closely. Field blank values exceeding the acceptability criteria will automatically invalidate the sample.~~ Notations of blank contamination are noted in the data summaries that accompany data deliverables. ~~Equipment blanks for metals analysis are also scrutinized very closely.~~

TABLE A7.1a Measurement Performance Specifications for Houston-Galveston Area Council (H-GAC)

Field Parameters

Parameter	Units	Matrix	Method	Parameter Code	Lab
TEMPERATURE, WATER (DEGREES CENTIGRADE)*	DEG C	water	SM 2550 B and TCEQ SOP V1	00010	Field
TRANSPARENCY, SECCHI DISC (METERS)*	meters	water	TCEQ SOP V1	00078	Field
SPECIFIC CONDUCTANCE,FIELD (US/CM @ 25C)*	us/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	Field
OXYGEN, DISSOLVED (MG/L)*	mg/L	water	SM 4500-O G and TCEQ SOP V1	00300	Field
PH (STANDARD UNITS)*	s.u	water	EPA 150.1 and TCEQ SOP V1	00400	Field
DAYS SINCE PRECIPITATION EVENT (DAYS)	days	other	TCEQ SOP V1	72053	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE*	meters	water	TCEQ SOP V2	82903	Field
MAXIMUM POOL WIDTH AT TIME OF STUDY (METERS)**	meters	other	TCEQ SOP V2	89864	Field
MAXIMUM POOL DEPTH AT TIME OF STUDY(METERS)**	meters	other	TCEQ SOP V2	89865	Field
POOL LENGTH, METERS**	meters	other	TCEQ SOP V2	89869	Field
% POOL COVERAGE IN 500 METER REACH**	%	other	TCEQ SOP V2	89870	Field
WIND INTENSITY (1=CALM,2=SLIGHT,3=MOD.,4=STRONG)	NU	other	NA	89965	Field
PRESENT WEATHER (1=CLEAR,2=PTCLDY,3=CLDY,4=RAIN,5=OTHER)	NU	other	NA	89966	Field
WATER SURFACE(1=CALM,2=RIPPLE,3=WAVE,4=WHITECAP)	NU	water	NA	89968	Field
WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGGS, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER (WRITE IN COMMENTS))	NU	water	NA	89971	Field
WATER COLOR 1=BRWN 2=RED 3=GRN 4=BLCK 5=CLR 6=OT	NU	water	NA	89969	Field
WATER CLARITY (1=EXCELLENT, 2=GOOD, 3=FAIR, 4=POOR)	NU	water	NA	20424	Field
TURBIDITY, OBSERVED (1=LOW, 2=MEDIUM, 3=HIGH)	NU	water	NA	88842	Field

* Reporting to be consistent with SWQM guidance and based on measurement capability.
** To be routinely reported when collecting data from perennial pools.

References:
United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.
TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.1b Measurement Performance Specifications for Houston-Galveston Area Council (H-GAC)					
Flow Parameters					
Parameter	**Units**	**Matrix**	**Method**	**Parameter Code**	**Lab**
FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)	cfs	water	TCEQ SOP V1	00061	Field
FLOW SEVERITY:1=No Flow,2=Low,3=Normal,4=Flood,5=High,6=Dry	NU	water	TCEQ SOP V1	01351	Field
FLOW MTH 1=GAGE 2=ELEC 3=MECH 4=WEIR/FLU 5=DOPPLER	NU	other	TCEQ SOP V1	89835	Field

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020

U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.1c Measurement Performance Specifications for Houston-Galveston Area Council (H-GAC)										
Conventional Parameters in Water										
Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD)	Bias %Rec. of LCS	Lab
RESIDUE, TOTAL NONFILTRABLE (MG/L)	mg/L	water	SM 2540D	00530	5	1	NA	NA	NA	Eastex
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	SM 4500 NH3G	00610	0.1	0.1	70-130	20	80-120	Eastex
NITRITE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0	00615	0.05	0.05	70-130	20	80-120	Eastex
NITRATE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0	00620	0.05	0.05	70-130	20	80-120	Eastex
NITROGEN, KJELDAHL, TOTAL (MG/L AS N)	mg/L	water	~~SM 4500-N_{org} B or C and SM 4500-NH3 C~~ EPA 351.2	00625	0.2	0.2	70-130	20	80-120	Eastex
NITRITE PLUS NITRATE, TOTAL ONE LAB DETERMINED VALUE (MG/L AS N)	mg/L	water	SM 4500-NO3 F	00630	0.05	0.02	70-130	20	80-120	Eastex
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	mg/L	water	EPA 200.7	00665	0.06	0.06	70-130	20	80-120	Eastex
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	mg/L	water	EPA 200.7	00665	0.06	0.06	70-130	20	80-120	Eastex
CHLORIDE (MG/L AS CL)	mg/L	water	EPA 300.0	00940	5	5	70-130	20	80-120	Eastex
SULFATE (MG/L AS SO4)	mg/L	water	EPA 300.0	00945	5	4	70-130	20	80-120	Eastex

References:
United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.
TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.1d Measurement Performance Specifications for Houston-Galveston Area Council (H-GAC)

Bacteriological Parameters in Water

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Log Difference of Duplicates	Bias %Rec. of LCS	Lab
E. COLI, COLILERT, IDEXX METHOD, MPN/100ML	MPN/100 mL	water	Colilert**	31699	1	1	NA	0.50*	NA	Eastex
E.COLI, COLILERT, IDEXX, HOLDING TIME	hours	water	NA	31704	NA	NA	NA	NA	NA	Eastex

* This value is not expressed as a relative percent difference. It represents the maximum allowable difference between the logarithm of the result of a sample and the logarithm of the duplicate result. See Section B5.

** E.coli samples analyzed by these methods should always be processed as soon as possible and within 8 hours. When transport conditions necessitate delays in delivery longer than 6 hours, the holding time may be extended and samples must be processed as soon as possible and within 30 hours.

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020

U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.1e Measurement Performance Specifications for Houston-Galveston Area Council (H-GAC)

24 HourParameters in Water

Parameter	Units	Matrix	Method	Parameter Code	Lab
TEMPERATURE, WATER (DEGREES CENTIGRADE), 24HR AVG	DEG C	Water	TCEQ SOP V1	00209	field
WATER TEMPERATURE, DEGREES CENTIGRADE, 24HR MAX	DEG C	Water	TCEQ SOP V1	00210	field
TEMPERATURE, WATER (DEGREES CENTIGRADE) 24HR MIN	DEG C	Water	TCEQ SOP V1	00211	field
SPECIFIC CONDUCTANCE, US/CM, FIELD, 24HR AVG	uS/cm	Water	TCEQ SOP V1	00212	field
SPECIFIC CONDUCTANCE, US/CM, FIELD, 24HR MAX	uS/cm	Water	TCEQ SOP V1	00213	field
SPECIFIC CONDUCTANCE, US/CM, FIELD, 24HR MIN	uS/cm	Water	TCEQ SOP V1	00214	field
PH, S.U., 24HR MAXIMUM VALUE	std. units	Water	TCEQ SOP V1	00215	field
PH, S.U., 24HR, MINIMUM VALUE	std. units	Water	TCEQ SOP V1	00216	field
WATER TEMPERATURE, # OF MEASUREMENTS IN 24-HRS	NU	Water	TCEQ SOP V1	00221	field
SPECIFIC CONDUCTANCE, # OF MEASUREMENTS IN 24-HRS	NU	Water	TCEQ SOP V1	00222	field
pH, # OF MEASUREMENTS IN 24-HRS	NU	Water	TCEQ SOP V1	00223	field
DISSOLVED OXYGEN, 24-HOUR MIN. (MG/L) MIN. 4 MEA	mg/l	Water	TCEQ SOP V1	89855	field
DISSOLVED OXYGEN, 24-HOUR MAX. (MG/L) MIN. 4 MEA	mg/l	Water	TCEQ SOP V1	89856	field
DISSOLVED OXYGEN, 24-HOUR AVG. (MG/L) MIN. 4 MEA	mg/l	Water	TCEQ SOP V1	89857	field
DISSOLVED OXYGEN, # OF MEASUREMENTS IN 24-HRS	NU	Water	TCEQ SOP V1	89858	field

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020

U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.2a Measurement Performance Specifications for Harris County Pollution Control Services (HCPCS)

Field Parameters

Parameter	Units	Matrix	Method	Parameter Code	Lab
TEMPERATURE, WATER (DEGREES CENTIGRADE)*	DEG C	water	SM 2550 B and TCEQ SOP V1	00010	Field
TRANSPARENCY, SECCHI DISC (METERS)*	meters	water	TCEQ SOP V1	00078	Field
SPECIFIC CONDUCTANCE,FIELD (US/CM @ 25C)*	us/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	Field
OXYGEN, DISSOLVED (MG/L)*	mg/L	water	SM 4500-O G and TCEQ SOP V1	00300	Field
PH (STANDARD UNITS)*	s.u	water	EPA 150.1 and TCEQ SOP V1	00400	Field
SALINITY - PARTS PER THOUSAND	PPT	water	SM 2520 and TCEQ SOP V1	00480	Field
DAYS SINCE PRECIPITATION EVENT (DAYS)	days	other	TCEQ SOP V1	72053	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE*	meters	water	TCEQ SOP V2	82903	Field
WIND INTENSITY (1=CALM,2=SLIGHT,3=MOD.,4=STRONG)	NU	other	NA	89965	Field
PRESENT WEATHER (1=CLEAR,2=PTCLDY,3=CLDY,4=RAIN,5=OTHER)	NU	other	NA	89966	Field
WATER SURFACE(1=CALM,2=RIPPLE,3=WAVE,4=WHITECAP)	NU	water	NA	89968	Field
TIDE STAGE 1=LOW,2=FALLING,3=SLACK,4=RISING,5=HI	NU	water	NA	89972	Field
WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGGS, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER (WRITE IN COMMENTS))	NU	water	NA	89971	Field
WATER COLOR 1=BRWN 2=RED 3=GRN 4=BLCK 5=CLR 6=OT	NU	water	NA	89969	Field
TURBIDITY, OBSERVED (1=LOW, 2=MEDIUM, 3=HIGH)	NU	water	NA	88842	Field

* Reporting to be consistent with SWQM guidance and based on measurement capability.

** To be routinely reported when collecting data from perennial pools.

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020

U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.2b Measurement Performance Specifications for Harris County Pollution Control (HCPCS)										
Conventional Parameters in Water										
Parameter	**Units**	**Matrix**	**Method**	**Parameter Code**	**TCEQ AWRL**	**LOQ**	**LOQ Check Sample %Rec**	**Precision (RPD)**	**Bias %Rec. of LCS**	**Lab**
RESIDUE, TOTAL NONFILTRABLE (MG/L)	mg/L	water	SM 2540D	00530	5	4	NA	NA	NA	HCPCS
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	SM 4500 NH3-D	00610	0.1	0.1	70-130	20	85-115	HCPCS
NITROGEN, KJELDAHL, TOTAL (MG/L AS N)	mg/L	water	~~SM 4500-N_{org} B or C and SM 4500-NH3 C~~ EPA 351.2	00625	0.2	0.2	70-130	20	80-120	Eastex
NITRITE PLUS NITRATE, TOTAL ONE LAB DETERMINED VALUE (MG/L AS N)	mg/L	water	SM 4500-NO3 E	00630	0.05	0.04	70-130	20	85-115	HCPCS
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	mg/L	water	SM 4500-P E	00665	0.06	0.02	70-130	20	85-115	HCPCS
CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	ug/L	water	EPA 446.0	32211	3	3	NA	20	80-120	Eastex

References:
United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.
TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.2c Measurement Performance Specifications for Harris County Pollution Control Services (HCPCS)

Bacteriological Parameters in Water

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Log Difference of Duplicates	Bias %Rec. of LCS	Lab
ENTEROCOCCI, ENTEROLERT, IDEXX, (MPN/100 ML)	MPN/100 mL	water	ASTM D-6503	31701	1***	10	NA	0.50*	NA	HCPCS

* This value is not expressed as a relative percent difference. It represents the maximum allowable difference between the logarithm of the result of a sample and the logarithm of the duplicate result. See Section B5.

***Enterococcus samples should be diluted 1:10 for all waters.

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020

U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.3a Measurement Performance Specifications for City of Houston, Health Department (HHD)

Field Parameters

Parameter	Units	Matrix	Method	Parameter Code	Lab
TEMPERATURE, WATER (DEGREES CENTIGRADE)*	DEG C	water	SM 2550 B and TCEQ SOP V1	00010	Field
TRANSPARENCY, SECCHI DISC (METERS)*	meters	water	TCEQ SOP V1	00078	Field
SPECIFIC CONDUCTANCE,FIELD (US/CM @ 25C)*	us/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	Field
OXYGEN, DISSOLVED (MG/L)*	mg/L	water	SM 4500-O G and TCEQ SOP V1	00300	Field
PH (STANDARD UNITS)*	s.u	water	EPA 150.1 and TCEQ SOP V1	00400	Field
SALINITY - PARTS PER THOUSAND	PPT	water	SM 2520 and TCEQ SOP V1	00480	Field
DAYS SINCE PRECIPITATION EVENT (DAYS)	days	other	TCEQ SOP V1	72053	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE*	meters	water	TCEQ SOP V2	82903	Field
MAXIMUM POOL WIDTH AT TIME OF STUDY (METERS)**	meters	other	TCEQ SOP V2	89864	Field
MAXIMUM POOL DEPTH AT TIME OF STUDY(METERS)**	meters	other	TCEQ SOP V2	89865	Field
POOL LENGTH, METERS**	meters	other	TCEQ SOP V2	89869	Field
% POOL COVERAGE IN 500 METER REACH**	%	other	TCEQ SOP V2	89870	Field
WIND INTENSITY (1=CALM,2=SLIGHT,3=MOD.,4=STRONG)	NU	other	NA	89965	Field
PRESENT WEATHER (1=CLEAR,2=PTCLDY,3=CLDY,4=RAIN,5=OTHER)	NU	other	NA	89966	Field
WATER SURFACE(1=CALM,2=RIPPLE,3=WAVE,4=WHITECAP)	NU	water	NA	89968	Field
TIDE STAGE 1=LOW,2=FALLING,3=SLACK,4=RISING,5=HI	NU	water	NA	89972	Field
WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGGS, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER (WRITE IN COMMENTS))	NU	water	NA	89971	Field
WATER COLOR 1=BRWN 2=RED 3=GRN 4=BLCK 5=CLR 6=OT	NU	water	NA	89969	Field

* Reporting to be consistent with SWQM guidance and based on measurement capability.
** To be routinely reported when collecting data from perennial pools.

References:
United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.
TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.3b Measurement Performance Specifications for City of Houston, Health Department (HHD)					
Flow Parameters					
Parameter	**Units**	**Matrix**	**Method**	**Parameter Code**	**Lab**
FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)	cfs	water	TCEQ SOP V1	00061	Field
FLOW SEVERITY:1=No Flow,2=Low,3=Normal,4=Flood,5=High,6=Dry	NU	water	TCEQ SOP V1	01351	Field
FLOW MTH 1=GAGE 2=ELEC 3=MECH 4=WEIR/FLU 5=DOPPLER	NU	other	TCEQ SOP V1	89835	Field

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard
Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.
TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.3c Measurement Performance Specifications for City of Houston, Health Department (HHD)

Conventional Parameters in Water

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD)	Bias %Rec. of LCS	Lab
RESIDUE, TOTAL NONFILTRABLE (MG/L)	mg/L	water	SM 2540D	00530	5	4	NA	NA	NA	HHD-BLS
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	SM 4500-NH3 H	00610	0.1	0.1	70-130	20	80-120	HHD-BLS
NITRITE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00615	0.05	0.02	70-130	20	80-120	HHD-BLS
NITRATE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00620	0.05	0.02	70-130	20	80-120	HHD-BLS
NITROGEN, KJELDAHL, TOTAL (MG/L AS N)	mg/L	water	~~SM 4500-N_{org} B or C and SM 4500-NH3 C~~ EPA 351.2	00625	0.2	0.2	70-130	20	80-120	Eastex
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	mg/L	water	EPA 365.1	00665	0.06	0.02	70-130	20	80-120	HHD-BLS
CHLORIDE (MG/L AS CL)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00940	5	5	70-130	20	80-120	HHD-BLS
SULFATE (MG/L AS SO4)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00945	5	5	70-130	20	80-120	HHD-BLS

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.
TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.3d Measurement Performance Specifications for City of Houston, Health Department (HHD)

Bacteriological Parameters in Water

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Log Difference of Duplicates	Bias %Rec. of LCS	Lab
E. COLI, COLILERT, IDEXX METHOD, MPN/100ML	MPN/100 mL	water	IDEXX Colilert 18	31699	1	1	NA	0.50*	NA	HHD-BLS
ENTEROCOCCI, ENTEROLERT, IDEXX, (MPN/100 ML)	MPN/100 mL	water	Enterolert	31701	1***	10	NA	0.50*	NA	HHD-BLS
E.COLI, COLILERT, IDEXX, HOLDING TIME	hours	water	NA	31704	NA	NA	NA	NA	NA	HHD-BLS

* This value is not expressed as a relative percent difference. It represents the maximum allowable difference between the logarithm of the result of a sample and the logarithm of the duplicate result. See Section B5.
** E.coli samples analyzed by these methods should always be processed as soon as possible and within 8 hours. When transport conditions necessitate delays in delivery longer than 6 hours, the holding time may be extended and samples must be processed as soon as possible and within 30 hours.
***Enterococcus samples should be diluted 1:10 for all waters.

References:
United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.
TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.4a Measurement Performance Specifications for City of Houston, Drinking Water Operations (DWO)

Field Parameters

Parameter	Units	Matrix	Method	Parameter Code	Lab
TEMPERATURE, WATER (DEGREES CENTIGRADE)*	DEG C	water	SM 2550 B and TCEQ SOP V1	00010	Field
TRANSPARENCY, SECCHI DISC (METERS)*	meters	water	TCEQ SOP V1	00078	Field
SPECIFIC CONDUCTANCE,FIELD (US/CM @ 25C)*	us/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	Field
OXYGEN, DISSOLVED (MG/L)*	mg/L	water	SM 4500-O G and TCEQ SOP V1	00300	Field
PH (STANDARD UNITS)*	s.u	water	EPA 150.1 and TCEQ SOP V1	00400	Field
DAYS SINCE PRECIPITATION EVENT (DAYS)	days	other	TCEQ SOP V1	72053	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE*	meters	water	TCEQ SOP V2	82903	Field
RESERVOIR STAGE (FEET ABOVE MEAN SEA LEVEL)***	FT ABOVE MSL	water	TWDB	00052	Field
RESERVOIR PERCENT FULL***	% RESERVOIR CAPACITY	water	TWDB	00053	Field
RESERVOIR ACCESS NOT POSSIBLE LEVEL TOO LOW ENTER 1 IF REPORTING	NS	other	TCEQ Drought Guidance	00051	Field
WIND INTENSITY (1=CALM,2=SLIGHT,3=MOD.,4=STRONG)	NU	other	NA	89965	Field
PRESENT WEATHER (1=CLEAR,2=PTCLDY,3=CLDY,4=RAIN,5=OTHER)	NU	other	NA	89966	Field
WATER SURFACE(1=CALM,2=RIPPLE,3=WAVE,4=WHITECAP)	NU	water	NA	89968	Field
WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGGS, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER (WRITE IN COMMENTS))	NU	water	NA	89971	Field
WATER COLOR 1=BRWN 2=RED 3=GRN 4=BLCK 5=CLR 6=OT	NU	water	NA	89969	Field
TURBIDITY, OBSERVED (1=LOW, 2=MEDIUM, 3=HIGH)	NU	water	NA	88842	Field

* Reporting to be consistent with SWQM guidance and based on measurement capability.
*** As published by the Texas Water Development Board on their website https://www.waterdatafortexas.org/reservoirs/statewide

References:
United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.
TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.4b Measurement Performance Specifications for City of Houston, Drinking Water Operations (D					
Flow Parameters					
Parameter	**Units**	**Matrix**	**Method**	**Parameter Code**	**Lab**
FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)	cfs	water	TCEQ SOP V1	00061	Field
FLOW SEVERITY:1=No Flow,2=Low,3=Normal,4=Flood,5=High,6=Dry	NU	water	TCEQ SOP V1	01351	Field
FLOW MTH 1=GAGE 2=ELEC 3=MECH 4=WEIR/FLU 5=DOPPLER	NU	other	TCEQ SOP V1	89835	Field

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020

U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard

Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.4c Measurement Performance Specifications for City of Houston, Drinking Water Operations (DWO)										
Conventional Parameters in Water										
Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD)	Bias %Rec. of LCS	Lab
ALKALINITY, TOTAL (MG/L AS CACO3)	mg/L	water	SM 2320B	00410	20	20	NA	20	NA	DWO
RESIDUE, TOTAL NONFILTRABLE (MG/L)	mg/L	water	SM 2540D	00530	5	4	NA	NA	NA	DWO
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	EPA 350.3	00610	0.1	0.1	70-130	20	80-120	DWO
NITRATE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00620	0.05	0.04	70-130	20	80-120	DWO
NITRITE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00615	0.05	0.04	70-130	20	80-120	DWO
NITROGEN, KJELDAHL, TOTAL (MG/L AS N)	mg/L	water	~~SM 4500-N_{org} B or C and SM 4500-NH3 C~~ EPA 351.2	00625	0.2	0.2	70-130	20	80-120	Eastex
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	mg/L	water	EPA 365.3	00665	0.06	0.02	70-130	20	80-120	DWO
CHLORIDE (MG/L AS CL)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00940	5	5	70-130	20	80-120	DWO
SULFATE (MG/L AS SO4)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00945	5	5	70-130	20	80-120	DWO
CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	ug/L	water	EPA 446.0	32211	3	3	NA	20	80-120	Eastex

References:
United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.
TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.4d Measurement Performance Specifications for City of Houston, Drinking Water Operations (DWO)

Bacteriological Parameters in Water

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Log Difference of Duplicates	Bias %Rec. of LCS	Lab
E. COLI, COLILERT, IDEXX METHOD, MPN/100ML	MPN/100 mL	water	SM 9223-B**	31699	1	1	NA	0.50*	NA	DWO
E.COLI, COLILERT, IDEXX, HOLDING TIME	hours	water	NA	31704	NA	NA	NA	NA	NA	DWO

* This value is not expressed as a relative percent difference. It represents the maximum allowable difference between the logarithm of the result of a sample and the logarithm of the duplicate result. See Section B5.

** E.coli samples analyzed by these methods should always be processed as soon as possible and within 8 hours. When transport conditions necessitate delays in delivery longer than 6 hours, the holding time may be extended and samples must be processed as soon as possible and within 30 hours.

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020

U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.5a Measurement Performance Specifications for San Jacinto River Authority - Lake Conroe (SJRA-LC)

Field Parameters

Parameter	Units	Matrix	Method	Parameter Code	Lab
TEMPERATURE, WATER (DEGREES CENTIGRADE)*	DEG C	water	SM 2550 B and TCEQ SOP V1	00010	Field
TRANSPARENCY, SECCHI DISC (METERS)*	meters	water	TCEQ SOP V1	00078	Field
SPECIFIC CONDUCTANCE,FIELD (US/CM @ 25C)*	us/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	Field
OXYGEN, DISSOLVED (MG/L)*	mg/L	water	SM 4500-O G and TCEQ SOP V1	00300	Field
PH (STANDARD UNITS)*	s.u	water	EPA 150.1 and TCEQ SOP V1	00400	Field
DAYS SINCE PRECIPITATION EVENT (DAYS)	days	other	TCEQ SOP V1	72053	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE*	meters	water	TCEQ SOP V2	82903	Field
RESERVOIR STAGE (FEET ABOVE MEAN SEA LEVEL)***	FT ABOVE MSL	water	TWDB	00052	Field
RESERVOIR PERCENT FULL***	% RESERVOIR CAPACITY	water	TWDB	00053	Field
RESERVOIR ACCESS NOT POSSIBLE LEVEL TOO LOW ENTER 1 IF REPORTING	NS	other	TCEQ Drought Guidance	00051	Field
WIND INTENSITY (1=CALM,2=SLIGHT,3=MOD.,4=STRONG)	NU	other	NA	89965	Field
PRESENT WEATHER (1=CLEAR,2=PTCLDY,3=CLDY,4=RAIN,5=OTHER)	NU	other	NA	89966	Field
WATER SURFACE(1=CALM,2=RIPPLE,3=WAVE,4=WHITECAP)	NU	water	NA	89968	Field
WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGGS, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER (WRITE IN COMMENTS))	NU	water	NA	89971	Field
WATER COLOR 1=BRWN 2=RED 3=GRN 4=BLCK 5=CLR 6=OT	NU	water	NA	89969	Field

* Reporting to be consistent with SWQM guidance and based on measurement capability.
*** As published by the Texas Water Development Board on their website https://www.waterdatafortexas.org/reservoirs/statewide

References:
United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.
TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.5b Measurement Performance Specifications for San Jacinto River Authority - Lake Conroe (SJRA-LC)

Conventional Parameters in Water

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD)	Bias %Rec. of LCS	Lab
ALKALINITY, TOTAL (MG/L AS CACO3)	mg/L	water	SM 2320B	00410	20	20	NA	20	NA	DWO
RESIDUE, TOTAL NONFILTRABLE (MG/L)	mg/L	water	SM 2540D	00530	5	4	NA	NA	NA	DWO
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	EPA 350.3	00610	0.1	0.1	70-130	20	80-120	DWO
NITRATE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00620	0.05	0.04	70-130	20	80-120	DWO
NITRITE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00615	0.05	0.04	70-130	20	80-120	DWO
NITROGEN, KJELDAHL, TOTAL (MG/L AS N)	mg/L	water	~~SM 4500-N_{org} B or C and SM 4500-NH3 C~~ EPA 351.2	00625	0.2	0.2	70-130	20	80-120	Eastex
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	mg/L	water	EPA 365.3	00665	0.06	0.02	70-130	20	80-120	DWO
CHLORIDE (MG/L AS CL)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00940	5	5	70-130	20	80-120	DWO
SULFATE (MG/L AS SO4)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00945	5	5	70-130	20	80-120	DWO
CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	ug/L	water	EPA 446.0	32211	3	3	NA	20	80-120	Eastex

References:
United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.
TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.5c Measurement Performance Specifications for San Jacinto River Authority - Lake Conroe (SJRA-LC)

Bacteriological Parameters in Water

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Log Difference of Duplicates	Bias %Rec. of LCS	Lab
E. COLI, COLILERT, IDEXX METHOD, MPN/100ML	MPN/100 mL	water	SM 9223-B**	31699	1	1	NA	0.50*	NA	DWO
E.COLI, COLILERT, IDEXX, HOLDING TIME	hours	water	NA	31704	NA	NA	NA	NA	NA	DWO

* This value is not expressed as a relative percent difference. It represents the maximum allowable difference between the logarithm of the result of a sample and the logarithm of the duplicate result. See Section B5.

** E.coli samples analyzed by these methods should always be processed as soon as possible and within 8 hours. When transport conditions necessitate delays in delivery longer than 6 hours, the holding time may be extended and samples must be processed as soon as possible and within 30 hours.

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020

U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.6a Measurement Performance Specifications for San Jacinto River Authority - samples from The Woodlands (SJRA-W)

Field Parameters

Parameter	Units	Matrix	Method	Parameter Code	Lab
TEMPERATURE, WATER (DEGREES CENTIGRADE)*	DEG C	water	SM 2550 B and TCEQ SOP V1	00010	Field
TRANSPARENCY, SECCHI DISC (METERS)*	meters	water	TCEQ SOP V1	00078	Field
SPECIFIC CONDUCTANCE,FIELD (US/CM @ 25C)*	us/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	Field
OXYGEN, DISSOLVED (MG/L)*	mg/L	water	SM 4500-O G and TCEQ SOP V1	00300	Field
PH (STANDARD UNITS)*	s.u	water	EPA 150.1 and TCEQ SOP V1	00400	Field
DAYS SINCE PRECIPITATION EVENT (DAYS)	days	other	TCEQ SOP V1	72053	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE*	meters	water	TCEQ SOP V2	82903	Field
RESERVOIR STAGE (FEET ABOVE MEAN SEA LEVEL)***	FT ABOVE MSL	water	TWDB	00052	Field
RESERVOIR PERCENT FULL***	% RESERVOIR CAPACITY	water	TWDB	00053	Field
RESERVOIR ACCESS NOT POSSIBLE LEVEL TOO LOW ENTER 1 IF REPORTING	NS	other	TCEQ Drought Guidance	00051	Field
PRESENT WEATHER (1=CLEAR,2=PTCLDY,3=CLDY,4=RAIN,5=OTHER)	NU	other	NA	89966	Field
WIND INTENSITY (1=CALM,2=SLIGHT,3=MOD.,4=STRONG)	NU	other	NA	89965	Field
WATER SURFACE(1=CALM,2=RIPPLE,3=WAVE,4=WHITECAP)	NU	water	NA	89968	Field
WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGGS, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER (WRITE IN COMMENTS))	NU	water	NA	89971	Field
WATER COLOR 1=BRWN 2=RED 3=GRN 4=BLCK 5=CLR 6=OT	NU	water	NA	89969	Field

* Reporting to be consistent with SWQM guidance and based on measurement capability.
*** As published by the Texas Water Development Board on their website https://www.waterdatafortexas.org/reservoirs/statewide

References:
United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.
TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.6b Measurement Performance Specifications for San Jacinto River Authority - samples from The Woodlands (SJRA-W)

Flow Parameters

Parameter	Units	Matrix	Method	Parameter Code	Lab
FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)	cfs	water	TCEQ SOP V1	00061	Field
FLOW SEVERITY:1=No Flow,2=Low,3=Normal,4=Flood,5=High,6=Dry	NU	water	TCEQ SOP V1	01351	Field
FLOW MTH 1=GAGE 2=ELEC 3=MECH 4=WEIR/FLU 5=DOPPLER	NU	other	TCEQ SOP V1	89835	Field

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.
TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.6c Measurement Performance Specifications for San Jacinto River Authority - samples from The Woodlands (SJRA-W)										
Conventional Parameters in Water										
Parameter	**Units**	**Matrix**	**Method**	**Parameter Code**	**TCEQ AWRL**	**LOQ**	**LOQ Check Sample %Rec**	**Precision (RPD)**	**Bias %Rec. of LCS**	**Lab**
RESIDUE, TOTAL NONFILTRABLE (MG/L)	mg/L	water	SM 2540D	00530	5	1	NA	NA	NA	Eastex
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	SM 4500 NH3 G	00610	0.1	0.1	70-130	20	80-120	Eastex
NITRITE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0	00615	0.05	0.05	70-130	20	80-120	Eastex
NITRATE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0	00620	0.05	0.05	70-130	20	80-120	Eastex
NITROGEN, KJELDAHL, TOTAL (MG/L AS N)	mg/L	water	~~SM 4500-N_{org} B or C and SM 4500-NH3 C~~ EPA 351.2	00625	0.2	0.2	70-130	20	80-120	Eastex
NITRITE PLUS NITRATE, TOTAL ONE LAB DETERMINED VALUE (MG/L AS N)	mg/L	water	SM 4500 - NO3 - F	00630	0.05	0.02	70-130	20	80-120	Eastex
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	mg/L	water	EPA 200.7	00665	0.06	0.06	70-130	20	80-120	Eastex
CHLORIDE (MG/L AS CL)	mg/L	water	EPA 300.0	00940	5	5	70-130	20	80-120	Eastex
SULFATE (MG/L AS SO4)	mg/L	water	EPA 300.0	00945	5	4	70-130	20	80-120	Eastex
CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	ug/L	water	EPA 446.0	32211	3	3	NA	20	80-120	Eastex

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.
TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.6d Measurement Performance Specifications for San Jacinto River Authority - samples from The Woodlands (SJRA-W)

Bacteriological Parameters in Water

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Log Difference of Duplicates	Bias %Rec. of LCS	Lab
E. COLI, COLILERT, IDEXX METHOD, MPN/100ML	MPN/100 mL	water	Colilert**	31699	1	1	NA	0.50*	NA	Eastex
E.COLI, COLILERT, IDEXX, HOLDING TIME	hours	water	NA	31704	NA	NA	NA	NA	NA	Eastex

* This value is not expressed as a relative percent difference. It represents the maximum allowable difference between the logarithm of the result of a sample and the logarithm of the duplicate result. See Section B5.

** E.coli samples analyzed by these methods should always be processed as soon as possible and within 8 hours. When transport conditions necessitate delays in delivery longer than 6 hours, the holding time may be extended and samples must be processed as soon as possible and within 30 hours.

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020

U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.7a Measurement Performance Specifications for Environmental Institute of Houston (EIH)

Field Parameters

Parameter	Units	Matrix	Method	Parameter Code	Lab
TEMPERATURE, WATER (DEGREES CENTIGRADE)*	DEG C	water	SM 2550 B and TCEQ SOP V1	00010	Field
TRANSPARENCY, SECCHI DISC (METERS)*	meters	water	TCEQ SOP V1	00078	Field
SPECIFIC CONDUCTANCE,FIELD (US/CM @ 25C)*	us/cm	water	EPA 120.1 and TCEQ SOP, V1	00094	Field
OXYGEN, DISSOLVED (MG/L)*	mg/L	water	SM 4500-O G and TCEQ SOP V1	00300	Field
PH (STANDARD UNITS)*	s.u	water	EPA 150.1 and TCEQ SOP V1	00400	Field
SALINITY - PARTS PER THOUSAND	PPT	water	SM 2520 and TCEQ SOP V1	00480	Field
DAYS SINCE PRECIPITATION EVENT (DAYS)	days	other	TCEQ SOP V1	72053	Field
DEPTH OF BOTTOM OF WATER BODY AT SAMPLE SITE*	meters	water	TCEQ SOP V2	82903	Field
MAXIMUM POOL WIDTH AT TIME OF STUDY (METERS)**	meters	other	TCEQ SOP V2	89864	Field
MAXIMUM POOL DEPTH AT TIME OF STUDY(METERS)**	meters	other	TCEQ SOP V2	89865	Field
POOL LENGTH, METERS**	meters	other	TCEQ SOP V2	89869	Field
% POOL COVERAGE IN 500 METER REACH**	%	other	TCEQ SOP V2	89870	Field
WIND INTENSITY (1=CALM,2=SLIGHT,3=MOD.,4=STRONG)	NU	other	NA	89965	Field
PRESENT WEATHER (1=CLEAR,2=PTCLDY,3=CLDY,4=RAIN,5=OTHER)	NU	other	NA	89966	Field
WATER SURFACE(1=CALM,2=RIPPLE,3=WAVE,4=WHITECAP)	NU	water	NA	89968	Field
TIDE STAGE 1=LOW,2=FALLING,3=SLACK,4=RISING,5=HI	NU	water	NA	89972	Field
WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGGS, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER (WRITE IN COMMENTS))	NU	water	NA	89971	Field
WATER COLOR 1=BRWN 2=RED 3=GRN 4=BLCK 5=CLR 6=OT	NU	water	NA	89969	Field

* Reporting to be consistent with SWQM guidance and based on measurement capability.

** To be routinely reported when collecting data from perennial pools.

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020

U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.7b Measurement Performance Specifications for Environmental Institute of Houston (EIH)

Flow Parameters

Parameter	Units	Matrix	Method	Parameter Code	Lab
FLOW STREAM, INSTANTANEOUS (CUBIC FEET PER SEC)	cfs	water	TCEQ SOP V1	00061	Field
FLOW SEVERITY:1=No Flow,2=Low,3=Normal,4=Flood,5=High,6=Dry	NU	water	TCEQ SOP V1	01351	Field
FLOW MTH 1=GAGE 2=ELEC 3=MECH 4=WEIR/FLU 5=DOPPLER	NU	other	TCEQ SOP V1	89835	Field

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.
TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.7c Measurement Performance Specifications for Environmental Institute of Houston (EIH)

Conventional Parameters in Water

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Precision (RPD)	Bias %Rec. of LCS	Lab
RESIDUE, TOTAL NONFILTRABLE (MG/L)	mg/L	water	SM 2540D	00530	5	1	NA	NA	NA	Eastex
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	SM 4500 NH3G	00610	0.1	0.1	70-130	20	80-120	Eastex
NITRITE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0	00615	0.05	0.05	70-130	20	80-120	Eastex
NITRATE NITROGEN, TOTAL (MG/L AS N)	mg/L	water	EPA 300.0	00620	0.05	0.05	70-130	20	80-120	Eastex
NITROGEN, KJELDAHL, TOTAL (MG/L AS N)	mg/L	water	~~SM 4500-Norg B or C and SM 4500-NH3 C~~ EPA 351.2	00625	0.2	0.2	70-130	20	80-120	Eastex
NITRITE PLUS NITRATE, TOTAL ONE LAB DETERMINED VALUE (MG/L AS N)	mg/L	water	SM 4500-NO3 F	00630	0.05	0.02	70-130	20	80-120	Eastex
PHOSPHORUS, TOTAL, WET METHOD (MG/L AS P)	mg/L	water	EPA 200.7	00665	0.06	0.06	70-130	20	80-120	Eastex
CHLORIDE (MG/L AS CL)	mg/L	water	EPA 300.0	00940	5	5	70-130	20	80-120	Eastex
SULFATE (MG/L AS SO4)	mg/L	water	EPA 300.0	00945	5	4	70-130	20	80-120	Eastex
CHLOROPHYLL-A UG/L SPECTROPHOTOMETRIC ACID. METH	ug/L	water	EPA 446.0	32211	3	3	NA	20	80-120	Eastex

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.
TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).
TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.7d Measurement Performance Specifications for Environmental Institute of Houston (EIH)

Bacteriological Parameters in Water

Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	LOQ	LOQ Check Sample %Rec	Log Difference of Duplicates	Bias %Rec. of LCS	Lab
E. COLI, COLILERT, IDEXX METHOD, MPN/100ML	MPN/100 mL	water	Colilert**	31699	1	1	NA	0.50*	NA	Eastex
ENTEROCOCCI, ENTEROLERT, IDEXX, (MPN/100 ML)	MPN/100 mL	water	Enterolert	31701	1***	10	NA	0.50*	NA	Eastex
E.COLI, COLILERT, IDEXX, HOLDING TIME	hours	water	NA	31704	NA	NA	NA	NA	NA	Eastex

* This value is not expressed as a relative percent difference. It represents the maximum allowable difference between the logarithm of the result of a sample and the logarithm of the duplicate result. See Section B5.

** E.coli samples analyzed by these methods should always be processed as soon as possible and within 8 hours. When transport conditions necessitate delays in delivery longer than 6 hours, the holding time may be extended and samples must be processed as soon as possible and within 30 hours.

***Enterococcus Samples should be diluted 1:10 for all waters.

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020

U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.

TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods, 2012 (RG-415).

TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

TABLE A7.1e Measurement Performance Specifications for Environmental Institute of Houston (EIH)

24 HourParameters in Water

Parameter	Units	Matrix	Method	Parameter Code	Lab
TEMPERATURE, WATER (DEGREES CENTIGRADE), 24HR AVG	DEG C	Water	TCEQ SOP V1	00209	field
WATER TEMPERATURE, DEGREES CENTIGRADE, 24HR MAX	DEG C	Water	TCEQ SOP V1	00210	field
TEMPERATURE, WATER (DEGREES CENTIGRADE) 24HR MIN	DEG C	Water	TCEQ SOP V1	00211	field
SPECIFIC CONDUCTANCE, US/CM, FIELD, 24HR AVG	uS/cm	Water	TCEQ SOP V1	00212	field
SPECIFIC CONDUCTANCE, US/CM, FIELD, 24HR MAX	uS/cm	Water	TCEQ SOP V1	00213	field
SPECIFIC CONDUCTANCE, US/CM, FIELD, 24HR MIN	uS/cm	Water	TCEQ SOP V1	00214	field
PH, S.U., 24HR MAXIMUM VALUE	std. units	Water	TCEQ SOP V1	00215	field
PH, S.U., 24HR, MINIMUM VALUE	std. units	Water	TCEQ SOP V1	00216	field
WATER TEMPERATURE, # OF MEASUREMENTS IN 24-HRS	NU	Water	TCEQ SOP V1	00221	field
SPECIFIC CONDUCTANCE, # OF MEASUREMENTS IN 24-HRS	NU	Water	TCEQ SOP V1	00222	field
pH, # OF MEASUREMENTS IN 24-HRS	NU	Water	TCEQ SOP V1	00223	field
DISSOLVED OXYGEN, 24-HOUR MIN. (MG/L) MIN. 4 MEA	mg/l	Water	TCEQ SOP V1	89855	field
DISSOLVED OXYGEN, 24-HOUR MAX. (MG/L) MIN. 4 MEA	mg/l	Water	TCEQ SOP V1	89856	field
DISSOLVED OXYGEN, 24-HOUR AVG. (MG/L) MIN. 4 MEA	mg/l	Water	TCEQ SOP V1	89857	field
DISSOLVED OXYGEN, # OF MEASUREMENTS IN 24-HRS	NU	Water	TCEQ SOP V1	89858	field

References:

United States Environmental Protection Agency (USEPA) Methods for Chemical Analysis of Water and Wastes, Manual #EPA-600/4-79-020
U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment, Part 136
American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017.
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TCEQ SOP, V2 - TCEQ Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data, 2014 (RG-416).

H-GAC's FY2020 Coordinated Monitoring Schedule
Amendment 1

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	MT	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
SAN JACINTO RIVER TIDAL IMMEDIATELY DOWNSTREAM OF IH 10 BRIDGE EAST OF CHANNELVIEW	11193	1001	10	12	HG	HC	RT	12	12	12				
SAN JACINTO RIVER TIDAL 23 METERS SOUTH AND 735 METERS EAST OF INTERSECTION OF WALLISVILLE ROAD AND 7TH STREET	11198	1001	10	12	HG	HC	RT	12	12	12				
SAN JACINTO RIVER TIDAL IMMEDIATELY DOWNSTREAM OF US 90 BRIDGE EAST OF SHELDON	11200	1001	10	12	HG	HC	RT	12	12	12				
SAN JACINTO RIVER TIDAL AT MAGNOLIA GARDENS 1.78 KM UPSTREAM OF US BUS 90U/ BEAUMONT HIGHWAY IN HOUSTON	11201	1001	10	12	HG	HC	RT	12	12	12				
HOUSTON SHIP CHANNEL AT BAYTOWN TUNNEL/CM 103 1.84 KM NORTH AND 1.17 KM EAST OF INTERSECTION OF SH 225 AND SH 146	11254	1005	10	12	HG	HC	RT	12	12	12				
HOUSTON SHIP CHANNEL AT SAN JACINTO PK WEST OF THE BATTLESHIP TX 317 M N AND 303 M W OF INTERSECTION OF BATTLEGROUND RD AND MARKER DR	11264	1006	10	12	HG	HC	RT	12	12	12				
HOUSTON SHIP CHANNEL AT CONFLUENCE WITH GREENS BAYOU/CM 152	11271	1006	10	12	HG	HC	RT	12	12	12				
HOUSTON SHIP CHANNEL/BUFFALO BAYOU HSC AT WASHBURN TUNNEL	11283	1007	10	12	HG	HC	RT	12	12	12				
HSC/BUFFALO BAYOU IN TURNING BASIN 2.82 K UPSTREAM OF CONFLUENCE WITH BRAYS BAYOU 433 M S AND 182 M W OF INTERSECT OF SIGNET AND DORSETT	11292	1007	10	12	HG	HC	RT	12	12	12				
CLEAR LAKE AT SH 146 DRAWBRIDGE	13332	2425	24	12	HG	HC	RT	6	6	6				
TABBS BAY MIDWAY BETWEEN GOOSE CREEK AND UPPER HOG ISLAND	13338	2426	24	12	HG	HC	RT	6	6	6				
BLACK DUCK BAY AT MID BAY 0.6 KM NE OF SH 146 BRIDGE AND 0.6 KM SE OF END OF OKLAHOMA ST IN BAYTOWN	13340	2428	24	12	HG	HC	RT	6	6	6				
BURNETT BAY AT MID BAY 1.3 KM SSW OF CONFLUENCE WITH SPRING GULLY AND 1.6 KM SE OF LYNCHBURG ROAD	13344	2430	24	12	HG	HC	RT	6	6	6				
ARMAND BAYOU TIDAL 25 M WEST OF CLEAR LAKE PARK FISHING PIER IN MUD LAKE/PASADENA LAKE IN HARRIS COUNTY	15455	1113	11	12	HG	HC	RT	6	6	6				
CLEAR CREEK TIDAL AT THE CONFLUENCE WITH CLEAR LAKE 30 M NORTH AND 266 M WEST OF DAVIS ROAD AT VEGA COURT IN LEAGUE CITY IN HARRIS COUNTY	16573	1101	11	12	HG	HC	RT	6	6	6				
HOUSTON SHIP CHANNEL AT CARGILL TERMINAL NORTH OF TIDAL ROAD	16617	1006	10	12	HG	HC	RT	12	12	12				
HOUSTON SHIP CHANNEL W OF EXXON DOCKS AND N OF ALEXANDER ISLAND 316 M S AND 1.55 KM W OF INTERSECTION OF BAYWAY DR AND BAYTOWN AVE	16618	1005	10	12	HG	HC	RT	12	12	12				
HOUSTON SHIP CHANNEL AT LYNCHBURG FERRY INN SOUTH OF LYNCHBURG RD 658 M N AND 802 M E OF INTERSECTION OF BATTLEGROUND RD AND TIDAL RD	16619	1005	10	12	HG	HC	RT	12	12	12				
HOUSTON SHIP CHANNEL/BUFFALO BAYOU AT MAYO SHELL RD 1.42 KM S AND 41 M W OF INTERSECTION OF MAYO SHELL RD AND CLINTON DR IN HOUSTON	16620	1007	10	12	HG	HC	RT	12	12	12				
SAN JACINTO RIVER TIDAL AT CONFLUENCE WITH HSC 226 M S AND 1.07 KM W OF INTERSECTION OF S LYNCHBURG RD AND POQUENO RD IN HOUSTON	16621	1005	10	12	HG	HC	RT	12	12	12				
SAN JACINTO RIVER TIDAL AT BANANA BEND ROAD AT END OF PAVEMENT IN HOUSTON	16622	1001	10	12	HG	HC	RT	12	12	12				
SAN JACINTO RIVER TIDAL MID STREAM AT TERMINUS OF SHADY LANE IN CHANNELVIEW 9 M S AND 648 M W OF INTERSECTION OF SHADY LN AND PARK DR	17919	1001	10	12	HG	HC	RT	12	12	12				
CRYSTAL BAY IN BAYTOWN 383 METERS WEST AND 137 METERS SOUTH OF THE INTERSECTION OF BAYSHORE DRIVE AND CROW ROAD	17921	2430A	24	12	HG	HC	RT	6	6	6				

H-GAC's FY2020 Coordinated Monitoring Schedule
Amendment 1

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	MT	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
SCOTT BAY 1.2 KM SW OF INTERSECTION OF BAYWAY DRIVE AND PARK STREET IN BAYTOWN	17922	2429	24	12	HG	HC	RT	6	6	6				
UPPER SAN JACINTO BAY UNDERNEATH ELECTRICAL TRANSMISSION LINES 2.1 KM E/NE OF INTERSECTION OF MILLER CUTOFF RD AND OLD CLARK RD	17923	2427	24	12	HG	HC	RT	6	6	6				
LOWER SAN JACINTO BAY MID CHANNEL SOUTH OF SH 146 1 KM NE OF INTERSECTION OF SH 225 AND STRANG ROAD IN LAPORTE	17924	2427	24	12	HG	HC	RT	6	6	6				
BARBOUR'S CUT NEAR NORTH BANK 0.5 KM NNW OF THE INTERSECTION OF BARBOURS CUT BLVD AND MAPLE ST	17925	2436	24	12	HG	HC	RT	6	6	6				
GOOSE CREEK NEAR SH 146 340 M SOUTH OF THE INTERSECTION OF SH 146 AND WEST MAIN IN BAYTOWN	17927	2426C	24	12	HG	HC	RT	6	6	6				
HARRIS COUNTY FLOOD CONTROL DITCH A TRIBUTARY TO TAYLOR BAYOU 385 M UPSTREAM OF CONFLUENCE WEST OF SH 146 AT PORT ROAD IN HARRIS COUNTY	20012	2425E	24	12	HG	HC	RT	6	6	6				
TAYLOR BAYOU MID CHANNEL 400 M DOWNSTREAM OF PORT ROAD BRIDGE IN HARRIS COUNTY	20013	2425A	24	12	HG	HC	RT	6	6	6				
CLEAR LAKE UNNAMED INLET 115 M SOUTHWEST OF THE INTERSECTION OF NASA ROAD 1 AND OCEANVIEW DRIVE IN SEABROOK IN HARRIS COUNTY	20014	2425	24	12	HG	HC	RT	6	6	6				
TAYLOR LAKE MID LAKE AT BLUE WINDOWS 230 M SOUTH OF LAKEWAY DRIVE AT RAY SHELL COURT/HARBOR COVE CIRCLE IN HARRIS COUNTY	20015	2425A	24	12	HG	HC	RT	6	6	6				
CARPENTERS BAYOU AT MOUTH OF BARGE CANAL 32 METERS WEST AND 666 METERS SOUTH FROM THE INTERSECTION OF DE ZAVALLA ROAD AND HARDING ROAD/HARDING STREET IN HARRIS COUNTY	20797	1006	10	12	HG	HC	RT	12	12	12				
SPRING BRANCH IMMEDIATELY DOWNSTREAM OF SHAKEY HOLLOW WEST OF WOODBRANCH VILLAGE IN MONTGOMERY COUNTY	21965	1010C	10	12	HG	HG	BS				4	4		Started collecting 24-hr DO in 2/2017; Continue through FY21
BUFFALO BAYOU IMMEDIATELY DOWNSTREAM OF GREEN BUSH ROAD 3.1 MILES SOUTHEAST OF KATY	11145	1014B	10	12	HG	HG	RT	4	4	4	4			
CRYSTAL CREEK AT FM 1314 SOUTHEAST OF CONROE	11181	1004D	10	12	HG	HG	RT	10			10			Site added in FY19
WEST FORK SAN JACINTO RIVER IMMEDIATELY UPSTREAM OF SH 242	11243	1004	10	12	HG	HG	RT	10			10			Site added FY19
CANEY CREEK IMMEDIATELY UPSTREAM OF FM 2090 WEST OF SPLENDORA	11335	1010	10	12	HG	HG	RT	4	4	4	4			
LAKE CREEK AT EGYPT COMMUNITY ROAD 8.3 MILES SOUTHWEST OF CONROE	11367	1015	10	12	HG	HG	RT	4	4	4	4			
STEWARTS CREEK 175 METERS DOWNSTREAM OF SH LOOP 336 SOUTHEAST OF CONROE	16626	1004E	10	12	HG	HG	RT	10			10			Site added in FY19
EAST FORK SAN JACINTO RIVER IMMEDIATELY DOWNSTREAM OF SH 150 WEST OF COLDSPRING	17431	1003	10	10	HG	HG	RT	4	4	4	4			
MOUND CREEK 167 METERS DOWNSTREAM OF MULLIGAN ROAD 1.35 KM UPSTREAM OF CONFLUENCE WITH LAKE CREEK	17937	1015A	10	12	HG	HG	RT	4	4	4	4			
LAKE CREEK AT SH 105 NR DOBBIN	18192	1015	10	12	HG	HG	RT	4	4	4	4			This site replaces site 18191
SPRING CREEK AT ROBERTS CEMETERY ROAD WEST-NORTHWEST OF TOMBALL	18868	1008	10	12	HG	HG	RT	4	4	4	4			
CANEY CREEK AT FIRETOWER ROAD WEST TO THE CITY OF WOODBRANCH	20452	1010	10	12	HG	HG	RT	4	4	4	4			
CANEY CREEK AT COUNTY LINE ROAD IN MONTGOMERY COUNTY EAST TO THE CITY OF WILLIS	20453	1010	10	12	HG	HG	RT	4	4	4	4			
PEACH CREEK AT COUNTY LINE ROAD-FM 3081 NORTHEAST OF CONROE IN MONTGOMERY COUNTY	20454	1011	10	12	HG	HG	RT	4	4	4	4			
LITTLE CYPRESS CREEK AT MUESCHKE ROAD 4.4 KILOMETERS NORTH OF SH 290 NORTHWEST OF CYPRESS	20456	1009E	10	12	HG	HG	RT	4	4	4	4			
CYPRESS CREEK AT KATY HOCKLEY ROAD 7 KILOMETERS SOUTH OF SH 290 WEST OF CYPRESS	20457	1009	10	12	HG	HG	RT	4	4	4	4			
WALNUT CREEK AT DECKER PRAIRIE ROSEHL ROAD NORTHWEST OF TOMBALL	20462	1008I	10	12	HG	HG	RT	4	4	4	4			

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Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	MT	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
BRUSHY CREEK AT GLENMONT ESTATES BOULEVARD 265 METERS NORTH AND 35 METERS WEST TO THE INTERSECTION OF ARNDT LANE AND ANN CIRCLE WEST OF TOMBALL	20463	1008J	10	12	HG	HG	RT	4	4	4	4			
HORSEPEN CREEK AT FM 529 1.9 KILOMETERS EAST OF SH 6 NORTHWEST OF HOUSTON	20465	1014C	10	12	HG	HG	RT	4	4	4	4			
TARKINGTON BAYOU AT SH 105/SH 321 SOUTHEAST OF CLEVELAND	20466	1002A	10	12	HG	HG	RT	4	4	4	4			
WHITE OAK CREEK AT MEMORIAL DRIVE IN CONROE	20731	1004J	10	12	HG	HG	RT	4	4	4	4			
WINTERS BAYOU AT TONY TAP ROAD NEAR CLEVELAND	21417	1003A	10	10	HG	HG	RT	4	4	4	4			
MILL CREEK AT FM 149 NORTH OF TOMBALL	21957	1008A	10	12	HG	HG	RT	4	4	4	4			This site replaces site 20461 in Feb. 2017
SPRING BRANCH IMMEDIATELY DOWNSTREAM OF SHAKEY HOLLOW WEST OF WOODBRANCH VILLAGE IN MONTGOMERY COUNTY	21965	1010C	10	12	HG	HG	RT	4	4	4	4			This site replaces site 20451 in Feb. 2017
GARNERS BAYOU AT NORTH SAM HOUSTON PARKWAY/SH LOOP 8 NE OF HOUSTON	11125	1016A	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8074250
HALLS BAYOU AT JENSEN DRIVE IN HOUSTON	11126	1006D	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8076500
HALLS BAYOU 87 METERS UPSTREAM OF TIDWELL ROAD IN SETTEGAST	11127	1006D	10	12	HG	HH	RT	6	6	6				
HUNTING BAYOU IMMEDIATELY DOWNSTREAM OF IH 10 EAST OF HOUSTON	11128	1007R	10	12	HG	HH	RT	6	6	6				
HUNTING BAYOU AT NORTH LOOP EAST/IH 610 IN HOUSTON	11129	1007R	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8075770
SIMS BAYOU AT TELEPHONE ROAD/SH 35 IN HOUSTON	11132	1007D	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8075500
SIMS BAYOU AT CULLEN BLVD/FM 865 SOUTH OF HOUSTON	11133	1007D	10	12	HG	HH	RT	6	6	6				
SIMS BAYOU AT HIRAM CLARKE RD IN HOUSTON	11135	1007D	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8075400
BRAYS BAYOU IMMEDIATELY DOWNSTREAM OF ALMEDA ROAD SOUTHWEST OF HOUSTON	11138	1007B	10	12	HG	HH	RT	6	6	6				
BRAYS BAYOU AT SOUTH MAIN ST IN HOUSTON	11139	1007B	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8075000
BRAYS BAYOU AT SOUTH GESSNER DRIVE IN HOUSTON	11140	1007B	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8074810
LITTLE WHITE OAK BAYOU AT TRIMBLE STREET/NORTH EDGE OF HOLLYWOOD CEMETERY IN HOUSTON	11148	1013A	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8074540
VOGEL CREEK IMMEDIATELY DOWNSTREAM OF WEST LITTLE YORK ROAD	11155	1017C	10	12	HG	HH	RT	6	6	6				
ROLLING FORK CREEK IMMEDIATELY DOWNSTREAM OF LAKE LANE	11157	1017F	10	12	HG	HH	RT	6		6				
SOUTH MAYDE CREEK IMMEDIATELY DOWNSTREAM OF MEMORIAL DRIVE	11163	1014H	10	12	HG	HH	RT	6	6	6				
BRAYS/KEEGANS BAYOU IMMEDIATELY DOWNSTREAM OF ROARK ROAD NEAR US 59 AT BELTWAY 8 IN SOUTHWEST HOUSTON	11169	1007C	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8074800
LITTLE VINCE BAYOU IMMEDIATELY DOWNSTREAM OF NORTH MAIN STREET IN PASADENA TX	11172	1007	10	12	HG	HH	RT	6	6	6				
WILLOW CREEK IMMEDIATELY UPSTREAM OF GOSLING ROAD	11185	1008H	10	12	HG	HH	RT	6	6	6				
RUMMEL CREEK IMMEDIATELY DOWNSTREAM OF MEMORIAL DRIVE IN WEST HOUSTON	11188	1014N	10	12	HG	HH	RT	6	6	6				
GREENS BAYOU IMMEDIATELY DOWNSTREAM OF GREEN RIVER ROAD/LEY ROAD IN HOUSTON	11279	1006	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8076700
HUNTING BAYOU TIDAL AT FEDERAL ROAD BRIDGE IN HOUSTON	11298	1007	10	12	HG	HH	RT	6	6	6				
SIMS BAYOU TIDAL IMMEDIATELY DOWNSTREAM OF LAWNDALE AVENUE IN HOUSTON	11302	1007	10	12	HG	HH	RT	6	6	6				
BRAYS BAYOU TIDAL AT 75TH STREET IN HOUSTON	11306	1007	10	12	HG	HH	RT	6	6	6				
BRAYS BAYOU TIDAL AT SCOTT STREET IN HOUSTON	11309	1007	10	12	HG	HH	RT	6	6	6				
SPRING CREEK IMMEDIATELY DOWNSTREAM OF RILEY FUZZEL ROAD	11312	1008	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8068520
SPRING CREEK 1.13 KM UPSTREAM OF SH 249 NEAR DRAGONFLY RD IN SPRING CREEK PARK	11315	1008	10	12	HG	HH	RT	6	6	6				Replaced 11314 in FY2020 due to construction at bridge
SPRING CREEK IMMEDIATELY UPSTREAM OF DECKER PRAIRIE ROSEHILL ROAD	11323	1008	10	12	HG	HH	RT	6	6	6				
CYPRESS CREEK AT STEUBNER-AIRLINE ROAD IN HOUSTON	11330	1009	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8068900
CYPRESS CREEK AT SH 249	11331	1009	10	12	HG	HH	RT	6	6	6				

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CYPRESS CREEK IMMEDIATELY DOWNSTREAM OF GRANT ROAD NEAR CYPRESS	11332	1009	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8068800
CYPRESS CREEK IMMEDIATELY DOWNSTREAM OF HOUSE HAHL ROAD NEAR CYPRESS	11333	1009	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8068740
BUFFALO BAYOU TIDAL AT MCKEE ST IN HOUSTON	11345	1013	10	12	HG	HH	RT	6	6	6				
BUFFALO BAYOU TIDAL IMMEDIATELY DOWNSTREAM OF MAIN STREET IN HOUSTON	11347	1013	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8074600
BUFFALO BAYOU TIDAL AT SHEPHERD DRIVE IN HOUSTON	11351	1013	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8074000
BUFFALO BAYOU AT VOSS ROAD	11356	1014	10	12	HG	HH	RT	6	6	6				
BUFFALO BAYOU IMMEDIATELY DOWNSTREAM OF WEST BELTWAY 8 IN HOUSTON	11360	1014	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8073600
BUFFALO BAYOU AT WILCREST DRIVE IN HOUSTON	11361	1014	10	12	HG	HH	RT	6	6	6				
BUFFALO BAYOU IMMEDIATELY DOWNSTREAM OF DAIRY ASHFORD ROAD WEST OF HOUSTON	11362	1014	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8073500
BUFFALO BAYOU AT ELDRIDGE ROAD IN HOUSTON	11363	1014	10	12	HG	HH	RT	6	6	6				
BUFFALO BAYOU AT SH 6	11364	1014	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8072500
GREENS BAYOU AT TIDWELL ROAD IN HARRIS CO	11369	1016	10	12	HG	HH	RT	6	6	6				
GREENS BAYOU IMMEDIATELY DOWNSTREAM OF MT HOUSTON PARKWAY	11370	1016	10	12	HG	HH	RT	6	6	6				
GREENS BAYOU AT US 59 NORTH OF HOUSTON	11371	1016	10	12	HG	HH	RT	6	6	6				
GREENS BAYOU AT WEST GREENS PARKWAY	11376	1016	10	12	HG	HH	RT	6	6	6				
WHITEOAK BAYOU AT NORTH SHEPHERD STREET IN HOUSTON	11389	1017	10	12	HG	HH	RT	6	6	6				
WHITEOAK BAYOU AT NORTH HOUSTON ROSSLYN ROAD	11394	1017	10	12	HG	HH	RT	6	6	6				
WHITEOAK BAYOU IMMEDIATELY DOWNSTREAM OF TAHOE DRIVE	11396	1017	10	12	HG	HH	RT	6	6	6				
ARMAND BAYOU AT GENOA-RED BLUFF RD NE OF ELLINGTON AFB	11404	1113A	11	12	HG	HH	RT	6	6	6				
ARMAND BAYOU AT FAIRMONT PARKWAY ALONG MEDIAN AT MIDPOINT BETWEEN BRIDGES	11405	1113A	11	12	HG	HH	RT	6	6	6				
ARMAND BAYOU TIDAL AT BAY AREA BLVD NORTH OF NASA AT MIDDLE OF MEDIAN BETWEEN 2 BRIDGES EASTERN SHORE	11503	1113	11	12	HG	HH	RT	6	6	6				
GREENS BAYOU 184 METERS DOWNSTREAM OF KNOBCREST DRIVE	13778	1016	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8075900
LITTLE CYPRESS CREEK IMMEDIATELY DOWNSTREAM OF KLUGE ROAD IN HOUSTON	14159	1009E	10	12	HG	HH	RT	6	6	6				
WHITEOAK BAYOU IMMEDIATELY DOWNSTREAM OF WEST 43RD STREET IN NORTHWEST HOUSTON	15829	1017	10	12	HG	HH	RT	6	6	6				
WHITEOAK BAYOU AT WEST TIDWELL ROAD IN NORTHWEST HOUSTON	15831	1017	10	12	HG	HH	RT	6	6	6				
BUFFALO BAYOU TIDAL IMMEDIATELY UPSTREAM OF JENSEN DRIVE IN HOUSTON	15841	1007	10	12	HG	HH	RT	6	6	6				
BUFFALO BAYOU TIDAL AT SABINE STREET NORTH OF ALLEN PARKWAY IN HOUSTON	15843	1013	10	12	HG	HH	RT	6	6	6				
BUFFALO BAYOU AT CHIMNEY ROCK ROAD IN HOUSTON	15845	1014	10	12	HG	HH	RT	6	6	6				
BUFFALO BAYOU IMMEDIATELY DOWNSTREAM OF BRIAR FOREST DRIVE IN WEST HOUSTON	15846	1014	10	12	HG	HH	RT	6	6	6				
TURKEY CREEK 200 M UPSTREAM OF MEMORIAL DRIVE AT BRIDGE IN MEMORIAL OAKS CEMETERY	15847	1014K	10	12	HG	HH	RT	6	6	6				Moved upstream in mid-FY20
BRAYS BAYOU IMMEDIATELY DOWNSTREAM OF SH 6 IN WEST HOUSTON	15848	1007B	10	12	HG	HH	RT	6	6	6				
BRAYS BAYOU AT DAIRY ASHFORD STREET IN WEST HOUSTON	15850	1007B	10	12	HG	HH	RT	6	6	6				
BRAYS BAYOU AT WILCREST DRIVE IN WEST HOUSTON	15851	1007B	10	12	HG	HH	RT	6	6	6				
BRAYS BAYOU IMMEDIATELY DOWNSTREAM OF BEECHNUT STREET IN WEST HOUSTON	15852	1007B	10	12	HG	HH	RT	6	6	6				
BRAYS BAYOU IMMEDIATELY DOWNSTREAM OF HILLCROFT STREET IN WEST HOUSTON	15853	1007B	10	12	HG	HH	RT	6	6	6				
BRAYS BAYOU IMMEDIATELY DOWNSTREAM OF SOUTH RICE AVENUE IN WEST HOUSTON	15854	1007B	10	12	HG	HH	RT	6	6	6				
BRAYS BAYOU IMMEDIATELY DOWNSTREAM OF STELLA LINK ROAD IN HOUSTON	15855	1007B	10	12	HG	HH	RT	6	6	6				
HALLS BAYOU AT HOMESTEAD ROAD IN NORTHEAST HOUSTON	15862	1006D	10	12	HG	HH	RT	6	6	6				
HALLS BAYOU AT HIRSCH RD IN NORTHEAST HOUSTON	15863	1006D	10	12	HG	HH	RT	6	6	6				
HALLS BAYOU AT MESA DR IN NORTHEAST HOUSTON	15864	1006D	10	12	HG	HH	RT	6	6	6				
HUNTING BAYOU AT JENSEN DRIVE IN NORTHEAST HOUSTON	15867	1007R	10	12	HG	HH	RT	6	6	6				

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Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	MT	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
HUNTING BAYOU AT CAVALCADE ST IN NORTHEAST HOUSTON	15869	1007R	10	12	HG	HH	RT	6	6	6				
HUNTING BAYOU AT LOCKWOOD DRIVE IN NORTHEAST HOUSTON	15873	1007R	10	12	HG	HH	RT	6	6	6				
SIMS BAYOU IMMEDIATELY DOWNSTREAM OF ALMEDA ROAD IN SOUTH HOUSTON	15876	1007D	10	12	HG	HH	RT	6	6	6				
SIMS BAYOU AT MARTIN LUTHER KING JUNIOR BOULEVARD IN SOUTH HOUSTON	15877	1007D	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8075470
SIMS BAYOU AT SWALLOW STREET IN SOUTHEAST HOUSTON	15878	1007D	10	12	HG	HH	RT	6	6	6				
BRAYS BAYOU AT SOUTH WAYSIDE DRIVE 802 METERS UPSTREAM OF IH 45 IN SOUTHEAST HOUSTON	16479	1007	10	12	HG	HH	RT	6	6	6				
GARNERS BAYOU IMMEDIATELY UPSTREAM OF OLD HUMBLE ROAD AT CONFLUENCE WITH RIENHARDT BAYOU IN NORTHEAST HOUSTON	16589	1016A	10	12	HG	HH	RT	6	6	6				
UNNAMED TRIBUTARY OF GREENS BAYOU AT MESA DR/E. HOUSTON-DYERSDALE ROAD IN NORTHEAST HOUSTON	16590	1016B	10	12	HG	HH	RT	6	6	6				
SPRING BRANCH CREEK IMMEDIATELY UPSTREAM OF WIRT ROAD 331 METERS DOWNSTREAM OF IH 10 IN WEST HOUSTON	16592	1014O	10	12	HG	HH	RT	6	6	6				
COLE CREEK IMMEDIATELY UPSTREAM OF BOLIVIA BLVD 792 METERS UPSTREAM OF CONFLUENCE WITH WHITEOAK BAYOU IN NW HOUSTON	16593	1017B	10	12	HG	HH	RT	6	6	6				
BRICKHOUSE GULLY AT US 290 IN NORTHWEST HOUSTON 2.03 KM UPSTREAM OF CONFLUENCE WITH WHITEOAK BAYOU	16594	1017A	10	12	HG	HH	RT	6		6	6			Flow from gage 8074250
UNNAMED TRIBUTARY OF WHITE OAK BAYOU AT W 14TH IN WEST HOUSTON 516 METERS UPSTREAM OF CONFLUENCE WITH WHITE OAK BAYOU	16596	1017E	10	12	HG	HH	RT	6	6	6				
NEWMAN BRANCH / NEIMANS BAYOU AT MEMORIAL DRIVE IN WEST HOUSTON	16597	1014M	10	12	HG	HH	RT	6	6	6				
LITTLE WHITE OAK BAYOU AT WHITE OAK DRIVE IN NORTH HOUSTON	16648	1013A	10	12	HG	HH	RT	6	6	6				
COUNTRY CLUB BAYOU/TRIBUTARY OF BRAYS BAYOU IMMEDIATELY UPSTREAM OF SOUTH WAYSIDE DRIVE/US90A IN CENTRAL HOUSTON	16650	1007K	10	12	HG	HH	RT	6	6	6				
COUNTRY CLUB BAYOU/TRIBUTARY OF BRAYS BAYOU AT HUGHES STREET IN CENTRAL HOUSTON	16651	1007K	10	12	HG	HH	RT	6	6	6				
WILLOW WATERHOLE AT MCDERMED DRIVE IN SOUTHWEST HOUSTON	16652	1007E	10	12	HG	HH	RT	6		6				
KUHLMAN GULLY/TRIBUTARY OF BRAYS BAYOU AT BROCK STREET 311 METERS UPSTREAM OF WHEELER STREET IN SOUTHEAST CENTRAL HOUSTON	16653	1007G	10	12	HG	HH	RT	6	6	6				
UNNAMED TRIBUTARY OF BRAYS BAYOU AT DUMFRIES DRIVE IN SOUTH WEST HOUSTON	16654	1007L	10	12	HG	HH	RT	6	6	6				
UNNAMED TRIBUTARY OF SIMS BAYOU AT DULCIMER STREET IN SOUTH HOUSTON	16655	1007N	10	12	HG	HH	RT	6	6	6				
SIMS BAYOU SOUTH BRANCH AT TIFFANY DRIVE IN SOUTH HOUSTON	16656	1007A	10	12	HG	HH	RT	6		6				
UNNAMED TRIBUTARY OF HUNTING BAYOU IMMEDIATELY UPSTREAM OF JOHN RALSTON ROAD IN EAST HOUSTON	16657	1007M	10	12	HG	HH	RT	6		6				
PLUM CREEK/TRIBUTARY OF SIMS BAYOU AT OLD GALVESTON ROAD IN SOUTH EAST HOUSTON	16658	1007I	10	12	HG	HH	RT	6	6	6				
PINE GULLY/TRIBUTARY OF SIMS BAYOU AT OLD GALVESTON ROAD IN SOUTH EAST HOUSTON	16659	1007H	10	12	HG	HH	RT	6	6	6				
BERRY BAYOU/TRIBUTARY OF SIMS BAYOU IMMEDIATELY UPSTREAM OF AHRENS DRIVE IN SOUTH EAST HOUSTON	16660	1007	10	12	HG	HH	RT	6	6	6				
BERRY BAYOU IMMEDIATELY UPSTREAM OF SOUTH RICHEY STREET IN SOUTH EAST HOUSTON	16661	1007F	10	12	HG	HH	RT	6	6	6				
BIG GULCH AT WALLISVILLE ROAD IN EAST HOUSTON	16662	1006F	10	12	HG	HH	RT	6		6				
SPRING GULLY AT WEST TERMINUS OF BARNESWORTH DRIVE IN NORTHEAST HOUSTON	16663	1006H	10	12	HG	HH	RT	6	6	6				
GOODYEAR CREEK TIDAL IMMEDIATELY UPSTREAM OF IH 10 IN EAST HOUSTON	16664	1006	10	12	HG	HH	RT	6	6	6				
UNNAMED TRIBUTARY OF HALLS BAYOU IMMEDIATELY DOWNSTREAM OF LANGLEY ROAD IN NORTH HOUSTON	16665	1006J	10	12	HG	HH	RT	6	6	6				

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Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	MT	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
UNNAMED TRIBUTARY OF HALLS BAYOU AT TALTON STREET IN NORTH EAST HOUSTON	16666	1006I	10	12	HG	HH	RT	6		6				
UNNAMED TRIBUTARY OF HALLS BAYOU AT WOODLYN ROAD IN NORTH EAST HOUSTON	16667	1006I	10	12	HG	HH	RT	6		6				
UNNAMED TRIB OF BUFFALO BAYOU AT GLENWOOD CEMETARY RD 160 M W OF INTERSECT OF LUBBOCK ST AND SAWYER ST IN CENTRAL HOUSTON	16675	1013C	10	12	HG	HH	RT	6	6	6				
UNNAMED TRIBUTARY OF GREENS BAYOU AT SMITH RD IN NORTHEAST HOUSTON	16676	1016D	10	12	HG	HH	RT	6	6	6				
SPRING GULLY AT SPRING CREEK OAKS DRIVE IN TOMBALL	17481	1009D	10	12	HG	HH	RT	6	6	6				
LANGHAM CREEK AT SH 6 IN NORTHWEST HOUSTON	17482	1014E	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8072760
BEAR CREEK AT OLD GREENHOUSE ROAD WEST OF HOUSTON	17484	1014A	10	12	HG	HH	RT	6	6	6				
UNNAMED TRIBUTARY OF HORSEPEN BAYOU TIDAL AT PENN HILLS	17485	1113C	11	12	HG	HH	RT	6	6	6				
BIG ISLAND SLOUGH AT HILLRIDGE ROAD IN SOUTHEAST HOUSTON	17486	1113E	11	12	HG	HH	RT	6	6	6				
WILLOW SPRING AT BANDRIDGE ROAD IN SOUTHEAST HOUSTON	17487	1113D	11	12	HG	HH	RT	6		6				
SPRING CREEK IMMEDIATELY DOWNSTREAM OF KUYKENDAHL ROAD NORTHEAST OF HOUSTON	17489	1008	10	12	HG	HH	RT	6	6	6				
HALLS BAYOU AT AIRLINE ROAD IN NORTH HOUSTON	17490	1006D	10	12	HG	HH	RT	6	6	6				
HALLS BAYOU AT DEER TRAIL DRIVE IN NORTH HOUSTON	17491	1006D	10	12	HG	HH	RT	6	6	6	6			Flow from gage 8076200
BUFFALO BAYOU AT SOUTH MASON ROAD WEST OF HOUSTON	17492	1014B	10	12	HG	HH	RT	6	6	6				
MASON CREEK 151 METERS DOWNSTREAM OF PARK PINE DRIVE WEST OF HOUSTON	17494	1014L	10	12	HG	HH	RT	6	6	6				
GREENS BAYOU IMMEDIATELY UPSTREAM OF MILLS ROAD WEST OF HOUSTON	17495	1016	10	12	HG	HH	RT	6	6	6				
FAULKEY GULLY OF CYPRESS CREEK 105 METERS DOWNSTREAM OF LAKEWOOD FOREST DRIVE NORTHWEST OF HOUSTON	17496	1009C	10	12	HG	HH	RT	6	6	6				
SIMS BAYOU UPSTREAM TIDAL AT SOUTH POST OAK ROAD IN SOUTHWEST HOUSTON	17976	1007D	10	12	HG	HH	RT	6	6	6				
UNNAMED TRIBUTARY OF BUFFALO BAYOU IMMEDIATELY DOWNSTREAM OF EMILE ST ON NORTH BANK 120 M SOUTH OF CLINTON DRIVE IN CENTRAL HOUSTON	17977	1007O	10	12	HG	HH	RT	6	6	6				
UNNAMED TRIBUTARY OF HUNTING BAYOU AT MINDEN STREET APPROXIMATELY 0.3 KM EAST OF LOCKWOOD AND S OF N 610 LOOP EAST	18689	1007V	10	12	HG	HH	RT	6		6				
BINTLIFF DITCH TRIBUTARY OF BRAYS BAYOU UNDER CENTER OF BISSONNET ST BRIDGE 317 M NE OF BISSONNET AT FONDREN RD IN SW HOUSTON	18690	1007T	10	12	HG	HH	RT	6		6				
MIMOSA DITCH TRIBUTARY OF BRAYS BAYOU AT NEWCASTLE DR IN SOUTHWEST HOUSTON	18691	1007U	10	12	HG	HH	RT	6		6				
POOR FARM DITCH TRIBUTARY OF BRAYS BAYOU AT EASTBOUND NORTH BRAESWOOD BLVD APPROX 200 M E OF BUFFALO SPEEDWAY IN SW HOUSTON	18692	1007S	10	12	HG	HH	RT	6		6				
KEEGAN'S BAYOU AT SYNOTT ROAD 1.1 KM SOUTH OF THE INTERSECTION OF SYNOTT ROAD AND BISSONET STREET IN SOUTHWEST HOUSTON	20211	1007C	10	12	HG	HH	RT	6	6	6				
BUFFALO BAYOU NORTH SHORE IMMEDIATELY UNDERNEATH THE SOUTHBOUND FEEDER ROAD BRIDGE OF IH 610 WEST IN HOUSTON	20212	1014	10	12	HG	HH	RT	6	6	6				
WILLOW CREEK AT TUWA ROAD APPROXIMATELY 859 METERS DOWNSTREAM OF FM 2920 ROAD IN NORTHERN HARRIS COUNTY	20730	1008H	10	12	HG	HH	RT	6	6	6				
SIMS BAYOU AT GALVESTON ROAD IN HOUSTON	20736	1007	10	12	HG	HH	RT	6	6	6				Replaced site 11304 in FY2020
GREENS BAYOU AT WALLISVILLE ROAD APPROX 150 METERS NORTHEAST OF THE INTERSECTION OF DATTNER ROAD AND WALLISVILLE ROAD IN HOUSTON	21008	1006	10	12	HG	HH	RT	6	6	6				
HARRIS COUNTY FLOOD CONTROL DISTRICT CHANNEL D138 / CHIMNEY DITCH IMMEDIATELY UPSTREAM OF CAVERSHAM DRIVE BETWEEN THE NORTHBOUND AND SOUTHBOUND SECTIONS OF CHIMNEY ROCK ROAD IN HOUSTON	21180	1007W	10	12	HG	HH	RT	6	6	6				
SOUTH MAYDE CREEK AT SOUTH PARK VIEW DRIVE WEST OF HOUSTON	21813	1014H	10	12	HG	HH	RT	6	6	6				Replaced site 17493 in FY2017
UNNAMED TRIBUTARY OF GREENS BAYOU AT ALDINE-WESTFIELD RD	22090	1016C	10	12	HG	HH	RT	6	6	6				Replaced site 11124 in FY19
UNNAMED TRIBUTARY OF WHITE OAK BAYOU APPROXIMATELY 30 METERS SW OF HELBERG RD DEAD END.	22094	1017D	10	12	HG	HH	RT	6	6	6				Replaced site 16595 in FY 19.

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TURKEY CREEK AT CLAY ROAD IN NORTHWEST HOUSTON	22169	1014K	10	12	HG	HH	RT	6	6	6				This site replaced site 17483 in FY20
CRYSTAL CREEK AT FM 1314 SOUTHEAST OF CONROE	11181	1004D	10	12	HG	HW	RT	6	6	6				Replaces site 16635 Crystal Creek at SH 242 in FY2018
LUCE BAYOU/SAN JACINTO RIVER EAST FORK AT HUFFMAN-NEW CANEY ROAD	11187	1002B	10	12	HG	HW	RT	6	6	6				
LAKE HOUSTON NORTH SIDE OF MISSOURI PACIFIC RAILROAD BRIDGE 137 METERS SOUTH AND 1.36 KM WEST OF INTERSECTION OF PINO LN AND SUNOCO RD	11208	1002	10	12	HG	HW	RT	12	12	12				
LAKE HOUSTON AT FM 1960 WEST END PASS BRIDGE 269 M N AND 731 M E OF INTERSECTION OF ATASCOCITA SHORES AND FM 1960/CITY HO SITE 9	11211	1002	10	12	HG	HW	RT	12	12	12				
LAKE HOUSTON AT FM 1960 EAST END PASS BRIDGE 235 M S AND 950 M WEST OF INTERSECTION OF FM 1960 AND FAIRLAKE LANE/CITY HO SITE 13	11212	1002	10	12	HG	HW	RT	12	12	12				
EAST FORK SAN JACINTO RIVER AT FM 1485	11235	1003	10	12	HG	HW	RT	6	6	6	6			Flow from gage 8070200
EAST FORK SAN JACINTO RIVER IMMEDIATELY UPSTREAM OF TX-105 BUSINESS ROUTE / W SOUTHLINE STREET WEST OF CLEVELAND	11238	1003	10	12	HG	HW	RT	6	6	6	6			Flow from gage 8070000
WEST FORK SAN JACINTO RIVER IMMEDIATELY UPSTREAM OF SH 242	11243	1004	10	12	HG	HW	RT	6	6	6				
WEST FORK SAN JACINTO RIVER IMMEDIATELY DOWNSTREAM OF SH 105 NW OF CONROE CAMS772	11251	1004	10	12	HG	HW	RT	6	6	6	6			Flow from gage 8067650
SPRING CREEK BRIDGE AT IH 45 20 MILES NORTH OF HOUSTON	11313	1008	10	12	HG	HW	RT	6	6	6	6			Flow from gage 8068500
CYPRESS CREEK BRIDGE ON IH 45 15 MI NORTH OF HOUSTON	11328	1009	10	12	HG	HW	RT	6	6	6	6			Flow from gage 8069000
CANEY CREEK IMMEDIATELY DOWNSTREAM OF FM 1485	11334	1010	10	12	HG	HW	RT	6	6	6				
PEACH CREEK BRIDGE AT FM 2090 IN SPLENDORA	11337	1011	10	12	HG	HW	RT	6	6	6				
LAKE HOUSTON 90 M S AND 349 M W OF INTERSECTION OF MAGNOLIA PT DR AND DIAMOND WAY CANEY CREEK ARM IN HOUSTON	16623	1002	10	12	HG	HW	RT	12	12	12				
PEACH CREEK IMMEDIATELY UPSTREAM OF OLD HWY 105	16625	1011	10	12	HG	HW	RT	6	6	6				
STEWARTS CREEK 175 METERS DOWNSTREAM OF SH LOOP 336 SOUTHEAST OF CONROE	16626	1004E	10	12	HG	HW	RT	6	6	6				
LK HOUSTON W OF LK SHADOWS SUBDIVISION MID LAKE NW OF HOUSTON 2.09 KM N AND 1.38 KM E OF INTERSECT OF LK HOUSTON PKWY AND DITE CAYLIN	16668	1002	10	12	HG	HW	RT	12	12	12				
LAKE HOUSTON IN THE WEST FORK SAN JACINTO RIVER CHANNEL 270 M EAST AND 60 M NORTH OF MISTY COVE AT ATASCOCITA PLACE DR	18667	1002	10	12	HG	HW	RT	12	12	12				
LAKE HOUSTON/LUCE BAYOU 123 M NORTH AND 188 M WEST OF LAKEWATER DR AT WATERWOOD DR IN WATER WONDERLAND SUBDIVISION IN HARRIS COUNTY	18670	1002	10	12	HG	HW	RT	12	12	12				
LAKE HOUSTON WEST FORK SAN JACINTO RIVER ARM UNDER POWER LINES 567 METERS EAST AND 538 METERS NORTH FROM THE INTERSECTION OF BELLEAU WOOD DRIVE AND SOUTHSHORE DRIVE IN HOUSTON	20782	1002	10	12	HG	HW	RT	12	12	12				
CANEY CREEK AT MILLMAC ROAD NORTHEAST OF CUT AND SHOOT	21465	1010	10	12	HG	HW	RT	6	6	6				
LAKE CONROE AT DAM MID CHANNEL 85 M OUT FROM MIDDLE TAINTER GATE 922 M N AND 426 M E OF INTERSECTION OF DAM SITE RD AND SH 105	11342	1012	10	12	HG	SJ	RT	12	12	12				
LAKE CONROE AT FM 1375 IN THE MAIN CHANNEL 4TH PILING FROM THE EAST 541 M SOUTH AND 1.40 KM W OF INTERSECTION OF KAGLE RD AND FM 1375 USGS SITE GC	11344	1012	10	12	HG	SJ	RT	12	12	12				
PANTHER BRANCH 295 METERS DOWNSTREAM OF SAWDUST ROAD IN THE WOODLANDS	16422	1008C	10	12	HG	SJ	RT	12	4	4			2	
LAKE WOODLANDS AT WESTERN REACH 110 METERS NORTH AND 100 METERS EAST OF INTERSECTION OF MEADOW COVE DR AND PLEASURE COVE DR IN THE WOODLANDS	16481	1008F	10	12	HG	SJ	RT	12	4	4			2	
LAKE WOODLANDS AT SOUTH END 23 METERS NORTH AND 50 METERS EAST OF THE WEST EDGE OF DAM IN THE WOODLANDS	16482	1008F	10	12	HG	SJ	RT	12	4	4			2	
LAKE WOODLANDS AT MID POINT 130 METERS NORTH AND 30 METERS EAST OF THE NORTHERN INTERSECTION OF E SHORE DR AND CAPE HARBOR PL IN THE WOODLANDS	16483	1008F	10	12	HG	SJ	RT	12	4	4			2	

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	MT	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
LAKE WOODLANDS AT NORTH END 111 METERS DOWNSTREAM OF RESEARCH FOREST DRIVE IN THE WOODLANDS	16484	1008F	10	12	HG	SJ	RT	12	4	4			2	
LOWER PANTHER BRANCH AT FOOTBRIDGE 265 M UPSTREAM OF SAWDUST RD APPROX 200 M UPSTREAM OF PERMIT WQ0011401-001 LOCATED AT 2436 SAWDUST ROAD	16627	1008C	10	12	HG	SJ	RT	12	4	4				
UPPER PANTHER BRANCH APPROX 80 M UPSTREAM OF PERMIT WQ0012597-001 LOCATED AT 5402 RESEARCH FOREST DR	16629	1008B	10	12	HG	SJ	RT	12	4	4				
UPPER PANTHER BRANCH APPROX 170 METERS DOWNSTREAM OF PERMIT WQ0012597-001 LOCATED AT 5402 RESEARCH FOREST DR	16630	1008B	10	12	HG	SJ	RT	12	4	4				
BEAR BRANCH 20 METERS DOWNSTREAM OF RESEARCH FOREST DRIVE	16631	1008E	10	12	HG	SJ	RT	12	4	4	4			Flow from gage 8068400
LAKE CONROE AT APRIL POINT MID CHANNEL 559 M N AND 586 M E OF INTERSECTION OF APRIL POINT PLACE AND APRIL HILL	16638	1012	10	12	HG	SJ	RT	12	12	12				
LAKE CONROE AT SOUTH END OF LAKE ON EAST SIDE 201 METERS SOUTH AND 732 METERS WEST OF INTERSECTION OF S VALLEY DRIVE AND CREST DRIVE	16639	1012	10	12	HG	SJ	RT	12	12	12				
LAKE CONROE S OF BENTWATER ISLAND WEST COVE S OF FM 1097 BRIDGE 769 M N AND 89 M E OF INTERSECTION OF WATERFRONT AND SPRINGTIME DR	16640	1012	10	12	HG	SJ	RT	12	12	12				
LAKE CONROE AT AQUARIUS POINT MID CHANNEL N OF FM 830 BOAT RAMP 437 M N AND 924 M W OF INTERSECT OF FM 830 AND LAKEVIEW MANOR DR	16641	1012	10	12	HG	SJ	RT	12	12	12				
LAKE CONROE AT LAKE MID POINT MID CHANNEL AT FM 1097 BRIDGE 57 M S AND 520 M W OF INTERSECTION OF FM 1097 AND BLUEBERRY HILL	16642	1012	10	12	HG	SJ	RT	12	12	12				
LAKE CONROE AT HUNTERS POINT CANEY CREEK ARM E OF SCOTTS RIDGE BOAT RAMP 640 M N AND 558 M E OF INTERSECT OF TEEL RD AND HUNTERS TRL	16643	1012	10	12	HG	SJ	RT	12	12	12				
LAKE CONROE AT PARADISE POINT MID CHANNEL 396 METERS S AND 309 M WEST INTERSECTION OF PARADISE VIEW DRIVE AND PARADISE POINT DRIVE	16644	1012	10	12	HG	SJ	RT	12	12	12				
LAKE CONROE AT MOUTH OF SANDY BRANCH COVE 2.63 KM EAST OF INTERSECTION OF HARDY SMITH ROAD AND F S 218 A	16645	1012	10	12	HG	SJ	RT	12	12	12				
EAST FORK SAN JACINTO RIVER AT FM 2090 IN LIBERTY COUNTY	11236	1003	10	12	HG	TF	RT	4	4	4	4			
EAST FORK SAN JACINTO RIVER IMMEDIATELY DOWNSTREAM OF FM 945 5.6 MILES NORTH OF CLEVELAND	11237	1003	10	10	HG	TF	RT	4	4	4	4			
EAST FORK SAN JACINTO RIVER IMMEDATELY DOWNSTREAM OF US 59 AT RED GULLY	14242	1003	10	12	HG	TF	RT	4	4	4	4			
WINTERS BAYOU AT FM 2929 / FOUR NOTCH ROAD 4.8 KILOMETERS SOUTH OF PHELPS IN WALKER COUNTY	21933	1003A	10	12	HG	TF	RT	4	4	4	4			
BOSWELL CREEK AT FOUR NOTCH ROAD / BOSWELL ROAD 13 KILOMETERS NORTHEAST OF NEW WAVERLY IN WALKER COUNTY	21934	1003C	10	12	HG	TF	RT	4	4	4	4			
WINTERS BAYOU AT FM 2693 IN SAN JACINTO COUNTY	21935	1003A	10	10	HG	TF	RT	4	4	4	4			
WINTERS BAYOU AT SH 150 IN SAN JACINTO COUNTY	21936	1003A	10	10	HG	TF	RT	4	4	4	4			
WINTERS BAYOU AT DABNEY BOTTOM RD IN SAN JACINTO COUNTY	21937	1003A	10	10	HG	TF	RT	4	4	4	4			
NEBLETTS CREEK AT FM 1725 IN SAN JACINTO COUNTY	21938	1003B	10	10	HG	TF	RT	4	4	4	4			
EAST FORK SAN JACINTO RIVER AT NORTH BUTCH ARTHUR ROAD IN SAN JACINTO COUNTY	21939	1003	10	10	HG	TF	RT	4	4	4	4			
OYSTER CREEK IMMEDIATELY DOWNSTREAM OF SH 35 WEST OF ANGLETON	11490	1110	11	12	HG	UI	BS				4	4		Added in FY 2020
OYSTER CREEK AT FM 1462	11493	1110	11	12	HG	UI	BS				4	4		Added in FY 2020
CEDAR BAYOU TIDAL MID CHANNEL 45 M DOWNSTREAM OF SH 146 NORTHEAST OF BAYTOWN	11115	0901	9	12	HG	UI	RT	4	4	4				
CEDAR BAYOU TIDAL AT IH 10 EASTBOUND BRIDGE SOUTH OF MONT BELVIEU EAST SIDE OF BAYOU	11117	0901	9	12	HG	UI	RT	4	4	4				
CEDAR BAYOU ABOVE TIDAL 30 M DOWNSTREAM OF FM 1942 AT EAST BANK	11118	0902	9	12	HG	UI	RT	4	4	4	4			

H-GAC's FY2020 Coordinated Monitoring Schedule
Amendment 1

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	MT	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
CEDAR BAYOU ABOVE TIDAL 45 M DOWNSTREAM OF FM 1960 NORTHEAST OF HUFFMAN	11123	0902	9	12	HG	UI	RT	4	4	4	4			
MOSES BAYOU AT NORTHBOUND SH 146 BRIDGE AT MID-BRIDGE NORTH OF LA MARQUE	11400	2431A	24	12	HG	UI	RT	4	4	4				
HIGHLAND BAYOU AT FAIRWOOD ROAD IN LA MARQUE IN GALVESTON COUNTY	11415	2424A	24	12	HG	UI	RT	4	4	4				
MUSTANG BAYOU AT FM 2917 SOUTH OF ALVIN	11423	2432A	24	12	HG	UI	RT	4	4	4	4			
CEDAR CREEK AT FM 517 W OF DICKINSON	11434	1103E	11	12	HG	UI	RT	4	4	4	4			
GUM BAYOU AT FM 517 E OF DICKINSON	11436	1103D	11	12	HG	UI	RT	4	4	4				
DICKINSON BAYOU TIDAL AT SH 146 BRIDGE EAST OF DICKINSON	11455	1103	11	12	HG	UI	RT	4	4	4				
DICKINSON BAYOU TIDAL AT IH 45	11462	1103	11	12	HG	UI	RT	4	4	4				
CHOCOLATE BAYOU TIDAL AT FM 2004 BRIDGE SOUTH OF ALVIN	11478	1107	11	12	HG	UI	RT	4	4	4				
OYSTER CREEK TIDAL AT THAT-WAY DRIVE 0.5 MILES BELOW FM 2004	11486	1109	11	12	HG	UI	RT	4	4	4				
OYSTER CREEK IMMEDIATELY DOWNSTREAM OF SH 35 WEST OF ANGLETON	11490	1110	11	12	HG	UI	RT	2	2	2				Start collecting field, conventionals & bact in mid FY20 along w/ 24Hr DO
OYSTER CREEK AT SIMS RD / BRAZORA CR 30 WEST OF ANGLETON	11491	1110	11	12	HG	UI	RT	12	4	4	12			Added in FY2019
OYSTER CREEK AT FM 1462 WEST OF ROSHARON	11493	1110	11	12	HG	UI	RT	12	2	2	12			Added in FY 2020. Start collecting conventionals & bact in mid FY20 along w/ 24Hr DO
HARDEMAN SLOUGH IMMEDIATELY DOWNSTREAM OF ALLENHURST RD NE OF FM 2540 NEAR ALLENHURST COMMUNITY	12135	1305A	13	12	HG	UI	RT	4	4	4	4			
CANEY CREEK IMMEDIATELY UPSTREAM OF CONCRETE BRIDGE 210 M DOWNSTREAM OF LINVILLE BAYOU CONFLUENCE AND ADJACENT TO FM 521	12151	1304	13	12	HG	UI	RT	4	4	4				
CANEY CREEK AT SERGEANT JOE PARKS JR MEMORIAL HIGHWAY / FM 457 IN MATAGORDA COUNTY	12153	1305	13	12	HG	UI	RT	4	4	4	4			
WEST BAY OFFAT BAYOU MID BAYOU OPPOSITE LAKE MADELINE CANAL	13322	2424D	24	12	HG	UI	RT	4	4	4				
WEST BAY AT RANGE MARKER D BETWEEN SOUTH DEER ISLAND AND TEICHMAN POINT	14622	2424	24	12	HG	UI	RT	4	4	4				
OFFATTS BAYOU OFF CM 18	14645	2424D	24	12	HG	UI	RT	4	4	4				
HIGHLAND BAYOU AT FM 519	15941	2424A	24	12	HG	UI	RT	4	4	4				Added for FY2019. Ck if gage 08077710 is active.
CANEY CREEK ABOVE TIDAL IMMEDIATELY UPSTREAM OF FM 457 IN CITY OF CEDAR LANE	15951	1304	13	12	HG	UI	RT	4	4	4	4			Added for FY2019.
SAN BERNARD RIVER IMMEDIATELY DOWNSTREAM OF FM 3013 ON THE COLORADO-AUSTIN COUNTY LINE APPROXIMATELY 15KM SW OF SEALY	16370	1302	13	12	HG	UI	RT	4	4	4	4			
GEISLER BAYOU AT FM517 BRIDGE 0.19MI UPSTREAM OF DICKINSON BAYOU IN DICKINSON	16470	1103C	11	12	HG	UI	RT	4	4	4				
BENSONS BAYOU AT FM 517 / PINE DR IN DICKINSON	16471	1103A	11	12	HG	UI	RT	4	4	4				
MARYS CREEK AT MARYS CROSSING IN NORTH FRIENDSWOOD	16473	1102B	11	12	HG	UI	RT	4	4	4	4			
ROBINSONS BAYOU AT FM270 IN LEAGUE CITY	16475	1101D	11	12	HG	UI	RT	4	4	4				
HIGHLAND BAYOU 80 M NORTHEAST OF SH 6 BRIDGE CENTERPOINT IN BAYOU VISTA WEST OF IH 45 IN GALVESTON COUNTY	16488	2424A	24	12	HG	UI	RT	4	4	4				
MARCHAND BAYOU TIDAL AT FM519 IN HITCHCOCK	16490	2424C	24	12	HG	UI	RT	4	4	4				
HIGHLAND BAYOU AT FM 2004 IN HITCHCOCK IN GALVESTON COUNTY	16491	2424A	24	12	HG	UI	RT	4	4	4				
CHIGGER CREEK AT FM528 BRIDGE IN FRIENDSWOOD	16493	1101B	11	12	HG	UI	RT	4	4	4	4			
HIGHLAND BAYOU AT END OF BAYOU LANE FREDDIESVILLE	16562	2424A	24	12	HG	UI	RT	4	4	4				
LAKE MADELINE AT CORNER OF BELUCHE DRIVE AND DOMINIQUE DRIVE IN GALVESTON	16564	2424B	24	12	HG	UI	RT	4	4	4				
CLEAR CREEK TIDAL AT BROOKDALE DR APPROX 0.1MI DOWNSTREAM OF GRISSOM RD IN COUNTRYSIDE PARK IN CANOE LAUNCHING AREA IN LEAGUE CITY	16576	1101	11	12	HG	UI	RT	4	4	4				

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	MT	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
MAGNOLIA CREEK AT W BAY AREA BLVD LEAGUE CITY APPROX 250 M UPSTREAM OF WWTP PERMIT WQ0010568-003	16611	1101A	11	12	HG	UI	RT	4	4	4	4			
COWART CREEK 9 METERS UPSTREAM FROM CASTLEWOOD DRIVE BRIDGE IN FRIENDSWOOD	16677	1102A	11	12	HG	UI	RT	4	4	4	4			
HICKORY SLOUGH AT ROBINSON DRIVE IN PEARLAND	17068	1102C	11	12	HG	UI	RT	4	4	4	4			
CHOCOLATE BAY 200 M NORTHWEST OF HORSE GROVE POINT AND 5.1 KM DOWNSTREAM OF FM 2004	17086	2432	24	12	HG	UI	RT	4	4	4				
MOSES BAYOU AT SH 3 IN TEXAS CITY	17910	2431A	24	12	HG	UI	RT	4	4	4	4			
NEW BAYOU AT FM 2004 S/SW OF HITCHCOCK	17911	2432E	24	12	HG	UI	RT	4	4	4				
PERSIMMON BAYOU AT FM 2004 S/SW OF HITCHCOCK	17913	2432D	24	12	HG	UI	RT	4	4	4				
COW BAYOU AT NASA ROAD 1 IN WEBSTER 100 M EAST OF FM 270/EL CAMINO REAL	17928	1101C	11	12	HG	UI	RT	4	4	4				
AUSTIN BAYOU TIDAL AT FM 2004	18048	1105B	11	12	HG	UI	RT	4	4	4				
BASTROP BAYOU OFF BAYOU WOOD DR DUE EAST OF BRAZORIA CR 201 AT BASTROP BAYOU DR	18502	1105	11	12	HG	UI	RT	4	4	4				
BASTROP BAYOU TIDAL APPROXIMATELY 15 M OFF NORTH BANK AND 1.55 KM UPSTREAM OF FM 2004 IN RICHWOOD VILLAGE	18503	1105	11	12	HG	UI	RT	4	4	4				
BASTROP BAYOU TIDAL MID CHANNEL AT NORTH END OF BASTROP BEACH ROAD 350 M DOWNSTREAM OF FM 523 SE OF ANGLETON	18504	1105	11	12	HG	UI	RT	4	4	4				
BASTROP BAYOU TIDAL 38 M NORTH OF N END OF COMPASS DR/BRAZORIA CR 504 APPROXIMATELY 4.4 KM DOWNSTREAM OF FM 523 SE OF ANGLETON	18505	1105	11	12	HG	UI	RT	4	4	4				
AUSTIN BAYOU IMMEDIATELY UPSTREAM OF DANBURY-ANGLETON ROAD/BRAZORIA CR 210 EAST OF DANBURY	18506	1105C	11	12	HG	UI	RT	4	4	4	4			
FLORES BAYOU IMMEDIATELY UPSTREAM OF DANBURY-ANGLETON ROAD/BRAZORIA CR 210 EAST OF ANGLETON	18508	1105A	11	12	HG	UI	RT	4	4	4	4			
MUSTANG BAYOU IMMEDIATELY UPSTREAM OF EAST SOUTH STREET 85 METERS WEST OF SOUTHBOUND SH 35 IN ALVIN USGS ID 8077890	18554	2432A	24	12	HG	UI	RT	4	4	4	4			
UNNAMED TRIBUTARY OF CLEAR CREEK TIDAL IN FOREST PARK CEMETERY IMMEDIATELY UPSTREAM OF S FEEDER RD OF I 45/GULF FWY S OF NASA RD 1 IN WEBSTER	18591	1101F	11	12	HG	UI	RT	4	4	4	4			
UNNAMED TRIBUTARY OF MOSES LAKE AT STATE LOOP 197/25TH AVE NORTH 432 M EAST OF NORTHBOUND SH 146 IN TEXAS CITY	18592	2431C	24	12	HG	UI	RT	4	4	4				
HIGHLAND BAYOU DIVERSION CANAL MID CHANNEL AT SECOND STREET BRIDGE 467 M UPSTREAM OF PRICE ROAD WWTP RELEASE IN HITCHCOCK	18593	2424G	24	12	HG	UI	RT	4	4	4				
MARYS CREEK BYPASS AT EAST BROADWAY ST/FM 518 WEST OF SUNSET MEADOWS DR IN PEARLAND	18639	1102F	11	12	HG	UI	RT	4	4	4	4			
WILLOW BAYOU AT BAKER ST 404 M UPSTREAM OF FM 2004 SOUTH OF SANTA FE IN GALVESTON COUNTY	18668	2432B	24	12	HG	UI	RT	4	4	4	4			
ENGLISH BAYOU MID BAYOU 250 M EAST AND 83 M SOUTH OF 61ST ST BRIDGE CENTERPOINT IN GALVESTON	18695	2424E	24	12	HG	UI	RT	4	4	4				
CLEAR CREEK ABOVE TIDAL AT YOST ROAD TERMINUS IN PEARLAND IN BRAZORIA COUNTY	20010	1102	11	12	HG	UI	RT	4	4	4	4			
SAN BERNARD RIVER TIDAL AT SH 35 SOUTHWEST OF WEST COLUMBIA	20460	1301	13	12	HG	UI	RT	4	4	4				
WEST BERNARD CREEK AT WHARTON CR 225 IN EAST OF HUNGERFORD	20721	1302B	13	12	HG	UI	RT	4	4	4	4			
PEACH CREEK AT WHARTON CR 117/CHUDALLA ROAD/ARCHER ROAD 89 METERS SOUTH OF THE INTERSECTION OF WHARTON CR 117/CHUDALLA ROAD/ARCHER ROAD AND WHARTON CR 121/ WHARTON CR 119/DONALDSON ROAD IN EAST OF WHARTON	20722	1302D	13	12	HG	UI	RT	4	4	4	4			
MOUND CREEK AT BRAZORIA CR 450/JACKSON SETTLEMENT ROAD 1.22 KILOMETERS UPSTREAM OF FM 1301 IN WEST OF WEST COLUMBIA	20723	1302E	13	12	HG	UI	RT	4	4	4	4			

H-GAC's FY2020 Coordinated Monitoring Schedule
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Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	MT	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
BORDENS GULLY AT SPRUCE DRIVE IN DICKINSON	20724	1103B	11	12	HG	UI	RT	4	4	4	4			
UNNAMED TRIBUTARY OF GUM BAYOU AT OWENS DRIVE 1.51 KILOMETERS UPSTREAM OF CONFLUENCE WITH GUM BAYOU IN DICKINSON	20728	1103G	11	12	HG	UI	RT	4	4	4				
CHOCOLATE BAYOU IMMEDIATELY UPSTREAM OF BRAZORIA CR 171 / MUSTANG CHOCOLATE BAYOU ROAD IN LIVERPOOL	21178	1107	11	12	HG	UI	RT	4	4	4				
MUSTANG BAYOU AT THE HEIGHTS-MANVEL ROAD /CARDINAL DRIVE BRIDGE NEAR ALVIN	21416	2432A	24	12	HG	UI	RT	4	4	4	4			
BRUSHY BAYOU AT BRAZORIA CR 213 / SHELL ROAD 8.9 KILOMETERS EAST OF ANGLETON	21734	1105E	11	12	HG	UI	RT	4	4	4	4			
UNNAMED TRIBUTARY OF BASTROP BAYOU TIDAL AT BRAZORIA CR 213 / SHELL ROAD 7.0 KILOMETERS EAST OF ANGLETON	21735	1105D	11	12	HG	UI	RT	4	4	4	4			
TURKEY CREEK AT BEAMER ROAD 1.5 KM SOUTHEAST OF FM 1959/DIXIE FARM ROAD IN FRIENDSWOOD	21925	1102D	11	12	HG	UI	RT	4	4	4	4			
AUSTIN BAYOU TIDAL 1.60 KILOMETERS UPSTREAM OF THE CONFLUENCE WITH BASTROP BAYOU IN BRAZORIA COUNTY	22012	1105B	11	12	HG	UI	RT	4	4	4				Replaced site 18507
ARMAND BAYOU TIDAL 100 METERS DOWNSTREAM OF CONFLUENCE WITH SPRING GULLY	22187	1113	11	12	HG	UI	RT	4	4	4				New site added for dropping 2 Jarbo Bayou sites in FY2020.
CHOCOLATE BAY 1.2 KM EAST OF WHARTON BAYOU AND 8.1 KM DOWNSTREAM OF FM 2004	17085	2432	24	12	HG	UI	RT	4	4	4				In FY16, this became a field parameter station only unless EIH cannot collect a water sample from another regular station during quarterly monitoring. TKN & Chloro will never be collected in FY18.

EASTEX ENVIRONMENTAL LABORATORY, INC.

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www.eastexlabs.com

White Copy-Follows Samples
Yellow Copy-Laboratory
Pink Copy-Client Copy

REPORT TO:

Company:
Address:
Attn:
Phone#:
Email:
P.O. #:
Sampler's Name (print):
Sampler's Signature:
Project Name: **Clean Rivers Program**

INVOICE TO:

Company:
Address:
Attn:
Phone#:

Remarks:

INSTRUCTIONS:

C or G: C= Composite G= Grab
Matrix: DW=Drinking Water WW=Wastewater SO=Soil/Sludge OT= Other
Container Size: 1=Gallon 2=1/2 Gallon 3=Quart/Liter 4=500mL 5=250mL 6=125mL (4oz) 7=60mL (2 oz) 8= 40mL Vial 9=Other
Type: P= Plastic G= Glass T= Teflon S= Sterile
Preservatives: C=Chilled S=Sulfuric Acid N=Nitric Acid B=Base/Caustic Z= Zn Acetate ST=Sodium Thiosulfate H=HCL O= Other

ANALYSIS REQUESTED

					Field Data						Containers												
Work Order ID	**Sample ID**	**Date**	**Time**	**Matrix**	**C or G**	**DO**	**pH**	**Cl2**	**Flow**	**Temp**	**#**	**Size**	**Type**	**Pres**									

Relinquished By: Received By: Date Time Received Iced: YES / NO

Relinquished By: Received By: Date Time Received Iced: YES / NO

Relinquished By: Received By and/or Checked in By: Date Time Received Iced: YES / NO

LAB USE ONLY Sample Condition Acceptable: YES / NO Temp °C *****Therm ID Logged In By: Date Time

Alternate Check In: Date Time

*Thermometer has 0.0 factor and recorded temperature is actual temperature

Pollution Control Services Department
101 S. Richey, Suite H
Pasadena, TX 77506 Fax: 713-274-6475 Phone: 713-920-2831

Sample Data and Custody Record

Id: _____ Type: _____ Permit No: _____ Date: _____ Time _____ : _____ AM PM

Site Id: _____ Name: _____ Key Map: _____

Site Info: _____

Sample Location: _____ Outfall: _____

Sample Location Info:

Outcome: ☐ Collected ☐ Collected (sample compromised) ☐ Field Test Only ☐ No Flow

Investigator(s): _____

Tests and Measurements

☐ Temperature (°C) ☐ Dissolved Oxygen (mg/L) ☐ Specific Conductivity (µS) ☐ Water Depth (meters)

☐ pH (standard units) ☐ Salinity (ppt) ☐ SECCHI Disk Transparency (meters)

Field Observations--Water

☐ Water Color 1-Brownish 2-Reddish 3-Greenish 4-Blackish 5-Clear 6-Other _____

☐ Surface Conditions 1-Clear 2-Scum 3-Foam 4-Debris 5-Sheen

☐ Water Odor 1-Sewage 2-Oily/Chemical 3-Rotten Egg 4-Musky 5-Fishy 6-None 7-Other _____

☐ Turbidity 1-Low 2-Medium 3-High

☐ Water Surface 1-Calm 2-Ripples 3-Waves 4-White Caps

Field Observations--Weather and Other

☐ Present Weather 1-Clear 2-Partly Cloudy 3-Cloudy 4-Rain 5-Other _____

☐ Wind Intensity 1-Calm 2-Slight 3-Moderate 4-Strong

☐ Tide Stage 1-Low 2-Falling 3-Slack 4-Rising 5-High

☐ 89978(Number of people observed)

☐ Days Since Last Significant Rainfall Source: _____

☐ 89979 (Evidence of activity)

Matrix: ☐ Air ☐ Drinking Water ☐ Liquid ☐ Oil ☐ Other Solid ☐ Particulate ☐ Sludge ☐ Soil ☐ Water ☐ Other

Collection Method ☐ Grab ☐ Composite

Samples Collected:

Bottle No.	Container Type	Container Size	Preservative	Ice?	Analysis Requested	Direct Coll. Req.	Collection Type	Split	Sampled By
				Y/N			D/I	Y/N	
				Y/N			D/I	Y/N	
				Y/N			D/I	Y/N	
				Y/N			D/I	Y/N	
				Y/N			D/I	Y/N	
				Y/N			D/I	Y/N	
				Y/N			D/I	Y/N	
				Y/N			D/I	Y/N	
				Y/N			D/I	Y/N	
				Y/N			D/I	Y/N	

Custody

Relinquished By: _____ Received By: _____

Date/Time: _____ AM PM Date/Time: _____ AM PM

Samples placed in restricted area by: _____ (Initial)

Legend

Collection Type
D - Direct
I - Indirect

Preservatives
H2SO4 NaOH
HCL Na2S2O3
HNO3 none

Container Sizes
1/2 gal 250 mL
1 gal 500 mL
1 qt 4 oz
40 mL 8 oz
100 mL n/a

Container Types
P - Plasitc
G - Glass
Can - Canister
C - Cartridge
PB - Plastic Bag
S - Slide
O - Other

Field No. _____

City of Houston
Houston Health Department
Bureau of Pollution Control and Prevention
7411 Park Place Blvd
832.393.5730 FAX 832-393-5726

FIELD FORM & CHAIN OF CUSTODY FORM

HOUSTON HEALTH DEPARTMENT

Date _____ **Samples Collected By:** _____

Run No. _____ **Station ID** _____ **Time (24 hr)** _____ **Field Meter #** _____

Stream Name & Intersecting Street _____

For lab use only:

Samples Received on Ice? Yes / No **Thermometer ID:** _____

Temp (°C) _____ **Corrected Temp (°C)** _____

FIELD OBSERVATIONS

Number of days since significant rainfall _____

Flow Severity	Tidal Stage	Color	Odor	Water Surface	Current Weather	Wind Intensity

Flow Severity	Tidal Stage	Color	Odor	Water Surface	Current Weather	Wind Intensity
1 – no flow	1 – low	1 – brownish	1 – sewage	1 – calm	1 – clear	1 – calm
2 – low	2 – falling	2 – reddish	2 – oily/chemical	2 – ripples	2 – partly cloudy	2 – slight
3 – normal	3 – slack	3 – greenish	3 – rotten egg	3 – waves	3 – cloudy	3 – moderate
4 – flood	4 – rising	4 – blackish	4 – musky	4 - whitecaps	4 – rain	4 - strong
5 – high	5 – high	5 – clear	5 – fishy		5 - other	
6 – dry*		6 – other*	6 – none			
			7 – other*			

Flow Method	Flow (cfs)	Secchi Depth (cm)	Evidence of Primary Contact Recreation	# people observed	Sample Depth (ft)	Total Depth (ft)

1 – flow-gauge station
5 - Doppler

1 – observed
0 – not observed

1 – 10
> 10

INSTRUMENT READINGS

Temp	Conductivity	Dissolved Oxygen (DO)	pH	Salinity
(1.0 to 38.0 °C)	(0.03 to 60 mS/cm)	(0.5 to 15.0 mg/L)	(5.0 to 10.0)	(.009 to 45.0 PSS)

***Other Observations:**

_____
_____
_____
_____

Request for Analysis (circle what is requested):

1 – pH
2 – Conductivity
3 – TSS
4 – N-NO3
5 – Cl-
6 – SO4
7 – N-NH3
8 – T-PO4
9 – E. coli
10 - Enterococcus

No. of Containers:

____ 100 mL sterile plastic
____ 200 mL sterile plastic
____ 1 L plastic
____ 1 L plastic w/ H_2SO_4
____ 1 gallon plastic
____ 1 L plastic(TKN) bottle w/H_2SO_4

Acid ID# H_2SO_4 _____

Samples Relinquished By: _____ **Date:** _____
(signature only)

Lab Sample No. _____ **Received by:** _____ **Date:** _____
(signature only)

*Note: If site is dry, photo should be taken. If water present within 400 m, and pool is 10+m long, and 0.4+m deep, collect sample and record Maximum pool width, depth, length, and percent pool coverage in 500 m reach (if measureable) in observations section.

CITY OF HOUSTON
DRINKING WATER OPERATIONS LABORATORY
LAKE HOUSTON WATERSHED SITE MONITORING
FIELD SHEET & CHAIN OF CUSTODY

Effective Date: 1 05/18/17 Document ID: 150 Version: 1.09

Date of Sampling:_____ Air Temperature :_____ Days Since Last Significant Rainfall :_____ Samples Collected By: _____

Sample Run Collected Bi-Monthly Note: All samples taken at a one foot depth by plastic bucket unless specificaliy designated in 'Sample Depth' column below.

Sample No.	Station Name	TCEQ ID	Time	Sample Depth (ft)	Total Depth (ft)	Water Temp °C	Sp. Cond. µs/cm	pH	DO mg/L	Secchi Depth (m)	Flow Severity	Obser. Turb.	Water Color	Water Odor	Present Weather	Wind Intensity	Water Surface	Primary Contact	Evidance of P.C.
1	LUCE BAYOU HUFFMAN / CLEVELAND	11187																	
2	EAST FORK SAN JACINTO RIVER @ FM 1485 (gage 8070200)	11235																	
3	CANEY CREEK @ FM 1485	11334																	
4	PEACH CREEK @ FM 2090	11337																	
5	EAST FORK SAN JACINTO @ SH 105 (gage 8070000)	11238																	
6	PEACH CREEK @ FM 105	16625																	
7	CANEY CREEK @Millmac Rd.	21465																	
8	WEST FORK SAN JACINTO @ FM 105 (gage 8067650)	11251																	
9	STEWART CREEK @ LOOP 336, CONROE	16626																	
10	CRYSTAL CREEK @ HWY 242	16635																	
11	WEST FORK SAN JACINTO @ FM 242	11243																	
12	SPRING CREEK @ I-45 (gage 8068500)	11313																	
13	CYPRESS CREEK @ I-45 (gage 8069000)	11328																	

Comments:

1-no flow	1-low	1-brownish	1-sewage	1-clear	1-calm	1-calm	# of people	1-Observed
2-low	2-medium	2-reddish	2-oily/chemical	2-p. cloudy	2-slight	2-ripple	Observed	0-Not observed
3-normal	3-high	3-greenish	3-rotten egg	3-cloudy	3-mod.	3-wave		
4-none		4-blackish	4-musty	4-rain	4-strong	4-whitecap		
5-high		5-clear	5-fishy	5-other				
6-dry		6-other	6-none					
			7-other					

Analysis Required: VOC, WQP*, T-phos, Ammonia, Total Coliform, E. coli Matrix: Water

Bottles used: 1-100ml sterilized bottle for Bacti analysis, 1-500ml plastic bottle for WQP analysis, 2-40ml VOA bottles with 1:1 HCl, 1-500 mL plastic bottle acidified with H_2SO_4 for NH_3 analysis, 1-250ml amber bottle for T-phos. & TOC analysis.

* WQP analysis includes: pH, Cond., TSS, Alk, Hard, NO_2-N, NO_3-N, F, Cl, Br, SO_4

Temperature of Samples when Received at Lab:_____

Biol. Samples Relinquished By :_____ Date:_____ Time :_____ Chem. Samples Relinquished By :_____ Date:_____ Time :_____

Biol. Samples Received By :_____ Date:_____ Time :_____ Chem. Samples Received By :_____ Date:_____ Time :_____

DRINKING WATER OPERATIONS LABORATORY

4200 Leeland Street, Annex Building, Houston, TX 77023

San Jacinto River Authority - Lake Conroe Division

LAKE CONROE MONITORING
CHAIN OF CUSTODY

Effective Date: 8/21/2019 **Document ID: 150** **Version: 1.11**

Date of Sampling:_____ **Samples Collected By:** _____

						Analysis Requested:					
Sample No.	**Station Name**	**Watershed ID**	**TCEQ ID**	**Time**	**Grab or Composite**	**TSS**	**WQP ***	**Total Coliform & E.Coli**	**T.Phos & TOC**	**Ammonia**	**Comments:**
1	**Walker County**	23	11344								
2	**T. James Creek**	25	16645								
3	**Weir Creek**	3	16644								
4	**Caney Creek**	6	16643								
5	**Tim Cude Creek**	26	16642								
6	**Lost Lake Creek**	33	16640								
7	**Lewis Creek**	4	16641								
8	**W.C. Clark Creek**	27	16639								
9	**Atkin Creek**	5	16638								
10	**Intake Lake Conroe**	24	11342								

Bottles used:
1-1000mL plastic botte for TSS
1-500ml plastic bottle for WQP analysis
1-120ml sterilized bottle for Bacti analysis
1-250ml amber bottle acidified with H2SO4 for T-phos. & TOC analysis
1-500 mL plastic bottle acidified with H2SO4 for NH3 analysis

Matrix: Surface Water

Samples Received on Ice: Yes_____No_____

Temperature of Samples when Received at Lab:_____

*** WQP analysis includes:** pH, Cond., Alk, Hard, NO_2-N, NO_3-N, F, Cl, Br, SO_4

Sample Condition Acceptable: Yes_____No_____
If no, explain in comment section above

Biological Samples
Relinquished By :_____ **Date:**_____ **Time:**_____

Chemical Samples
Relinquished By :_____ **Date:**_____ **Time:**_____

Biological Samples
Received By :_____ **Date:**_____ **Time:**_____

Chemical Samples
Received By :_____ **Date:**_____ **Time:**_____

Texas Research Institute for Environmental Studies (TRIES) Analytical Laboratory
Sam Houston State University
Chain of Custody

REPORT TO:	BILL TO:
Name: Kaitlen Gary	**Name:** Kaitlen Gary
Company: TRIES Aquatics Laboratory	**Company:** TRIES Aquatics Laboratory
Address: 2424 Sam Houston Avenue, Suite B-8	**Address:** 2424 Sam Houston Avenue, Suite B-8
City, State, Zip: Huntsville, Tx 77340	**City, State, Zip:** Huntsville, TX 77320
Phone: 936-294-2501 **Fax** **Email:** kpgary@shsu.edu	**Phone:** 936-294-2501 **Fax:** **Email:** kpgary@shsu.edu
Sampler Name: **Sampler Signature:**	Analysis Required — TRIES Log #

Date Collected	Time Collected	Matrix Code	Type* C	Type* G	Sample Description/Location	Bottle ID	pH	°C	Preservation Code	Cl, SO4, NO2, NO3	TSS	T PO4	NH3				Sample Number
		AQ		X		B1			C	X							
		AQ		X		B2			C		X						
		AQ		X		B3			A			X					
		AQ		X		B4			D				X				

Requested TAT:
Normal (10 days)
Expedite: (5 days)
Rush (1 Day)
*C=Composite
G=Grab

Matrix Code:
WW=Wastewater
AQ=water
SW=solid

Preservation
C = <6° C
A= pH <2 HNO_3
B = pH <2 HCl
D = pH <2 H_2SO_4
E = $Na_2S_2O_3$

Sample Receiving/Lab Comments:

TRIES Use Only

Sample Receipt Checklist:

Shipped: _____
Hand Del: _____

Container Tape:
Present: **Y N NA** Intact **Y N NA**

Cooler Temp:_____(°C)

Broken: **Y N** Leaking: **Y N**

Preserved: **Y N**
Acid type: _____
Acid vol:_____
Acid lot: _____

COC Seals:
Present: **Y N NA** Intact: **Y N NA**

COC & Labels Match: **Y N**

Sufficient Quantity: **Y N**

Relinquished By:	**Date/Time:**	**Relinquished By:**	**Date/Time:**
Received By:	**Date/Time:**	**Received By:**	**Date/Time:**
Thermometer ID:	**pH strips Lot:**	**Project:** Clean Rivers Program	