Amendment # 1 Update to Appendix B Sampling Process Design and Monitoring Schedule to the Houston-Galveston Area Council Clean Rivers Program FY 2016/2017 QAPP

Prepared by the Houston-Galveston Area Council (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: Jean Wright, Houston-Galveston Area Council (H-GAC) CRP Quality Assurance Officer P.O. Box 22777 Houston, Texas 77227-2777 (713) 499-6660 jean.wright@h-gac.com

Justification

The original FY16-17 QAPP was approved on August 21, 2015. Since December 31, 2015, several individuals have retired or were reassigned from their original positions as they were associated with the Clean Rivers Program within the local partner organizations. This amendment will include those needed changes including the change in TCEQ Project Manager and QA Specialist. This amendment will address changes to monitoring schedules, personnel, and department names. New people have been assigned these duties or they have been combined with other CRP duties within the local partners. For the rest of FY2017, the position descriptions will not be combined. Rather, the original break down of the various positions will remain separate and the person's name will be repeated. If the combined duties continue into the next biennium, the new QAPP will be rewritten to reflect the combined responsibilities.

Changes to monitoring sites and sampling frequency are based upon discussions during the FY2017 coordinated monitoring meeting and presented in this amendment as Appendix B. Along with a new Appendix B are changes or corrections made to the A7 tables for several local partners.

Detail of Changes

List each section in which a change is proposed and provide a description of the change(s) in the table below. Copies of changed language is included as replacement pages.

Section/Figure/Table	Page	Change	Justification
A1 Approval Page	2	Replace Allison Fischer's	Allison Fischer took another
A3 Distribution List	14	name in the Project QA	job outside of the agency.
A4 Project/Task Organization	15	Specialist position with Kelly	
A4 Project/Task Organization	16	Rodibaugh throughout the	
Figure A4.1. Org. Chart	23	entire QAPP	
A1 Approval Page	4	Replace Tim Duffey, Field	Tim Duffey retired.
A4 Project/Task Organization	18	QAO, with Bryan Kosler	
Figure A4.1b. Org. Chart	25	throughout entire QAPP	
Table A8.1 Designated trainer	39		
A1 Approval Page	5	Replace all City of Houston,	The city went through a
Table of Contents	10	Health and Human Services	reorganization and
Table of Contents	11	(HHS) references with City of	renamed of some of the
List of Acronyms	12	Houston, Health Department	city departments.
A3 Distribution List	14	(HHD) throughout the entire	
A4 Project/Task Organization	19	QAPP. Including HHS is	
Figure A4.1. Org. Chart	23	replaced with HHD.	
Figure A4.1c. Org. Chart	26		
A5 changes general	31		
A6 changes general	33		
A6 changes general	34		
Table A8.1 Designated trainer	39		

Table A9.1c	42		
Table B2.1c	51		
Sample Containers general	55		
Table B3.1	59		
B10 changes general	70		
Table B10.1	71		
Data Errors and Loss	72		
D1 changes general	82		
Table D2.1c	86		
Appendix A			
A1 Approval Page	6	Replace all City of Houston,	Making name change per
Table of Contents	10	Water Quality Control (WQC)	the NELAP certification
Table of Contents	11	references with City of	documents.
List of Acronyms	12	Houston, Drinking Water	
A3 Distribution List	14	Operations (DWO)	
A4 Project/Task Organization	20	throughout the entire QAPP.	
Figure A4.1. Org. Chart	23	Including WQC is replaced	
Figure A4.1d. Org. Chart	27	with DWO. These pages	
Figure A4.1e. Org. Chart	28	include those sections	
A5 changes general	31	address SJRA Lake Conroe as	
A6 changes general	33	well.	
A6 changes general	34		
Table A8.1 Designated trainer	39		
Table A9.1d	43		
Table A9.1e	44		
Table B2.1d	51		
Sample Containers general	55		
Sample Containers general	56		
Table B3.1	60		
B10 changes general	70		
Table B10.1	71		
Data Errors and Loss	72		
D1 changes general	82		
Table D2.1d	87		
Table D2.1e	88		
Appendix A			
A1 Approval Page	5	Drop 'Acting' from Daisy	Daisy James is no longer
A4 Project/Task Organization	18	James' title.	the 'Acting' CRP Project
Figure A4.1c Org. Chart	27		Manager but the full-time
			CRP Manager.
A1 Approval Page	6	Replace Ying Wei with	Ying Wei retired
A4 Project/Task Organization	20	Shubha Thakur and ADD	
Figure A4.1d Org Chart	27	'Acting' to CRP Project	
Figure A4 1e Org Chart	28	Manager & Laboratory	
	20	manager & casoratory	

		Manager title.	
A1 Approval Page A4 Project/Task Organization Figure A4.1e Org. Chart	7 21 28	Replace Randy Acreman, Project Manager and Field QAO with Shane Simpson	SJRA went through a reorganization and Randy Acreman was assigned new
Table A8.1 Designated trainer	39a	throughout the entire QAPP	duties not associated with CRP.
A6 changes to 24 HR DO monitoring	35	H-GAC is dropping sites 18818 and 20461 24 hr. DO monitoring and replacing with sites 18191 and 20451. The number of deployments at Site 16611 is increasing from 3 to 4 per year to get maximum data sets during the year with the hope of removing concerns in the future.	These changes were identified during the Coordinated Monitoring Meeting in April 2016 to go into effect in September 2016. Information is needed to address concerns found through routine monitoring.
Sample Containers	55	Change HHS in paragraph to HHD	Now the Houston Health Dept. (HHD) Lab instead of HHS Lab.

Distribution

QAPP Amendments and Revisions to Appendices will be distributed to all personnel on the distribution list maintained by the Planning Agency.

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

A1 Approval Page

Texas Commission on Environmental Quality

8/25

Water Quality Planning Division

2016

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Date

Sarah Eagle Work Leader Clean Rivers Program sarah.eagle@TCEQ.texas.gov

8/25/

Kelly Rodibaugh Project Manager, CRP CRP <u>kelly.rodibaugh@tceq.texas.gov</u>

Date

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Cathy Anderson, Team Leader

Data Management and Analysis

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Daniel R. Burke Date Lead CRP Quality Assurance Specialist Laboratory and Quality Assurance Section daniel.burke@TCEQ.texas.gov

Houston-Galveston Area Council (H-GAC)

16 81

Todd Running H-GAC Project Manager

Date

16 Jean Wright

H-GAC Quality Assurance Officer

Harris County Pollution Control Services (HCPCS)

~ 8/23/

Michael Cantu HCPCSCRP Project Manager

Date

23-16

Date

Bryan Kosler Field Quality Assurance Officer

Michael Cantu HCPCS Laboratory Manager

Date

16 Debra Burney Date

Laboratory Quality Assurance Officer

Replacement Page 4 FY2016-2017

City of Houston, Health Department (HHD)

Daisy les

CRP Project Manager

14

8/22/11-

Lisa Groves Date HHD Field Quality Assurance Officer

8/23/16 Date Odat

Dr. Odatt Rajan HHD Laboratory Director

16

Cyndie Boulé Date HHD Laboratory Quality Assurance Officer

8 23 2016

Emina Marjanovich Date HHD Lab Inorganic Chemistry Section Technical Supervisor

For odaut m 8/23/16 Rag

Linda Holman HHD Lab Microbiology Section Technical Supervisor

City of Houston, Drinking Water Operations (DWO) Laboratory

8-22-2A16 Date

Date Desta DWO I

Desta Takie DWO Field Quality Assurance Officer

Date

DWO Laboratory Director

Fabian Heaney

8/22/16

Shubha Thakur Date 'Acting' DWO CRP Project Manager & Laboratory Manager

8/22/16

Shubha Thakur Date DWO Laboratory Quality Assurance Officer

San Jacinto River Authority (SJRA)

in The Shane Simpson Date

SJRA Project Manager

Ber Date

Shane Simpson SJRA Field Quality Assurance Officer

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

8 6

Dr. George Guillen CRP Project Manager and QAO

Date

8/22/10 Date Jenny Oakley

CRP Field QAO

Eastex Laboratory

14 Rm Pam Hickman Date

Eastex Lab Manager

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Daniel Bowen Eastex Lab Quality Assurance Officer

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A2 Table of Contents

A1	Approval Page	2
A2	Table of Contents	10
	List of Acronyms	12
A3	Distribution List	14
A4	PROJECT/TASK ORGANIZATION	15
	Figure A4.1. Organization Chart - Lines of Communication	23
	Figure A4.1a. The Houston-Galveston Area Council (H-GAC) Organizational Chart	24
	Figure A4.1b. The Harris County Pollution Control Services (HCPCS) CRP Organization Chart	25
	Figure A4.1c. The City of Houston, Health Department (HHD) CRP Organization Chart	26
	Figure A4.1d. The City Houston, Drinking Water Operations (DWO) CRP Organization Chart	27
	Figure A4.1e. San Jacinto River Authority (SRJA) CRP Organization Chart	28
	Figure A4.1f. The Environmental Institute of Houston (EIH) at the University of Houston - Clea	ar
	Lake (UHCL) CRP Organization Chart	29
A5	Problem Definition/Background	30
A6	Project/Task Description	33
A7	Quality Objectives and Criteria	36
A8	Special Training/Certification	39
	Table A8.1 The Designated Trainer for each Local Partner	39
A9	Documents and Records	40
	Table A9.1a Project Documents and Records – H-GAC	40
	Table A9.1b Project Documents and Records – HCPCS	41
	Table A9.1c Project Documents and Records – Houston –HHD	42
	Table A9.1d Project Documents and Records – Houston – DWO	43
	Table A9.1e Project Documents and Records – SJRA – Lake Conroe samples only	44
	Table A9.1f Project Documents and Records - SJRA - Woodlands samples only	45
	Table A9.1g Project Documents and Records – EIH	46
	Table A9.2 The Software used by Local partners to Submit Data to H-GAC	49
B1	Sampling Process Design	50
B2	Sampling Methods	50
	Table B2.1a Sample Storage, Preservation and Handling Requirements for H-GAC. Samples	
	Analyzed at Eastex Environmental Laboratory	50
	Table B2.1b Sample Storage, Preservation and Handling Requirements for HCPCS	51
	Table B2.1c Sample Storage, Preservation and Handling Requirements for HHD	51
	Table B2.1d Sample Storage, Preservation and Handling Requirements for DWO	52
	Table B2.1e Sample Storage, Preservation and Handling Requirements for SJRA Samples	
	Collected from Lake Conroe and Analyzed by DWO Laboratory	52
	Table B2.1f Sample Storage, Preservation and Handling Requirements for SJRA Samples	
	Collected form the Woodlands and Analyzed at Eastex Environmental Laboratory	53
	Table B2.1g Sample Storage, Preservation and Handling Requirements for EIH. Samples	
	Analyzed by Eastex Environmental Laboratory	54
B3	Sample Handling and Custody	58
H-GA(C QAPP Amendment 1 Replacement Page 10	

	Table B3.1 Sample Handling References for Local Monitoring Partners	.59			
B4	Analytical Methods	.60			
B5	Quality Control	.61			
B6	Instrument/Equipment Testing, Inspection, and Maintenance	.67			
B7	Instrument Calibration and Frequency	.67			
B8	Inspection/Acceptance of Supplies and Consumables	.68			
B9	Acquired Data	.68			
B10	Data Management	.69			
	Table B10.1 Sampling Entity Data Submission Codes	.71			
C1	Assessments and Response Actions	.76			
1	Table C1.1 Assessments and Response Requirements	.76			
I	Figure C1.1 Corrective Action Process for Deficiencies	.78			
C2	Reports to Management	.79			
	Table C2.1 QA Management Reports	.79			
D1	Data Review, Verification, and Validation	.82			
D2	Verification and Validation Methods	.82			
	Table D2.1: Data Review Tasks	.84			
	Table D2.1a: Data Review Tasks for the Houston-Galveston Area Council (H-GAC)	.84			
	Table D2.1b: Data Review Tasks for Harris County Pollution Control Services (HCPCS)	.85			
	Table D2.1c: Data Review Tasks for City of Houston, Health Department (HHD)	.86			
	Table D2.1d: Data Review Tasks for City of Houston, Drinking Water Operations (DWO) Lab	.87			
	Table D2.1e: Data Review Tasks for San Jacinto River Authority-samples from Lake Conroe and				
i	analyzed by DWO Lab	.89			
	Table D2.1f: Data Review Tasks for San Jacinto River Authority-samples from The Woodlands				
i	area and analyzed by Eastex Lab	.90			
Table	2 D2.1g: Data Review Tasks for Environmental Institute of Houston (EIH) with samples analyzed	t l			
by Ea	stex Lab	.91			
D3	Reconciliation with User Requirements	.92			
Appe	ndix A: Measurement Performance Specifications (Table A7.1)				
Appe	ndix B: Task 3 Work Plan & Sampling Process Design and Monitoring Schedule (Plan)				
Appe	ndix C: Station Location Maps				
Appe	ndix D: Field Data Sheets				
Appe	ppendix E: Chain of Custody Forms				

- Appendix F: Data Review Checklist and Summary
- Appendix G: Summary Report for H-GAC Data Submissions
- Appendix H: Data Management Process

Appendix I: Data Management Plan

List of Acronym

AWRL	Ambient Water Reporting Limit
BMP	Best Management Practices
САР	Corrective Action Plan
COC	Chain of Custody
CRP	Clean Rivers Program
DMRG	Surface Water Quality Monitoring Data Management Reference Guide,
	August 2015, or most recent version
DM&A	Data Management and Analysis
DWO	Drinking Water Operations
Eastex	Eastex Environmental Laboratory
EPA	United States Environmental Protection Agency
EIH	Environmental Institute of Houston, University of Houston – Clear Lake
FWS	Flood Warning System
FY	Fiscal Year
GIS	Geographical Information System
GPS	Global Positioning System
H-GAC	Houston-Galveston Area Council
HCFCD	Harris County Flood Control District
HCPCS	Harris County Pollution Control Services
HHD	City of Houston, Health Department
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LIMS	Laboratory Information Management System
LOD	Limit of Detection
LOQ	Limit of Quantitation
MPS	Measurement Performance Specifications
NCC	National Climatic Center
NELAP	National Environmental Lab Accreditation Program
NOAA	National Oceanic and Atmospheric Administration
NWIS	National Water Information System
QA	Quality Assurance
QM	Quality Manual
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QAS	Quality Assurance Specialist
QC	Quality Control
QMP	Quality Management Plan
RMW	Regional Monitoring Workgroup
SJRA	San Jacinto River Authority
SLOC	Station Location
SOP	Standard Operating Procedure
SWQM	Surface Water Quality Monitoring

SWQMIS	Surface Water Quality Monitoring Information System
TMDL	Total Maximum Daily Load
TCEQ	Texas Commission on Environmental Quality
TNI	The NELAC Institute
TSWQS	University of Houston – Clear Lake
UHCL	Texas Surface Water Quality Standards
VOA	Volatile Organic Analytes
WIMS	Water Information Management System

A3 Distribution List

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The Houston-Galveston Area Council (H-GAC) will provide copies of this project plan and any amendments or appendices of this plan to each person on this list and to each sub-tier project participant, e.g., subcontractors, subparticipants, or other units of government. H-GAC will document distribution of the plan and any amendments and appendices, maintain this documentation as part of the project's quality assurance records, and will ensure the documentation is available for review. Sub-Tier participants & Laboratories to receive copies of the QAPP include:

- Harris County Pollution Control Services & Laboratory
- City of Houston, Health Department & Laboratory
- City of Houston, Drinking Water Operations & Laboratory
- Environmental Institute of Houston, University of Houston-Clear Lake
- San Jacinto River Authority
- Eastex Environmental Laboratory

A4 PROJECT/TASK ORGANIZATION

Description of Responsibilities

TCEQ

Sarah Eagle

CRP Work Leader

Responsible for Texas Commission on Environmental Quality (TCEQ) activities supporting the development and implementation of the Texas Clean Rivers Program (CRP). Responsible for verifying that the TCEQ Quality Management Plan (QMP) is followed by CRP staff. Supervises TCEQ CRP staff. Reviews and responds to any deficiencies, corrective actions, or findings related to the area of responsibility. Oversees the development of Quality Assurance (QA) guidance for the CRP. Reviews and approves all QA audits, corrective actions, reviews, reports, work plans, contracts, QAPPs, and TCEQ Quality Management Plan. Enforces corrective action, as required, where QA protocols are not met. Ensures CRP personnel are fully trained.

Daniel R. Burke

CRP Lead Quality Assurance Specialist

Participates in the development, approval, implementation, and maintenance of written QA standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Assists program and project manager in developing and implementing quality system. Serves on planning team for CRP special projects. Coordinates the review and approval of CRP QAPPs. Prepares and distributes annual audit plans. Conducts monitoring systems audits of Planning Agencies. Concurs with and monitors implementation of corrective actions. Conveys QA problems to appropriate management. Recommends that work be stopped in order to safeguard programmatic objectives, worker safety, public health, or environmental protection. Ensures maintenance of QAPPs and audit records for the CRP.

Kelly Rodibaugh

CRP Project Manager

Responsible for the development, implementation, and maintenance of CRP contracts. Tracks, reviews, and approves deliverables. Participates in the development, approval, implementation, and maintenance of written QA standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Assists CRP Lead QA Specialist in conducting Basin Planning Agency audits. Verifies QAPPs are being followed by contractors and that projects are producing data of known quality. Coordinates project planning with the Basin Planning Agency Project Manager. Reviews and approves data and reports produced by contractors. Notifies QA Specialists of circumstances which may adversely affect the quality of data derived from the collection and analysis of samples. Develops, enforces, and monitors corrective action measures to ensure contractors meet deadlines and scheduled commitments.

Cathy Anderson

Team Leader, Data Management and Analysis (DM&A) Team

Participates in the development, approval, implementation, and maintenance of written QA standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Ensures DM&A staff perform data management related tasks, including coordination and tracking of CRP data sets from initial submittal through CRP Project Manager review and approval; ensuring that data are reported following

instructions in the Surface Water Quality Monitoring Data Management Reference Guide, August 2015, or most current version (DMRG); running automated data validation checks in Surface Water Quality Monitoring Information System (SWQMIS) and coordinating data verification and error correction with CRP Project Managers; generating SWQMIS summary reports to assist CRP Project Managers' data review; identifying data anomalies and inconsistencies; providing training and guidance to CRP and Planning Agencies on technical data issues to ensure that data are submitted according to documented procedures; reviewing QAPPs for valid stream monitoring stations, validity of parameter codes, submitting entity code(s), collecting entity code(s), and monitoring type code(s); developing and maintaining data management-related standard operating procedures (SOPs) for CRP data management; and coordinating and processing data correction requests.

Peter Bohls

CRP Data Manager, DM&A Team

Responsible for coordination and tracking of CRP data sets from initial submittal through CRP Project Manager review and approval. Ensures that data are reported following instructions in the DMRG. Runs automated data validation checks in SWQMIS and coordinates data verification and error correction with CRP Project Managers. Generates SWQMIS summary reports to assist CRP Project Managers' data review. Identifies data anomalies and inconsistencies. Provides training and guidance to CRP and Planning Agencies on technical data issues to ensure that data are submitted according to documented procedures. Reviews QAPPs for valid stream monitoring stations. Checks validity of parameter codes, submitting entity code(s), collecting entity code(s), and monitoring type code(s). Develops and maintains data management-related SOPs for CRP data management. Coordinates and processes data correction requests. Participates in the development, implementation, and maintenance of written QA standards (e.g., Program Guidance, SOPs, QAPPs, QMP).

Kelly Rodibaugh

CRP Project Quality Assurance Specialist

Serves as liaison between CRP management and TCEQ QA management. Participates in the development, approval, implementation, and maintenance of written QA standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Serves on planning team for CRP special projects and reviews QAPPs in coordination with other CRP staff. Coordinates documentation and implementation of corrective action for the CRP.

Houston-Galveston Area Council (H-GAC)

Todd Running

H-GAC Project Manager and Field Supervisor

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 basin planning agency participants and that projects are producing data of known quality. Ensures that subcontractors are qualified to perform contracted work. Ensures CRP project managers and/or QA Specialists are notified of deficiencies and corrective actions, and that issues are resolved.

Harris County Pollution Control Services (HCPCS)

Michael Cantu

CRP Project Manager / Manager-Laboratory Services

Responsible for project oversight, and maintaining communication with H-GAC Project Manager, and between field and laboratory personnel. Responsible for producing quality analytical data and maintaining verification of procedures establishing the level of quality.

Debra Burney

Lab Quality Assurance Officer (QAO) / CRP QAO / CRP Data Manager

Responsible for monitoring the activities of HCPCS field and laboratory personnel, ensuring that all data collected meet the data quality objectives of the project. Ensures both field and laboratory data are entered into appropriate spreadsheets and data bases and is reviewed and validated as required. Responsible for submitting all data to H-GAC in the correct format.

Bryan Kosler

Field Supervisor & Field QAO

Responsible for supervising the collection, preservation, handling and delivery of samples. Responsible for ensuring that field measurements, sample custody, and documentation follow prescribed procedures. Trains all field monitoring personnel.

City of Houston, Health Department (HHD)

Daisy James

CRP Project Manager

Responsible for meeting the requirements of the contract between H-GAC and the City of Houston, Health Department, ensuring project oversight consistent with QAPP requirements, and communicating project status to H-GAC Project Manager. Additional responsibilities include ensuring the H-GAC CRP project manager and/or the H-GAC QAO are notified of circumstances that may adversely affect quality of data derived from collection and analysis of samples.

Lisa Groves

CRP QAO and Field Supervisor for Ambient Waters

Responsible for supervising sample collection, processing, handling, holding and reporting activities to ensure compliance with monitoring requirements. Responsible for notifying the Project Manager and Quality Assurance Officer of circumstances that may adversely affect the quality of data. Responsible for working with Project manager to ensure coordination of activities. Reviews and verifies data prior to submission to H-GAC. Trains all HHD monitoring personnel.

Lisa Leija

CRP Data Manager

Responsible for data entry of all field and laboratory data. Responsible for reviewing for transcription inaccuracies. Reviews data for outliers and verifies reasonableness. Formats and delivers data in electronic format to H-GAC Data Manager. Responsible for sending hard copies of field data sheets and COC forms to H-GAC CRP Data Manager.

City of Houston, Health Department (HHD) Laboratory

Dr. Odatt Rajan HHD Lab Director

Responsible for meeting the requirements of the contract between H-GAC and the City of Houston, Health Department (HHD) Laboratory, ensures implementation is consistent with CRP QAPP requirements, QAPP amendments and appendices, and communicates project status to H-GAC Project Manager. Ensures lab's QMP and required monitoring systems audits are conducted to ensure QAPPs are followed and that projects are producing data of known quality. Ensures H-GAC CRP project manager and/or QA Specialist are notified of circumstances which may adversely affect quality of data derived from analysis of samples. Responsible for validating that all data collected meet the data quality objectives of the project and are suitable for reporting to the TCEQ. Ensures lab personnel are involved in coordinating basin planning activities and work with other basin partners as needed.

Emina Marjanovich

HHD Laboratory Inorganic Chemistry Section Technical Supervisor

Responsible for inorganic chemistry laboratory testing of samples from CRP as per CRP requirements in contracts, QAPPs, and QAPP amendments and appendices. Ensures NELAP certification in CRP parameters and that projects are producing data of known quality. Ensures that subcontractors are qualified to perform contracted work. Ensures CRP project managers, laboratory director, and/or QA Specialists are notified of circumstances which may adversely affect quality of data derived from collection and analysis of samples. Responsible for validating that all data collected meet the data quality objectives of the project and are suitable for reporting to the TCEQ.

Linda Holman

HHD Laboratory Microbiology Section Technical Supervisor

Responsible for microbiology laboratory testing of samples from CRP as per CRP requirements in contracts, QAPPs, and QAPP amendments and appendices. Ensures NELAP certification in CRP parameters and that projects are producing data of known quality. Ensures that subcontractors are qualified to perform contracted work. Ensures CRP project managers, laboratory director, and/or QA Specialists are notified of circumstances which may adversely affect quality of data derived from collection and analysis of samples. Responsible for validating that all data collected meet the data quality objectives of the project and are suitable for reporting to the TCEQ.

Cyndie Boule

HHD Laboratory Quality Assurance Officer

Responsible for ensuring the quality system is implemented and followed. Develops, facilitates, and conducts laboratory quality assurance audits and notifies laboratory management of deficiencies (or opportunities for continuous improvement) and monitors corrective actions. Provides QC samples as per requirements of QAPP. Responsible for keeping the laboratory's *Quality Assurance Manual* current. Responsible for ensuring initial and continuing training as well as the demonstrations of capability meet NELAP acceptance criteria. Additional responsibilities include identifying, receiving, and maintaining project laboratory quality assurance records, notifying the laboratory Director, the Project Manager, and H-GAC's Project Manager of circumstances that may adversely affect the quality of data, and validating data prior to the submission of laboratory data to H-GAC.

City of Houston, Drinking Water Operations (DWO)

Fabian Heaney

Laboratory Director

Responsible for producing quality analytical data and maintaining verification of procedures for establishing the level of quality. This position supervises, manages, and provides guidance to administrative and operational support staff regarding laboratory operations, practices/policies, quality assurance, safety/security/training, information technology, legislation/regulation, and procurement/billing functions to ensure high-quality internal and external customer service. Oversees planning, development, and supervision of operational and administrative programs, evaluates, and makes improvements to operational procedures, policies, and services provided to internal and external stakeholders/customers.

Shubha Thakur

'Acting' Laboratory Manager / CRP Project Manager

Responsible for the day-to-day operations of the lab and supervision of lab personnel to produce quality analytical data. Maintains verification of procedures for establishing the level of quality. Ensures staff are properly trained according to prescribed procedures and laboratory techniques. Develops and revises standard operating procedures, techniques, polices and reports. Responsible for coordinating CRP activities with H-GAC Project Manager and QA Officer.

Shubha Thakur

Lab QAO / CRP QAO

Checks training, competency, and re-training of technicians. Performs verification and validation procedures to confirm quality data is issued to clients. Performs other QA/QC duties and checks associated with lab activities. Resolves out-of-control issues. Conducts internal lab audits. Provides QC samples as per requirements of QAPP. Responsible for keeping the laboratory's *Quality Assurance Manual* current. Responsible for ensuring initial and continuing training as well as the demonstrations of capability meet NELAP acceptance criteria.

Bingwei Zhao

CRP Data Manager

Responsible for ensuring all data and associated reports meet the requirements of the QAPP by managing, reviewing, verifying, and submitting electronic data to H-GAC's CRP Data Manager. This includes comparing hard copy and electronic data files, and chain-of-custody forms.

Joey Eickhoff

Field Supervisor and CRP Field Data Manager

Responsible for supervising the collection, field preservation, handling and delivery of samples to the laboratory. Responsible for ensuring that equipment calibration, field measurements, sample custody, and documentation follow prescribed procedures in the QAPP. Trains all DWO monitoring personnel. Responsible for ensuring all data and associated reports meet the requirements of the QAPP by managing, reviewing, verifying, and submitting electronic data to H-GAC's CRP data Manager. This includes comparing hard copy and electronic data files.

Desta Takie CRP Field QAO

Performs all associated QA/QC checks on the data and completes Data Review Check-list for accuracy, reasonableness, and completeness. Submits hard copies of field sheets, chain-of custody reports and Data Review Checklist to HGAC.

San Jacinto River Authority (SJRA)

Shane Simpson

CRP Project Manager / Field Supervisor / Quality Assurance Officer

Responsible for project oversight and maintaining communication with H-GAC Project Manager for all samples collected from both Lake Conroe and the Woodlands area. Ensures that all program activities are conducted in accordance with established SWQM procedures, methods and protocols, as well as requirements of the CRP QAPP. Responsible for ensuring that all data and associated reports meet requirements of the QAPP. Reviews data, electronic data files, chain-of-custody forms, and Data Review Check-lists for accuracy, reasonableness, and completeness. Performs QA/QC checks on data. Reviews the Data Review Check-list for accuracy. Ensures all monitoring personnel are properly trained. Responsible for ensuring that proper methods and protocols are followed during sample collection. Responsible for scheduling and ensuring all field samples and parameters are collected. Maintains and administers QA/QC checks on field equipment. Ensures water samples are transported and relinquishes to City of Houston laboratory staff or contract lab with required COC in timely manner.

Shane Simpson

CRP Data Manager

Enters field data into an electronic data file and reviews data for accuracy and reasonableness. Enters laboratory data into an electronic data file and reviews all data for accuracy, reasonableness, completeness, and compliance with the QAPP. Responsible for reviewing and verifying data with field operations and with contract laboratory personnel. Submits electronic data and supporting documents (field data sheets, chain-of-custody reports, and Data Review Check-lists) to the Project Manager/QAO for review. Submits data and supporting documents to H-GAC. Completes and submits Data Review Checklists to H-GAC Data Manager with each set of data submitted to H-GAC.

Project Organization Chart





Lines of Management ______ Lines of Communication _____ Figure A4.1b. The Harris County Pollution Control Services (HCPCS) CRP Organizational Chart.



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.



Houston Ship Channel. Galveston Bay is an estuary of state and national importance. In fact, three of the four basins overseen by H-GAC drain into or are part of the Galveston Bay system. The San Jacinto River Basin contains the most highly urbanized and industrialized portion of the Houston metropolitan area.

The 2012 State of Texas Integrated Report (which includes a List of Impaired Water Bodies and is required under Section 303d of the Clean Water Act) identifies 43 of the 51 classified segments located within H-GAC's four Clean Rivers Program basins as having an impairment(s) or water quality concern(s). This includes 1 segment in the Trinity-San Jacinto Coastal Basin, 15 segments in the San Jacinto River Basin (plus 54 unclassified waterbodies), 7 segments in the San Jacinto-Brazos Coastal Basin (plus 20 unclassified waterbodies), and 4 segments in the Brazos-Colorado Coastal Basin (plus 3 unclassified waterbodies), plus 16 bay/estuary segments (14 unclassified waterbodies) which are in H-GAC's monitoring area. Among the segments listed in H-GAC's basins, the identified water quality impairments are related to the following factors (with some segments listed for several reasons): elevated bacteria levels which could pose a health risk to people engaged in contact recreation activities, fish/shellfish consumption advisories issued by the Texas Department of Health with most related to dioxin and PCB concerns in the Houston Ship Channel vicinity, low dissolved oxygen, and elevated bacteria levels which trigger shellfish harvesting closures/limitations in shellfish harvesting areas.

In addition to promoting water quality data collection, the Clean Rivers Program aims to develop and maintain "a basin-wide water quality monitoring program that minimizes duplicative monitoring, facilitates the assessment process, and targets monitoring to support the permitting and standards process."

H-GAC's regional surface water quality monitoring program is a voluntary association of local monitoring agencies, coordinated through the H-GAC, under the auspices of the Texas Clean Rivers Program. Federal, state, and local agencies that conduct routine surface water quality monitoring programs within the San Jacinto River, Trinity-San Jacinto Coastal, San Jacinto-Brazos Coastal and Brazos-Colorado Coastal Basins collect surface water quality monitoring information that not only is used by their individual agencies, but will be shared among the other participants through a data clearinghouse maintained by H-GAC. The agencies that make up the regional monitoring workgroup (RMW) include the Texas Commission on Environmental Quality – Region 12, Harris County Pollution Control Services (HCPCS), City of Houston, Health Department (HHD), City of Houston, Drinking Water Operations (DWO), San Jacinto River Authority (SJRA), the Environmental Institute of Houston (EIH) – University of Houston Clear Lake (UHCL), Harris County Flood Control District (HCFCD), the City of Houston, Public Works and Engineering (PWE), and the Houston-Galveston Area Council (H-GAC). Other agencies and organizations which are invited to participate or are active on the steering committee include the United States Environmental Protection Agency - Houston Lab, the United States Geological Survey, Texas Parks and Wildlife Coastal Fisheries, Texas Parks and Wildlife Inland Fisheries, National Oceanic and Atmospheric Administration/National Marine Fisheries Service, Texas Water Development Board, Texas State Soil and Water Conservation Board, United States Fish and Wildlife, and Texas Department of State Health Services.

Note: Only the agencies listed in **Bold** type above fall under this QAPP.

uses it for evaluations of water quality under the Clean Rivers Program. The data is also widely used by state water quality managers, cities, counties, consultants, students and the general public. Routine samples are collected from 39 classified stream, reservoir and bay segments to monitor for the attainment of uses and numerical criteria. Unclassified water bodies are also monitored in response to perceived risk for pollution and/or to define water quality. A map showing the locations of all fixed monitoring locations are included in Appendix C.

Beginning in July 2008, all laboratories working with the Clean Rivers Program began reporting data which was produced under NELAP certification. H-GAC continues its leadership role in coordinating efforts to make sure all the laboratories that perform analyses on CRP samples continue to be NELAP certified (National Environmental Laboratory Accreditation Program). H-GAC funds the annual renewal of certifications and provides the proficiency samples to 3 partner laboratories.

A6 Project/Task Description

In the absence of a single, regional entity that comprehensively monitors water quality across the San Jacinto River Basin and the various coastal basins in the Houston metropolitan area, the regional monitoring approach which H-GAC is pursuing through the Clean Rivers Program involves coordinating efforts among those local agencies which monitor water quality in some portion of the area for their own specialized purposes and with their own organizational approaches. H-GAC's regional Quality Assurance Project Plan (QAPP) is the mechanism for bringing this data into the statewide water quality database (SWQMIS). The participation of local monitoring agencies in this regional coordination effort has been largely voluntary as these agencies have not received significant Clean Rivers Program (CRP) funding for their activities.

The local agencies involved in this regional monitoring effort are: the Harris County Pollution Control Services, the City of Houston, Health Department, the City of Houston, Drinking Water Operations Laboratory, the San Jacinto River Authority, the Environmental Institute of Houston at UHCL, and the Houston-Galveston Area Council. These organizations have a combined total of approximately 300 monitoring sites throughout the region. Each of the agencies' monitoring activities will be coordinated through the RMW. See Appendix B for the project-related work plan tasks and schedule of deliverables for a description of work defined in this QAPP. Appendix B also contains a copy of the annual coordinated monitoring schedule (CMS) which describes the sampling design and monitoring activities pertaining to this QAPP. Appendix C contains a map of the sampling station locations. Appendices D and E contain copies of the local programs' field monitoring sheets and Chain-of-Custody forms respectively. A brief description of each partners program follows.

Harris County Pollution Control Services' surface water quality monitoring is conducted at specific sites on the Houston Ship Channel, San Jacinto River, side bays of Galveston Bay, and in and around Clear Lake and its tributaries. Data is collected on a monthly or bi-monthly basis for informational and regulatory purposes involving municipal and industrial wastewater treatment facilities.

City of Houston, Health Department monitors area surface waters to document water quality status and trends with specific concerns for human health risks associated with the use of the

waters for contact/non-contact recreation and potable water supply. Data is collected nine times per site per fiscal year.

City of Houston, Drinking Water Operations monitors ambient water quality at many locations on Lake Houston and the tributaries flowing into the lake. Lake Houston is one of the primary sources of public water supply for the City of Houston. The monitoring that is conducted allows the Drinking Water Operations Division to assess the quality of water that will eventually be pumped into water production facilities, treated and distributed to the public as drinking water. Data is collected on a monthly or bi-monthly basis and provided to the Clean Rivers Program as detailed in this QAPP. Because Lake Conroe is also a public drinking water source, the City of Houston contracts with SJRA to collect water samples from that lake. Lake Conroe samples are also analyzed at the Drinking Water Operations Laboratory.

San Jacinto River Authority monitors surface waters in Lake Conroe, Lake Woodlands, Upper and Lower Panther Branch and Bear Branch. Data is provided to the Clean Rivers Program as detailed in this QAPP. SJRA collects routine surface water quality samples from Lake Conroe and transports samples to the DWO Lab for analysis. Samples are collected on a monthly basis. Field data is submitted to H-GAC on a monthly basis. Lab data from Lake Conroe is submitted to H-GAC on a quarterly basis directly from DWO Lab.

SJRA also collects routine samples to establish baseline surface water quality information for Lake Woodlands and Panther Branch – a tributary 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. A few but not all of the TSWQS metals-in-water are collected and analyzed twice a year to look for changes over time. Data is submitted to H-GAC on a quarterly basis.

Environmental Institute of Houston was contracted by H-GAC to monitor surface water quality at more than 50 locations in the San Jacinto-Brazos Coastal Basin. There are no local cities or agencies able to voluntarily monitor the waterways in those areas. Data is collected for the Clean Rivers Program on a quarterly basis for a total of 4 events at each site per year.

Houston-Galveston Area Council began collecting quarterly surface water quality monitoring samples at 30 locations beginning in September 2007. In FY2014, the number has increased to 34 monitoring sites. There are no local agencies available or willing to collect samples in the areas being targeted so H-GAC established its own monitoring program. Beginning in late FY2015, 13 of the 34 monitoring sites were transferred to EIH to be collected under the contract between H-GAC and EIH. H-GAC now has 21 monitoring locations sampled on a quarterly basis. Special studies were conducted in the past which indicate the areas are under pressure from urbanization. Routine monitoring in these areas will support future assessments and allow H-GAC or TCEQ to evaluate if or how the streams' water quality changes over time.

Routine monitoring is scheduled at varying frequencies, which are determined by the parameters of concern for individual streams and/or proximity to a monitoring agency's field office and lab. Water bodies are also selected for baseline monitoring if there is a high public interest; if it has a high potential for impairment; or there is a need for continuous up-to-date water quality information.

H-GAC QAPP Amendment 1 Last revised on August 4, 2016 Replacement Page 34 FY2016-2017 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 the H-GAC QAPP and the most current versions of TCEQ's *Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring (RG-415)* and the TCEQ's *Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data 2014 (RG-416).*

24-Hour Dissolved Oxygen (DO) monitoring by the Houston-Galveston Area Council.

Numerous segment and unclassified waterbodies in the 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 concerns. Additional data is needed to determine whether these segment and/or unclassified waterbodies are actually impaired. H-GAC will conduct 24-hour DO monitoring events on each of these water bodies throughout a two year period. All data collected and summarized will be submitted to the TCEQ for inclusion in SWQMIS. Spring Branch, Walnut Creek, Brushy Creek and Lake Creek will be monitored 4 times per year for 2 years. Magnolia Creek will be monitored four times per year – once during the index period, once during the critical period, and not more than once during the non-index period. The fourth event will be during the index or critical period.

The sites are located on segments/unclassified segments:

- 20451 (1010C) Spring Branch at SH 242 northwest to the City of Woodbranch
- Site 20462 (1008I) Walnut Creek at Decker Prairie Rosehill Rd west of Tomball, TX (Spring Creek tributary)
- Site 20463 (1008J) Brushy Creek at Glenmont Estates Blvd west of Tomball, TX (Spring Creek tributary)
- Site 11367 (1015) Lake Creek at Honea-Egypt Rd
- Site 16611 (1101A) Magnolia Creek approximately 600 meters upstream of FM518, League City, 30 meters upstream of WWTP permit WQ0010568-003
- Site 18191 (1015) Lake Creek at FM 149 approx 12.5 miles southwest of Conroe

See Appendix B for the project-related work plan tasks and schedule of deliverables for a description of work defined in this QAPP. Attach work plan tasks pertaining to this QAPP. See Appendix B for sampling design and monitoring pertaining to this QAPP.

time intervals. At a minimum, samples are collected over at least two seasons (to include interseasonal variation) and over two years (to include inter-year variation) and include some data collected during an index 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 total representation of the water body will be tempered by the potential funding for complete representativeness.

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 and as described in this QAPP and in TCEQ SOPs. 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 Section B10.

Completeness

The completeness of the data is basically a relationship of 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 will be available during monitoring systems audits.

The requirements for Global Positioning System (GPS) certification are located in Section B10, Data Management.

Contractors and subcontractors must ensure that laboratories analyzing samples under this QAPP meet the requirements contained in section The NELAC Institute (TNI) 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, Health Department	Lisa Groves
City of Houston, Drinking Water Operations	Joey Eickhoff

Local Partner Agency	Designated Trainer	
San Jacinto River Authority	Shane Simpson	
Environmental Institute of Houston	Jenny Oakley	

Document/Record	Location	Retention (yrs)	Format
QAPPs, amendments and appendices	H-GAC / HHD	<u>></u> 7	Paper or Electronic
Field SOPs	HHD	<u>></u> 7	Paper or Electronic
Laboratory Quality Manuals	HHD Lab / H-GAC	≥7	Current version – electronic & paper; prior versions paper only
Laboratory SOPs	HHD Laboratory	<u>≥</u> 7	Current version – electronic & paper; prior versions paper only
QAPP distribution documentation	HHD/ HHD lab / H- GAC	<u>>7</u>	Paper
Field staff training records	HHD / H-GAC	<u>></u> 7	Paper
Field equipment calibration/maintenance logs	HHD	<u>></u> 7	Paper
Field instrument printouts	HHD	<u>></u> 7	Paper
Field notebooks or data sheets	HHD/ H-GAC	<u>></u> 7	Paper
Chain of custody records	HHD/ HHD Lab / H-GAC	<u>></u> 7	Paper
Laboratory calibration records	HHD Lab	<u>>7</u>	Paper or Electronic
Laboratory instrument printouts	HHD Lab	<u>></u> 7	Paper or Electronic
Laboratory data reports/results	HHD Lab / H-GAC	<u>></u> 7	Paper or Electronic
Laboratory equipment maintenance logs	HHD Lab	<u>></u> 7	Paper
Corrective Action Documentation	HHD Lab / H-GAC	<u>></u> 7	Paper or Electronic

Table A9.1c – Project Documents and Records – Houston – HHD

Table A9.1d – Project Documents and Records – Houston – DWO

Document/Record	Location	Retention (yrs)	Format
QAPPs, amendments and appendices	H-GAC / DWO / DWO Lab	<u>></u> 7	Paper
Field SOPs	DWO	<u>></u> 7	Paper
Laboratory Quality Manuals	H-GAC / DWO Lab	<u>></u> 7	Current version – electronic & paper; prior versions paper only
Laboratory SOPs	DWO Lab	<u>></u> 7	Current version – electronic & paper; prior versions paper only
QAPP distribution documentation	DWO / H-GAC / DWO Lab	<u>></u> 7	Paper
Field staff training records	DWO / H-GAC	<u>></u> 7	Paper
Field equipment calibration/maintenance logs	DWO	<u>></u> 7	Paper
Field notebooks or data sheets	DWO / H-GAC	<u>></u> 7	Paper
Chain of custody records	DWO / H-GAC	<u>></u> 7	Paper
Laboratory calibration records	DWO Lab	<u>></u> 7	Paper
Laboratory instrument printouts	DWO Lab	<u>></u> 7	Paper
Laboratory data reports/results	DWO Lab / H-GAC	<u>></u> 7	Paper
Laboratory equipment maintenance logs	DWO Lab	<u>></u> 7	Paper
Corrective Action Documentation	H-GAC / DWO Lab	<u>></u> 7	Paper
Table A9.1e – Project Documents and Records – SJRA – Lake Conroe samples only

Document/Record	Location	Retention (yrs)	Format
QAPPs, amendments and appendices	H-GAC / SJRA / DWO Lab	<u>≥</u> 7	Paper
Field SOPs	SJRA	<u>></u> 7	Paper
Laboratory Quality Manuals	DWO Lab / H-GAC	<u>≥</u> 7	Current version – electronic & paper; prior versions paper only
Laboratory SOPs	DWO Lab	≥7	Current version – electronic & paper; prior versions paper only
QAPP distribution documentation	H-GAC / SJRA / DWO Lab	<u>></u> 7	Paper
Field staff training records	H-GAC / SJRA	<u>></u> 7	Paper
Field equipment calibration/maintenance logs	SJRA	<u>></u> 7	Paper
Field instrument printouts	SJRA	<u>></u> 7	Paper
Field notebooks or data sheets	H-GAC / SJRA	<u>></u> 7	Paper
Chain of custody records	H-GAC / SJRA / DWO Lab	<u>≥</u> 7	Paper
Laboratory calibration records	DWO Lab	<u>></u> 7	Paper
Laboratory instrument printouts	DWO Lab	<u>></u> 7	Paper
Laboratory data reports/results	DWO Lab / H-GAC	<u>></u> 7	Paper
Laboratory equipment maintenance logs	DWO Lab	<u>></u> 7	Paper
Corrective Action Documentation	H-GAC / SJRA / DWO Lab	<u>></u> 7	Paper

Table B2.1b Sample Storage, Preservation and Handling Requirementsfor HCPCS

Parameter	Matrix	Container	Preservation	Sample Volume	Holding Time
TSS	water	Plastic	Cool to 4°C	½ Gal	7 days
Enterococci IDEXX Enterolert	water	Sterile Plastic w/ sodium thiosulfate	Cool to <6°C but not frozen	120 mL ³	8 hours
Ammonia-N	water	Plastic	Cool to 4°C H ₂ SO ₄ to pH <2	50 mL ²	28 days
TKN	water	Plastic	Cool to 4°C H ₂ SO ₄ to pH <2	500 mL	28 days ¹
Nitrite + nitrate- N	water	Plastic	Cool to 4°C, H₂SO₄ to pH <2	50 mL ²	28 days
Phosphorus-P, total	water	Plastic	Cool to 4°C H ₂ SO ₄ to pH <2	50 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 23 days ²

1 Contract lab will pick up and analyze samples(s).

2 Three nutrient tests are collected from one 500 mL plastic container.

3. Maximum volume analyzed for Entero is 10 mL allowing duplicate analyses from 1 container.

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

Parameter	Matrix	Container	Preservation	Sample Volume	Holding Time
TSS	water	Plastic	Cool to 4°C	700 mL ³	7 days
Sulfate	water	Plastic	Cool to 4°C	100 mL ³	28 days
Chloride	water	Plastic	Cool to 4°C	100 mL ³	28 days
<i>E. coli</i> 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 4°C H ₂ SO ₄ to pH <2	250 mL	28 days ²
Ammonia-N	water	Plastic	Cool to 4°C H ₂ SO ₄ to pH <2	100 mL ⁴	28 days
Nitrate-N	water	Plastic	Cool to 4°C	100 mL ³	48 hours
Phosphorus-P, total	water	Plastic	Cool to 4°C H ₂ SO 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 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. ² Contract lab will pick up and analyze sample(s).

³ Multiple tests are collected from one 1-liter plastic cubitainer with **no** preservative added.

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 Requirementsfor DWO Lab

Parameter	Matrix	Container	Preservation	Sample Volume	Holding Time
TSS	water	Plastic	Cool to 6°C	100 mL ³	7 days
Sulfate	water	Plastic	Cool to 6°C	50 mL ³	28 days
Chloride	water	Plastic	Cool to 6°C	50 mL ³	28 days
<i>E. coli</i> 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 mL⁵	8 hours
TKN	water	Plastic	Cool to 6°C H₂SO₄ to pH <2	500 mL	28 days ²
Ammonia-N	water	Plastic	Cool to 6°C H₂SO₄ to pH <2	500 mL	28 days
Nitrate-N	water	Plastic	Cool to 6°C,	50 mL ³	48 hours
Phosphorus-P, total	water	Brown, glass bottle	Cool to 6°C H₂SO₄ 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 23 days ²
Alkalinity, Total	water	Plastic	Cool to 6°C	50 mL ³	28 days

1 *E.coli* samples analyzed by SM 9223-B 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.

2 Contract lab will pick up and analyze sample(s). 3 All tests are collected in one 500 mL plastic bottle.

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.

5. Maximum volume analyzed for Entero is 10 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

	1		1		
Parameter	Matrix	Container	Preservation	Sample Volume	Holding Time
TSS	water	Plastic	Cool to 6°C	100 mL ³	7 days
Sulfate	water	Plastic	Cool to 6°C	50 mL ³	28 days
Chloride	water	Plastic	Cool to 6°C	50 mL ³	28 days
<i>E. coli</i> 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 H₂SO₄ to pH <2	500 mL	28 days ²
Ammonia-N	water	Plastic	Cool to 6°C H₂SO₄ to pH <2	500 mL	28 days
Nitrate-N	water	Plastic	Cool to 6°C,	50 mL ³	28 days
Phosphorus-P, total	water	Brown, glass bottle	Cool to 6°C H₂SO₄ 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 23 days ²
Alkalinity, Total	water	Plastic	Cool to 6°C	50 mL ³	28 days

1 *E.coli* samples analyzed by SM 9223-B 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. 2 Contract 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.

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 peristaltic pump and collected from the required depth as specified in the SWQM Procedures Volume 1 manual using an in-take tube 1 foot (0.3 meter) long.

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 Lab where all QC checks and documentation are performed. The HHD 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)

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.

- 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 – Lake Conroe samples

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 except total phosphorus samples.
- 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.

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 for storage.

San Jacinto River Authority – The Woodlands samples

Eastex Environmental Lab is the contract lab for samples collected from The Woodlands.

- 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.
- 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.
- Pre-cleaned, plastic, disposable sample containers for the TKN samples are provided by H-GAC's contract lab, Eastex Environmental Lab.

Preservative used Was the sample filtered Analyses required Name of collector Custody transfer signatures and dates and time of transfer Bill of lading, if applicable

Sample Labeling

Samples from the field are labeled on the container, or on a label; with an indelible marker. Label information includes:

Site identification Date and time of collection Preservative added, if applicable Indication of field-filtration for metals, as applicable Sample type (i.e., analyses) to be performed

Sample Handling

Upon collection, all local partners immediately immerse their samples in coolers containing ice. If a temperature blank is carried (it is not required), it shall be placed on top of the samples instead of buried in the ice. Samples are transported to each local partner's lab by the person who collected the samples or, in the case of EIH, H-GAC, and SJRA samples from The Woodlands area, the samples are transferred to a lab courier who signs the chain of custody form and transports the samples to the lab. After the samples arrive, the lab personnel taking custody of samples will verify the samples are "in the process" of cooling to <6 °C before signing the COC. Internal sample handling, custody, and storage procedures for each of the laboratories supporting H-GAC's monitoring entities are described in the Quality Manuals (QM) kept on file with H–GAC. For TKN and chlorophyll *a* samples, all samples are transferred to a lab courier who signs the chain of custody form and transports the samples to the contract lab for processing and analysis. References for each local partner's field & lab sample handling procedure is listed in the following table.

Monitoring Entity	Reference to Sample Handling
Houston-Galveston Area Council	H-GAC's Standard Operating Procedures (SOP) Manual for Conducting Surface Water Quality Monitoring references the most current <i>TCEQ Surface Water Quality</i> <i>Monitoring Procedures Volumes 1 & 2</i> plus specific SOP's pertaining to H-GAC monitoring activities only.
	Eastex Environmental Laboratory QM, most current version, covers samples relinquished to the lab.
Harris County Pollution Control Services	Harris County Pollution Control Services Department Standard Operating Procedure – <i>Procedures for Sample Custody, Login, Tracking, Data Entry and Reporting.</i> Most current version
City of Houston, Health Department	HHD Lab's Environmental Laboratory Services QM, Section 22 – Sample Management, most current version

Table B3.1.	Sample Handling	References for	Local Monitoring	Partners.
			0	

Monitoring Entity	Reference to Sample Handling
City of Houston, Drinking Water Operations Laboratory <i>And</i> San Jacinto River Authority – Lake Conroe samples	DWO - Environmental Sampling SOP, most recent revision.
San Jacinto River Authority – The Woodlands area samples	SJRA's Sample Custody Standard Operating Procedure, October 2007. Eastex Environmental Laboratory QM, most current version, covers samples relinquished to the lab.
Environmental Institute of Houston	EIH's Standard Operating Procedures (SOP) Manual for Conducting Surface Water Quality Monitoring references the most current <i>TCEQ Surface Water Quality</i> <i>Monitoring Procedures Volume 1 & 2</i> plus additional/specific SOP's pertaining to EIH's monitoring activities only. Eastex Environmental Laboratory QM, most current version, covers samples relinquished to the lab.

Sample Tracking Procedure Deficiencies and Corrective Action

All deficiencies associated with COC procedures, as described in this QAPP, are immediately reported to the Basin Planning Agency Project Manager. These include such items as delays in transfer resulting in holding time violations; violations of sample preservation requirements; incomplete documentation, including signatures; possible tampering of samples; broken or spilled samples, etc. The H-GAC Project Manager in consultation with the H-GAC QAO will determine if the procedural violation may have compromised the validity of the resulting data. Any failures that have reasonable potential to compromise data validity will invalidate data and the sampling event should be repeated. The resolution of the situation will be reported to the TCEQ CRP Project Manager in the project progress report. CAPs will be prepared by the Lead Organization QAO and submitted to TCEQ CRP Project Manager along with project progress report.

The definition of and process for handling deficiencies and corrective action are defined in Section C1.

B4 Analytical Methods

The analytical methods, associated matrices, and performing laboratories are listed in Appendix A. The authority for analysis methodologies under CRP is derived from the 30 Tex. Admin. Code Ch. 307, in that data generally are generated for comparison to those standards and/or criteria. The Standards state "Procedures for laboratory analysis must be in accordance with the most recently published edition of the book entitled Standard Methods for the Examination of Water and Wastewater, the TCEQ Surface Water Quality Monitoring Procedures as amended, 40 CFR 136, or other reliable procedures acceptable to the TCEQ, and in accordance with chapter 25 of this title." verification, or change. This record of the QAO review is retained with the data review package. See H-GAC's Data Management Flow Chart to see the various tables and Flagged Records reports that are created during the Data review process.

- <u>Harris County Pollution Control Services (HCPCS)</u> submits two Access tables to H-GAC containing laboratory and field data. These tables are exported from the department database and are reviewed by Lab Manager, the QAO and the Sample Administrator for accuracy, consistency, and reasonableness (as indicated by inter-parameter correlations, historical parameter results, and screening values established by the TCEQ). Documented non-conformances from QAPP, SOP, and HCPCS Quality Manual requirements that may impact the data and problems encountered in collection or analysis of the samples are evaluated and addressed in the data submittal checklist. A Data Review Checklist is generated for each data packet. The checklist is prepared by the QAO and reviewed and approved by the Supervisor Wet Chemistry, a representative of the field collection team, and the Sample Administrator.
- The <u>City of Houston, HHD</u> field personnel and data manager enter laboratory and field data into an Access database. Print-outs of any data from field equipment memory is printed out to be saved with field forms. The data manager reviews all data entries for accuracy then checks for outliers. A Data Review Checklist is generated for each data packet. Data is then submitted to the Laboratory QAO for additional review before being submitted to HGAC. The data management process is explained in the lab's QM Section 23.8 Data Review.
- <u>City of Houston, DWO</u> field personnel turn in the chain of custody and field form to the sample receiver in the lab. The data manager enters only the final laboratory data into an Access database. The data manager reviews all data entries for accuracy then checks for outliers. A Data Review Checklist is generated for this data set. The data packet is then submitted to the Laboratory QAO for additional review. All comments are documented on the Data Review Checklist before being submitted to HGAC. The field data is entered into the database by the data entry clerk at the Lake Houston office. She reviews the data for accuracy and completeness. The Field Supervisor reviews at least 10% of the data for accuracy, completeness, reasonableness and outliers. The Field supervisor completes a Data Review Checklist for that data set before it is submitted to H-GAC independent of the lab data.
- <u>SJRA</u> collects samples from Lake Conroe and submits those water samples to the City of Houston, DWO Lab for analysis. Field personnel turn in the chain of custody and field form to the sample receiver in the lab. The lab data manager enters laboratory data into an Access database. The lab data manager reviews all data entries for accuracy then checks for outliers. A Data Review Checklist is generated for this data set. The data packet is then submitted to the Laboratory QAO for additional review and documentation on Data Review Checklist before being submitted directly to H-GAC. Electronic 'profile' data files from the Hydrolab Surveyor are sent directly to H-GAC's Data Manager who inputs the data to an Access database. Additional Lake Conroe field data are input to an MS EXCEL spreadsheet by SJRA's Data Manager, where it is reviewed, formatted, and submitted to H-GAC. H-GAC's Data Manager merges the field data with the profile data and rechecks for outliers and formatting.

• <u>H-GAC</u>'s QAO checks the data for accuracy and reasonableness. Lake Conroe keeps the original field sheets and prints out copies of the Surveyor profile data to keep in their files. Copies of field sheets, COCs, calibration logs, and a Data Review Checklist are sent to H-GAC along with every data submittal for Lake Conroe samples.

A Data Review Checklist is completed by SJRA for field data and by DWO Lab or Eastex Lab for lab analyses. DWO Lab data manager performs all data entry & data management for Lake Conroe lab data only. SJRA performs data management for all Woodlands data.

- <u>SJRA</u> also collects samples from The Woodlands area. A courier from Eastex Lab inspects, receives, and transports the samples to Eastex Lab for analysis. The SJRA Data Manager enters the field data in MS EXCEL spreadsheet and reviews it for accuracy. SJRA receives lab results from Eastex and enters data into the spreadsheet with the corresponding field data. The SJRA Quality Assurance Officer (QAO) formats the data, verifies at least 10% of the data for transcription accuracy, reviews the data for outliers, and reviews the chain of custody forms. The QAO compiles the Data Review Checklist forms and submits the final data to H-GAC.
- <u>EIH</u> performs data entry for only the field data collected by their program. The EIH field QAO or the individual who collected the data inputs the data to an EXCEL spreadsheet. All supporting QA data is input to spreadsheets as well. The EIH field QAO and the EIH CRP Project Manager review more than 10% of the data for accuracy, completeness, and reasonableness. A Data Review checklist is generated while data is being reviewed. Then, it is submitted to H-GAC along with electronic data and hard copies of the field sheets and COCs. H-GAC's Data Manager receives electronic data files from Eastex Lab and merges lab data with field data prior to review and submission to TCEQ.

Data Dictionary

Terminology and field descriptions are included in the most recent version of TCEQ's DMRG. A table outlining the entities that will be used when submitting data under this QAPP is included below for the purpose of verifying which entity codes are included in this QAPP.

Name of Monitoring Entity	Tag Prefix	Submitting Entity	Collecting Entity
Houston-Galveston Area	I	HG	HG
Council			
Harris County Pollution	I	HG	HC
Control Services			
City of Houston, Health	I	HG	HH
Department			
City of Houston, Drinking	I	HG	HW
Water Operations			
San Jacinto River Authority	I	HG	SJ

Table B10.1 – Sampling Entity Data Submission Codes

Name of Monitoring Entity	Tag Prefix	Submitting Entity	Collecting Entity
Environmental Institute of	I	HG	UI
Houston – University of			
Houston Clear Lake			

Data Errors and Loss

H-GAC stores original electronic data as "Raw Data" files. These files are saved in the original format and other than changing the name of a file, remains unchanged. Any changes to a data file are saved in the "Working Data" folders. In these folders, data is merged, formatted, and converted to the correct reporting units before SAS processing begins. After SAS is applied, the files are stored in ACCESS tables. An ACCESS database is made for each data set. In this database there are several folders where all reports and modifications are documented. There is an INPUT folder, an OUTPUT folder, Draft Matrix tables which should show all the data as reformatted and ready to be converted into the EVENT/RESULTS format for TCEQ. All changes, validation, and verification actions on the data are documented in a Data Review Summary Report which accompanies each data set submittal (Appendix G).

Copies of e-mails and communications with partners are printed and attached to the data set for traceability.

Each partner has a paragraph below briefly discussing their data control mechanisms.

- <u>Harris County Pollution Control Services (HCPCS)</u> Details of the mechanisms for review and correction of errors and preventing loss of data are described in the HCPCS Laboratory Services Quality Manual, (most current version). All field data sheets are given to the Data Manager who applies the same review, correction of errors, and prevention of loss of data as the lab data. A Data Review Checklist is completed for each set of data submitted to H-GAC.
- <u>City of Houston, HHD</u> Details of the HHD Laboratory protocols for data reductions and review are described in their Environmental Laboratory Services Quality Manual, Section 23, (most current version). All field data is gathered by the Data Manager who inputs the data to their database, checks all data for outliers and reasonableness. Then, the data is reviewed by a second individual for transcription accuracy. A Data Review Checklist is completed for each set of data submitted to H-GAC.
- <u>City of Houston, DWO</u> Details of their Laboratory protocols for data reductions and review are described in their Quality Management Plan, Section 7, (most recent revision). All field data sheets are turned over to the data entry clerk located at the Lake Houston office for data input to EXCEL spreadsheets. This person is also the Field Data Manager. The Data Manager reviews the data for outliers and accuracy. Then, the Field QAO reviews the data for

D1 Data Review, Verification, and Validation

All field and laboratory data will be reviewed and verified for integrity and continuity, reasonableness, and conformance to project requirements, and then validated against the project objectives and measurement performance specifications which are listed in Section A7. Only those data which are supported by appropriate quality control data and meet the measurement performance specifications defined for this project will be considered acceptable, and will be reported to the TCEQ for entry into SWQMIS.

The procedures for verification and validation of data are described in Section D2 below. Local agency data managers and the H-GAC CRP Data Manager are responsible for ensuring that field data are properly reviewed, verified, and submitted in the required format to the project database. Likewise, the Laboratory Managers of HCPCS, HHD, DWO, SJRA, EIH, and Eastex laboratories are responsible for ensuring that laboratory data are reviewed, verified, and submitted in the required in the required format to the H-GAC CRP project database. Finally, the H-GAC CRP QAO is responsible for confirming the validation of all collected data and ensuring that all reported data meet the data quality objectives of the project and are suitable for reporting to TCEQ.

D2 Verification and Validation Methods

All field and laboratory data will be reviewed, verified and validated to ensure they conform to project specifications and meet the conditions of end use as described in Section A7 of this document.

Data review, verification, and validation will be performed using self-assessments and peer and management review as appropriate to the project task. The data review tasks to be performed by field and laboratory staff is listed in the first two columns of Table D2.1, respectively. Potential errors are identified by examination of documentation and by manual, examination of corollary or unreasonable data, or computer-assisted. If a question arises or an error is identified, the manager of the task responsible for generating the data is contacted to resolve the issue. Issues which can be corrected are corrected and documented. If an issue cannot be corrected, the task manager consults with the higher level project management to establish the appropriate course of action, or the data associated with the issue are rejected and not reported to the TCEQ for storage in SWQMIS. Field and laboratory reviews, verifications, and validations are documented.

After the field and laboratory data are reviewed, another level of review is performed once the data are combined into a data set. This review step as specified in Table D2.1 is performed by the H-GAC Data Manager and QAO. Data review, verification, and validation tasks to be performed on the data set include, but are not limited to, the confirmation of laboratory and field data review, evaluation of field QC results, additional evaluation of anomalies and outliers, analysis of sampling and analytical gaps, and confirmation that all parameters and sampling sites are included in the QAPP.

The Data Review Checklist (See Appendix F) covers three main types of review: data format and structure, data quality review, and documentation review. The Data Review Checklist is transferred

Outliers confirmed and documented; reasonableness check performed		Manager- Lab Services & QAO	H-GAC Data Mgr & H-GAC QAO
Dates formatted correctly		QAO & Sample Administrator	H-GAC Data Mgr
Depth reported correctly	Sr. Investigator	QAO	H-GAC Data Mgr
TAG IDs correct			H-GAC Data Mgr
TCEQ Station ID number assigned			H-GAC Data Mgr
Valid parameter codes			H-GAC Data Mgr
Codes for submitting entity(ies), collecting entity(ies), and monitoring type(s) used correctly			H-GAC Data Mgr
Time based on 24-hour clock	Sr. Investigator	QAO & Sample Administrator	H-GAC Data Mgr
Absence of transcription error confirmed		Sample Administrator & QAO	H-GAC Data Mgr
Absence of electronic errors confirmed		Sample Administrator & QAO	H-GAC Data Mgr
Sampling and analytical data gaps checked (e.g., all sites for which data are reported are on the coordinated monitoring schedule)		Sample Administrator & QAO	H-GAC Data Mgr & H-GAC QAO
Field QC results attached to data review checklist		QAO	H-GAC Data Mgr
Verified data log submitted			H-GAC Data Mgr
10% of data manually reviewed		Supervisor –Wet Lab & QAO	H-GAC Data Mgr & H-GAC QAO

Table D2.1c: Data Review Tasks for City of Houston – Health Department (HHD)

HHD Data to be Verified	Field Task	Laboratory Task (HHD Lab)	Lead Organization Data Manager Task
Sample documentation complete; samples labeled, sites identified	Field QAO	Appropriate Analytical Staff	
Field instrument pre- and post-calibration results within limits	Field QAO		H-GAC Data Mgr &/or H-GAC QAO
Field QC samples collected for all analytes as prescribed in the TCEQ SWQM Procedures Manual	Field Personnel on each run		
Standards and reagents traceable	Field QAO	Lab Supervisors, Lab QAO, Analysts	
Chain of custody complete/acceptable	Data Manager	Receiving analyst – rotation schedule	H-GAC Data Mgr
NELAP Accreditation is current		Laboratory Director	
Sample preservation and handling acceptable		Lab Supervisors & Lab QAO	
Holding times not exceeded		Lab Supervisors, Lab QAO, Analysts	H-GAC Data Mgr
Collection, preparation, and analysis consistent with SOPs and QAPP	Field QAO	Lab Supervisors, Lab QAO & Analysts	
Field documentation (e.g., biological, stream habitat) complete	Data Manager		
Instrument calibration data complete	Data Manager	Lab Supervisors, Lab QAO, & Analysts	
Bacteriological records complete		Lab Supervisors or Analysts	
QC samples analyzed at required frequency		Lab QAO	H-GAC Data Mgr

HHD Data to be Verified	Field Task	Laboratory Task (HHD Lab)	Lead Organization Data Manager Task
QC results meet performance and program specifications		Lab Director	
Analytical sensitivity (Minimum Analytical Levels/Ambient Water Reporting Limits) consistent with QAPP		Lab Supervisors & Lab QAO	
Results, calculations, transcriptions checked		Analysts & Lab Supervisors	
Laboratory bench-level review performed		Lab Supervisors & Lab QAO	
All laboratory samples analyzed for all parameters		Lab QAO	
Corollary data agree		Lab Supervisors & Lab QAO	
Nonconforming activities documented	Field QAO	Lab Supervisors & Lab QAO	H-GAC QAO
Outliers confirmed and documented; reasonableness check performed	Field QAO & Data manager		H-GAC Data Mgr & H-GAC QAO
Dates formatted correctly	Data Manager		H-GAC Data Mgr
Depth reported correctly	Field QAO		H-GAC Data Mgr
TAG IDs correct			H-GAC Data Mgr
TCEQ Station ID number assigned			H-GAC Data Mgr
Valid parameter codes		Lab Supervisors	H-GAC Data Mgr
Codes for submitting entity(ies), collecting entity(ies), and monitoring type(s) used correctly			H-GAC Data Mgr
Time based on 24-hour clock	Data Manager		H-GAC Data Mgr
Absence of transcription error confirmed	Data Manager	Lab Supervisors	H-GAC Data Mgr
Absence of electronic errors confirmed	Data Manager	Lab Supervisors	H-GAC Data Mgr
Sampling and analytical data gaps checked (e.g., all sites for which data are reported are on the coordinated monitoring schedule)	Field QAO	Lab QAO & Lab Director	H-GAC Data Mgr & H-GAC QAO
Field QC results attached to data review checklist		Lab QAO	H-GAC Data Mgr
Verified data log submitted			H-GAC Data Mgr
10% of data manually reviewed	Data Manager		H-GAC Data Mgr & H-GAC QAO

Table D2.1d: Data Review Tasks for City of Houston – Drinking Water Operations (DWO)

DWO Data to be Verified	Field Task	Laboratory Task	Lead Organization Data Manager Task
Sample documentation complete; samples labeled, sites identified	Field QAO	Sample Custodian	
Field instrument pre- and post- calibration results within limits	Field QAO		H-GAC Data Mgr &/or H-GAC QAO
Field QC samples collected for all analytes as prescribed in the TCEQ SWQM Procedures Manual	Field QAO	Sample Custodian	
Standards and reagents traceable		Lab Supervisor	
Chain of custody complete/acceptable		Sample Custodian	H-GAC Data Mgr
NELAP Accreditation is current		QA Mgr.	
Sample preservation and handling acceptable		QA Mgr.	
Holding times not exceeded		QA Mgr.	H-GAC Data Mgr
Collection, preparation, and analysis consistent with SOPs and QAPP		QA Mgr.	

DWO Data to be Verified	Field	Laboratory	Lead Organization Data
Field desumentation (e.g., biological	TASK	Task	ivianager Task
stream habitat) complete		Sample Custodian	
Instrument calibration data complete	Data Manager	Chemists	
Bacteriological records complete		Microbiologist I	
QC samples analyzed at required frequency		QA Mgr.	H-GAC Data Mgr
QC results meet performance and program specifications		QA Mgr.	
Analytical sensitivity (Minimum Analytical Levels/Ambient Water Reporting Limits) consistent with QAPP		QA Mgr.	
Results, calculations, transcriptions checked		Lab Mgr.	
Laboratory bench-level review performed		Lab Mgr.	
All laboratory samples analyzed for all parameters		Lab Supervisor	
Corollary data agree		QA Mgr.	
Nonconforming activities documented	Field QAO	Lab Mgr.	H-GAC QAO
Outliers confirmed and documented; reasonableness check performed	Data Manager	Lab Mgr.	H-GAC Data Mgr & H-GAC QAO
Dates formatted correctly	Data Manager	Data Manager	H-GAC Data Mgr
Depth reported correctly	Data Manager	Data Manager	H-GAC Data Mgr
TAG IDs correct		Data Manager	H-GAC Data Mgr
TCEQ Station ID number assigned		Data Manager	H-GAC Data Mgr
Valid parameter codes		Data Manager	H-GAC Data Mgr
Codes for submitting entity(ies), collecting entity(ies), and monitoring type(s) used correctly		Data Manager	H-GAC Data Mgr
Time based on 24-hour clock	Data Manager	Data Manager	H-GAC Data Mgr
Absence of transcription error confirmed	Data Manager	QA Mgr.	H-GAC Data Mgr
Absence of electronic errors confirmed	Data Manager	QA Mgr.	H-GAC Data Mgr
Sampling and analytical data gaps checked (e.g., all sites for which data are reported are on the coordinated monitoring schedule)		QA Mgr.	H-GAC Data Mgr & H-GAC QAO
Field QC results attached to data review checklist	Field QAO	QA Mgr.	H-GAC Data Mgr
Verified data log submitted		Lab Mgr.	H-GAC Data Mgr
10% of data manually reviewed	Field QAO	Lab Mgr. or QA Mgr.	H-GAC Data Mgr & H-GAC QAO

TABLE A7.1c Measurement Perform	ance Sp	ecificatio	ons for City of I	Houston,	Health Dep	oartmer	<mark>nt (HHD)</mark>			
	Conventional Parameters in Water									
Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	TOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Гар
RESIDUE, TOTAL NONFILTRABLE (MG/L)	mg/L	water	SM 2540D	00530	5	4	NA	NA	NA	Holcombe
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	SM 4500 NH3-H	00610	0.1	0.1	70- 130	20	80-120	Holcombe
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	Holcombe
NITROGEN, KJELDAHL, TOTAL (MG/L AS N)	mg/L	water	SM 4500 NH3-C B; SM 4500 - Norg	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	Holcombe
CHLORIDE (MG/L AS CL)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00940	5	5	70- 130	20	80-120	Holcombe
SULFATE (MG/L AS SO4)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00945	5	5	70- 130	20	80-120	Holcombe

Appendix A – Replacement tables for City of Houston, Health Department (HHD)

References:

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

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.)

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

TABLE A7.1c Measurement Performa	ance Specificati	ions for City	of Houston, Health Department (HHD)	
	Fi	eld Paramet	ters	-	
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)	std.units	water	EPA 150.1 and TCEQ SOP V1	00400	Field
SALINITY - PARTS PER THOUSAND	РРТ	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 COLOR (1=BROWNISH, 2=REDDISH, 3=GREENISH, 4=BLACKISH, 5=CLEAR, 6=OTHER)	NU	water	NA	89969	Field
WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGG, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER)	NU	water	NA	89971	Field
PRIMARY CONTACT, OBSERVED ACTIVITY (# OF PEOPLE OBSERVED)	# of people observed	other	NA	89978	Field
EVIDENCE OF PRIMARY CONTACT RECREATION (1 = OBSERVED, 0 = NOT OBSERVED)	NU	other	NA	89979	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 American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.) 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 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				
STREAM FLOW ESTIMATE (CFS)	cfs	water	TCEQ SOP V1	74069	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 American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.) 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 P	TABLE A7.1c 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	Colilert- 18 **	31699	1	1	NA	0.50*	NA	HHD
ENTEROCOCCI, ENTEROLERT, IDEXX, (MPN/100 ML)	MPN/100 mL	water	Enterolert	31701	10***	10	NA	0.50*	NA	HHD
E.COLI, COLILERT, IDEXX, HOLDING TIME	hours	water	NA	31704	NA	NA	NA	NA	NA	HHD

* 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 American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.) 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 City of Houston, Drinking Water Operations (DWO)								
	Field Paramet	ters						
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			
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			

Appendix A – Replacement tables for City of Houston, Drinking Water Operations (DWO)

WATER COLOR (1=BROWNISH, 2=REDDISH, 3=GREENISH, 4=BLACKISH, 5=CLEAR, 6=OTHER)	NU	water	NA	89969	Field
WATER ODOR (1=SEWAGE, 2=OILY/CHEMICAL, 3=ROTTEN EGG, 4=MUSKY, 5=FISHY, 6=NONE, 7=OTHER)	NU	water	NA	89971	Field
TRUBIDITY, OBSERVED (1=LOW, 2=MEDIUM, 3=HIGH)	NU	water	NA	88842	Field
PRIMARY CONTACT, OBSERVED ACTIVITY (# OF PEOPLE OBSERVED)	# of people observed	other	NA	89978	Field
EVIDENCE OF PRIMARY CONTACT RECREATION (1 = OBSERVED, 0 = NOT OBSERVED)	NU	other	NA	89979	Field

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

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

 $\ensuremath{^{+}}\xspace$ As published by the Texas Water Development Board on their website

http://wiid.twdb.state.tx.us/ims/resinfo/BushButton/lakestatus.asp?selcat=3&slbasin=2

References:

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

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

Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.)

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

TABLE A7.1d Measurement Performance Specifications for City of
Houston, Drinking Water Operations (DWO)

Flow I	Param	eters			
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
STREAM FLOW ESTIMATE (CFS)	cfs	Water	TCEQ SOP V1	74069	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

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

Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.)

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

TABLE A7.1d Measurement Per	TABLE A7.1d 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	Colilert- 18**	31699	1	1	NA	0.50*	NA	WQC
ENTEROCOCCI, ENTEROLERT, IDEXX, (MPN/100 ML)	MPN/100 mL	water	Enterolert	31701	10***	10	NA	0.50*	NA	WQC
E.COLI, COLILERT, IDEXX, HOLDING TIME	hours	water	NA	31704	NA	NA	NA	NA	NA	WQC

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

the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.)

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

TABLE A7.1d Measurement Performance Specifications for City of Houston, Drinking Water Operations (DWO)													
		Conv	entional Paran	neters in	Water								
Parameter	Units	Matrix	Method	Parameter Code	TCEQ AWRL	TOQ	LOQ Check Sample %Rec	Precision (RPD of LCS/LCSD)	Bias %Rec. of LCS	Lab			
ALKALINITY, TOTAL (MG/L AS CACO3)	mg/L	water	SM 2320B	00410	20	20	NA	20	NA	WQC			
RESIDUE, TOTAL NONFILTRABLE (MG/L)	mg/L	water	SM 2540D	00530	5	4	NA	NA	NA	WQC			
NITROGEN, AMMONIA, TOTAL (MG/L AS N)	mg/L	water	EPA 350.3	00610	0.1	0.1	70- 130	20	80-120	WQC			
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	WQC			
NITROGEN, KJELDAHL, TOTAL (MG/L AS N)	mg/L	water	SM 4500- NH3 C B; SM 4500- N _{org}	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	WQC			
CHLORIDE (MG/L AS CL)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00940	5	5	70- 130	20	80-120	WQC			
SULFATE (MG/L AS SO4)	mg/L	water	EPA 300.0 Rev. 2.1 (1993)	00945	5	5	70- 130	20	80-120	WQC			
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

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. (Note: The 21st edition may be cited if it becomes available.)

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

Appendix B

Sample Design Rationale FY 2017

The sample design is based on the legislative intent of CRP. Under the legislation, the Basin Planning Agencies have been tasked with providing data to characterize water quality conditions in support of the Texas Water Quality Integrated Report, and to identify significant long-term water quality trends. Based on Steering Committee input, achievable water quality objectives and priorities and the identification of water quality issues are used to develop work plans which are in accord with available resources. As part of the Steering Committee process, the H-GAC coordinates closely with the TCEQ and other participants to ensure a comprehensive water monitoring strategy within the watershed.

Beginning in September 2016, the following changes in sampling locations will be made to the Coordinated Monitoring Schedule for FY2017. These sites were identified at the Coordinated Monitoring Meeting conducted on April 12, 2016, and agreed upon in subsequent conversations with local partners and steering committee members. There were no changes in monitoring frequencies except for one 24- hour monitoring station (see below). Field, conventional, nutrients and bacteria will be collected as listed in each partner's A7.1 tables. The following changes or additions have been made to the monitoring schedule.

Houston-Galveston Area Council (H-GAC)

- All routine monitoring stations will remain the same.
- H-GAC identified 2 new sites for 24-hr DO monitoring for FY2016. Four of the 6 sites collected during FY2016 will also be continued in FY2017. H-GAC chose the following sites:
 - ADD Spring Branch (Segment 1010C_01) at SH 242 (Site 20451)
 - KEEP Brushy Creek (Segment 1008J) at Glenmont Estates (Site 20463)
 - KEEP Lake Creek (Segment 1015_02) at Honea Egypt Rd. (Site 11367)
 - ADD Lake Creek (Segment 1015_01) at FM149 (Site 18191)
 - KEEP Walnut Creek (Segment1008I_01) at Decker Prairie Rd. (Site 20462)
 - KEEP Magnolia Creek (Segment 1101A_01) at FM 518/Bay Area Blvd (Site 16611). Increase frequency from 3 times to 4 times per year.
 - DROP Unnamed tributary (Newport Ditch) to Clear Creek tidal (Segment 1101E_01) at FM 518 (Site 18818).
 - o DROP Mill Creek (Segment 1008A_01) at Hardin Store Rd near Tomball (Site 20461)

Harris County Pollution Control Services Department (HCPCS)

- No changes were made to the monitoring sites, frequency or parameter list.
 - HCPCS collects profile data quarterly every 2-3 meters on the ship channel and river, plus top, middle and 1 ft from bottom on lakes and side bays.

City of Houston, Health Department (HHD)

- DROP station 17493 South Mayde Creek because in same AU as site 11163
- ADD station 21813 (South Mayde Creek at South Park View Drive). 21813 is in different AU from.
- Continue REDUCED frequency for Site 17489 (Spring Creek @ Kuykendahl) from 9 times per year to quarterly. Because they cannot park on the bridge, the site requires a quarter mile walk to the centroid of the flow.

City of Houston, Drinking Water Operations (DWO)

- Will start collecting profile data on Lake Houston by collecting top, middle and bottom as well as total depth at least quarterly.
- No profile data will be collected on the watershed sites because they use a bucket to collect samples and measure field parameters.

San Jacinto River Authority (SJRA) – Lake Conroe and Woodlands Division

- Sites on Lake Conroe and on Lake Woodlands will not change.
- SJRA reported they collect lake profile data every 10 feet, in addition to the 1 ft surface and 1 ft off the bottom depths. All water quality samples collected from the 1 ft surface location.

Environmental Institute of Houston – UHCL (EIH)

• Continue same monitoring stations, parameters, and frequencies as previously conducted during FY2016.

Site Selection Criteria

This data collection effort involves monitoring routine water quality, using procedures that are consistent with the TCEQ SWQM program, for the purpose of data entry into the SWQMIS database maintained by the TCEQ. To this end, some general guidelines are followed when selecting sampling sites, as basically outlined below, and discussed thoroughly in SWQM Procedures. Overall consideration is given to accessibility and safety. All monitoring activities have been developed in coordination with the CRP Steering Committee and with the TCEQ. The site selection criteria set forth here may not apply to all programs. The site selection criteria specified are those the TCEQ would like considered in order to produce data which is complementary to that collected by the state and which can be used in assessments, etc. Other criteria may be considered and should be described.

- Locate stream sites so that samples can be safely collected from the centroid of flow. Centroid is defined as the midpoint of that portion of stream width which contains 50 percent of the total flow. If few sites are available for a stream segment, choose one that would best represent the water body, and not an unusual condition or contaminant source. Avoid backwater areas or eddies when selecting a stream site.
- 2. At a minimum for reservoirs, locate sites near the dam (reservoirs) and in the major arms. Larger reservoirs might also include stations in the middle and upper (riverine) areas. Select sites that best represent the water body by avoiding coves and back water areas. A single monitoring site is considered representative of 25 percent of the total reservoir acres, but not more than 5,120 acres.

- 3. Routine monitoring sites are selected to maximize stream coverage or basin coverage. Very long segments may require more stations. As a rule of thumb, stream segments between 25 and 50 miles long require two stations, and longer than 50 miles require three or more depending on the existence of areas with significantly different sources of contamination or potential water quality concerns. Major hydrological features, such as the confluence of a major tributary or an instream dam, may also limit the spatial extent of an assessment based on one station.
- 4. Because historical water quality data can be very useful in assessing use attainment or impairment, it may be best to use sites that are on current or past monitoring schedules.
- 5. All classified segments (including reservoirs) should have at least one routine monitoring site that adequately characterizes the water body, and should be coordinated with the TCEQ or other qualified monitoring entities reporting routine data to TCEQ.
- 6. Routine monitoring sites may be selected to bracket sources of pollution, influence of tributaries, changes in land uses, and hydrological modifications.
- 7. Sites should be accessible. When possible, stream sites should have a USGS or IBWC stream flow gauge. If not, it should be possible to conduct flow measurement during routine visits.

Monitoring Sites for FY 2017

The sample design for H-GAC's coordinated surface water quality monitoring schedule is shown in Table B1.1 in the following EXCEL spreadsheet.

Critical vs. non-critical measurements

All data taken for CRP and entered into SWQMIS are considered critical

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	МТ	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	нс	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	нс	RT	12	12	12				
SAN JACINTO RIVER TIDAL IMMEDIATELY DOWNSTREAM OF US 90 BRIDGE EAST OF SHELDON	11200	1001	10	12	HG	нс	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	нс	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	нс	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	нс	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	нс	RT	12	12	12				
CLEAR LAKE AT SH 146 DRAWBRIDGE	13332	2425	24	12	HG	HC	RT	12	12	12				
TABBS BAY MIDWAY BETWEEN GOOSE CREEK AND UPPER HOG ISLAND	13338	2426	24	12	HG	нс	RT	12	12	12				This site replaced site 17926
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	нс	RT	12	12	12				
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	нс	RT	12	12	12				This site replaced site 17920
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	нс	RT	12	12	12				

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	MT	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
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	нс	RT	12	12	12				
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	нс	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	нс	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	нс	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	нс	RT	12	12	12				
SAN JACINTO RIVER TIDAL AT BANANA BEND ROAD AT END OF PAVEMENT IN HOUSTON	16622	1001	10	12	HG	нс	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	нс	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	нс	RT	12	12	12				Change temporary id to 17921
SCOTT BAY 1.2 KM SW OF INTERSECTION OF BAYWAY DRIVE AND PARK STREET IN BAYTOWN	17922	2429	24	12	HG	НС	RT	12	12	12				
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	нс	RT	12	12	12				
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	НС	RT	12	12	12				

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	МТ	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
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	нс	RT	12	12	12				
GOOSE CREEK NEAR SH 146 0.4 KM S/SW OF THE INTERSECTION OF SH 146 AND WEST MAIN IN BAYTOWN	17927	2426C	24	12	HG	нс	RT	12	12	12				
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	нс	RT	12	12	12				
TAYLOR BAYOU MID CHANNEL 400 M DOWNSTREAM OF PORT ROAD BRIDGE IN HARRIS COUNTY	20013	2425D	24	12	HG	нс	RT	12	12	12				
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	нс	RT	12	12	12				
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	нс	RT	12	12	12				
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	нс	RT	12	12	12				
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			was HG168
CANEY CREEK IMMEDIATELY UPSTREAM OF FM 2090 WEST OF SPLENDORA	11335	1010	10	12	HG	HG	RT	4	4	4	4			Site added in FY2012
LAKE CREEK AT EGYPT COMMUNITY ROAD 8.3 MILES SOUTHWEST OF CONROE	11367	1015	10	12	HG	HG	BS				4	4		Started collecting 24-hr DO in FY2016.
LAKE CREEK AT EGYPT COMMUNITY ROAD 8.3 MILES SOUTHWEST OF CONROE	11367	1015	10	12	HG	HG	RT	4	4	4	4			
MAGNOLIA CREEK AT W BAY AREA BLVD LEAGUE CITY APPROX 250 M UPSTREAM OF WWTP PERMIT WQ0010568-003	16611	1101A	11	12	HG	HG	BS				4	4		24- HR DO collected 4 times during 2017
EAST FORK SAN JACINTO RIVER IMMEDIATELY DOWNSTREAM OF SH 150 WEST OF COLDSPRING	17431	1003	10	10	HG	HG	RT	4	4	4	4			Added site in FY11

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	MT	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
MOUND CREEK 167 METERS DOWNSTREAM OF RUN OF THE OAKS 1.35 KM UPSTREAM OF CONFLUENCE WITH LAKE CREEK	17937	1015A	10	12	HG	HG	RT	4	4	4	4			
LAKE CREEK AT FM 149 APPROX 12.5 KM SOUTH OF MONTGOMERY TEXAS NEAR KAREN TEXAS	18191	1015	10	12	HG	HG	BS				4	4		Started collecting 24-hr DO in FY2017.
LAKE CREEK AT FM 149 APPROX 12.5 KM SOUTH OF MONTGOMERY TEXAS NEAR KAREN TEXAS	18191	1015	10	12	HG	HG	RT	4	4	4	4			
SPRING CREEK AT ROBERTS CEMETERY ROAD WEST-NORTHWEST OF TOMBALL	18868	1008	10	12	HG	HG	RT	4	4	4	4			
SPRING BRANCH AT SH 242 NORTHWEST TO THE CITY OF WOODBRANCH	20451	1010C	10	12	НG	HG	BS				4	4		24- HR DO collected 4 times starting in 2017
SPRING BRANCH AT SH 242 NORTHWEST TO THE CITY OF WOODBRANCH	20451	1010C	10	12	HG	HG	RT	4	4	4	4			was HG170
CANEY CREEK AT FIRETOWER ROAD WEST TO THE CITY OF WOODBRANCH	20452	1010	10	12	HG	HG	RT	4	4	4	4			was HG171
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			was HG172
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			was HG173
HALLS BAYOU 50 METERS EAST TO THE INTERSECTION OF KOWIS STREET AND SHADY LANE 535 METERS DOWNSTREAM OF HOPPER ROAD AND 502 METERS UPSTREAM OF LITTLE YORK ROAD IN HOUSTON	20455	1006D	10	12	HG	HG	RT	4	4	4	4			was HG177
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			was HG166
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			was HG167

	Site	Station ID	Waterbody ID	Basin	Region	SE	CE	МТ	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
	MILL CREEK AT HARDIN STORE ROAD NORTH OF TOMBALL	20461	1008A	10	12	HG	HG	RT	4	4	4	4			This site replaces site 16604. HG had been using wrong site ID.
	WALNUT CREEK AT DECKER PRAIRIE ROSEHL ROAD NORTHWEST OF TOMBALL	20462	10081	10	12	HG	HG	BS				4	4		Started collecting 24-hr DO in FY2016.
	WALNUT CREEK AT DECKER PRAIRIE ROSEHL ROAD NORTHWEST OF TOMBALL	20462	10081	10	12	HG	HG	RT	4	4	4	4			was HG180
	BRUSHY CREEEK 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	BS				4	4		Started collecting 24-hr DO in FY2016.
	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			
Ē	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			was HG165
	TARKINGTON BAYOU AT SH 105/SH 321 SOUTHEAST OF CLEVELAND	20466	1002A	10	12	HG	HG	RT	4	4	4	4			was HG169
	WHITE OAK CREEK AT MEMORIAL DRIVE IN CONROE	20731	1004B	10	12	HG	HG	RT	4	4	4	4			Added in FY13. Replaced site 11250.
	WINTERS BAYOU AT TONY TAP ROAD NEAR CLEVELAND	21417	1003	10	10	HG	HG	RT	4	4	4	4			Site addded in FY2014
	UNNAMED TRIBUTARY OF GREENS BAYOU IMMEDIATELY DOWNSTREAM OF GREENRANCH ROAD 1.02 KM UPSTREAM OF CONFLUENCE WITH GREENS BAYOU	11124	1016C	10	12	HG	нн	RT	9	9	9				
	GARNERS BAYOU AT NORTH SAM HOUSTON PARKWAY/SH LOOP 8 NE OF HOUSTON	11125	1016A	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8074250
	HALLS BAYOU AT JENSEN DRIVE IN HOUSTON	11126	1006D	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8076500

Site Description	Station ID	Vaterbody ID	Basin	Region	SE	CE	МТ	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
HALLS BAYOU 87 METERS UPSTREAM OF TIDWELL ROAD IN SETTEGAST	11127	> 1006D	10	12	HG	НН	RT	9	9	9				
HUNTING BAYOU IMMEDIATELY DOWNSTREAM OF IH 10 EAST OF HOUSTON	11128	1007R	10	12	HG	НН	RT	9	9	9				
HUNTING BAYOU AT NORTH LOOP EAST/IH 610 IN HOUSTON	11129	1007R	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8075770
SIMS BAYOU AT TELEPHONE ROAD/SH 35 IN HOUSTON	11132	1007D	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8075500
SIMS BAYOU AT CULLEN BLVD/FM 865 SOUTH OF HOUSTON	11133	1007D	10	12	HG	HH	RT	9	9	9				
SIMS BAYOU AT HIRAM CLARKE RD IN HOUSTON	11135	1007D	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8075400
BRAYS BAYOU IMMEDIATELY DOWNSTREAM OF ALMEDA ROAD SOUTHWEST OF HOUSTON	11138	1007B	10	12	HG	нн	RT	9	9	9				
BRAYS BAYOU AT SOUTH MAIN ST IN HOUSTON	11139	1007B	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8075000
BRAYS BAYOU AT SOUTH GESSNER DRIVE IN HOUSTON	11140	1007B	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8074810
LITTLE WHITE OAK BAYOU AT TRIMBLE STREET/NORTH EDGE OF HOLLYWOOD CEMETERY IN HOUSTON	11148	1013A	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8074540
VOGEL CREEK IMMEDIATELY DOWNSTREAM OF WEST LITTLE YORK ROAD	11155	1017C	10	12	HG	HH	RT	9	9	9				
ROLLING FORK CREEK IMMEDIATELY DOWNSTREAM OF LAKE LANE	11157	1017F	10	12	HG	HH	RT	9	9	9				
SOUTH MAYDE CREEK IMMEDIATELY DOWNSTREAM OF MEMORIAL DRIVE	11163	1014H	10	12	HG	HH	RT	9	9	9				
BRAYS/KEEGANS BAYOU IMMEDIATELY DOWNSTREAM OF ROARK ROAD NEAR US 59 AT BELTWAY 8 IN SOUTHWEST HOUSTON	11169	1007C	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8074800
LITTLE VINCE BAYOU IMMEDIATELY DOWNSTREAM OF NORTH MAIN STREET IN PASADENA TX	11172	1007	10	12	HG	нн	RT	9	9	9				
WILLOW CREEK IMMEDIATELY UPSTREAM OF GOSLING ROAD	11185	1008H	10	12	HG	HH	RT	9	9	9				
RUMMEL CREEK IMMEDIATELY DOWNSTREAM OF MEMORIAL DRIVE IN WEST HOUSTON	11188	1014N	10	12	HG	нн	RT	9	9	9				

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	MT	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
GREENS BAYOU IMMEDIATELY DOWNSTREAM OF GREEN RIVER ROAD/LEY ROAD IN HOUSTON	11279	1006	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8076700
HUNTING BAYOU TIDAL AT FEDERAL ROAD BRIDGE IN HOUSTON	11298	1007	10	12	HG	HH	RT	9	9	9				
SIMS BAYOU TIDAL IMMEDIATELY DOWNSTREAM OF LAWNDALE AVENUE IN HOUSTON	11302	1007	10	12	HG	нн	RT	9	9	9				
BRAYS BAYOU TIDAL AT 75TH STREET IN HOUSTON	11306	1007	10	12	HG	HH	RT	9	9	9				
BRAYS BAYOU TIDAL AT SCOTT STREET IN HOUSTON	11309	1007	10	12	HG	HH	RT	9	9	9				
SPRING CREEK IMMEDIATELY DOWNSTREAM OF RILEY FUZZEL ROAD	11312	1008	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8068520
SPRING CREEK IMMEDIATELY UPSTREAM OF SH 249	11314	1008	10	12	НG	нн	RT	9	9	9	9			Monitoring Entity changed from HW to HH in 2010. Flow from gage 8068275
SPRING CREEK IMMEDIATELY UPSTREAM OF DECKER PRAIRIE ROSEHILL ROAD	11323	1008	10	12	HG	НН	RT	9	9	9				Part of UAA
CYPRESS CREEK AT STEUBNER-AIRLINE ROAD IN HOUSTON	11330	1009	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8068900
CYPRESS CREEK AT SH 249	11331	1009	10	12	HG	нн	RT	9	9	9				Monitoring Entity changed from HW to HH in 2010
CYPRESS CREEK IMMEDIATELY DOWNSTREAM OF GRANT ROAD NEAR CYPRESS	11332	1009	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8068800
CYPRESS CREEK IMMEDIATELY DOWNSTREAM OF HOUSE HAHL ROAD NEAR CYPRESS	11333	1009	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8068740
BUFFALO BAYOU TIDAL AT MCKEE ST IN HOUSTON	11345	1013	10	12	HG	ΗН	RT	9	9	9				
BUFFALO BAYOU TIDAL IMMEDIATELY DOWNSTREAM OF MAIN STREET IN HOUSTON	11347	1013	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8074600

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	MT	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
BUFFALO BAYOU TIDAL AT SHEPHERD DRIVE IN HOUSTON	11351	1013	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8074000
BUFFALO BAYOU AT VOSS ROAD	11356	1014	10	12	HG	НН	RT	9	9	9				
BUFFALO BAYOU IMMEDIATELY DOWNSTREAM OF WEST BELTWAY 8 IN HOUSTON	11360	1014	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8073600
BUFFALO BAYOU AT WILCREST DRIVE IN HOUSTON	11361	1014	10	12	HG	HH	RT	9	9	9				
BUFFALO BAYOU IMMEDIATELY DOWNSTREAM OF DAIRY ASHFORD ROAD WEST OF HOUSTON	11362	1014	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8073500
BUFFALO BAYOU AT ELDRIDGE ROAD IN HOUSTON	11363	1014	10	12	HG	HH	RT	9	9	9				
BUFFALO BAYOU AT SH 6	11364	1014	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8072500
GREENS BAYOU AT TIDWELL ROAD IN HARRIS CO	11369	1016	10	12	HG	HH	RT	9	9	9				
GREENS BAYOU IMMEDIATELY DOWNSTREAM OF MT HOUSTON PARKWAY	11370	1016	10	12	HG	НН	RT	9	9	9				
GREENS BAYOU AT US 59 NORTH OF HOUSTON	11371	1016	10	12	HG	нн	RT	9	9	9				
GREENS BAYOU AT WEST GREENS PARKWAY	11376	1016	10	12	HG	HH	RT	9	9	9				
WHITEOAK BAYOU AT NORTH SHEPHERD STREET IN HOUSTON	11389	1017	10	12	HG	нн	RT	9	9	9				This site replaced site 15827
WHITEOAK BAYOU AT NORTH HOUSTON ROSSLYN ROAD	11394	1017	10	12	HG	НН	RT	9	9	9				
WHITEOAK BAYOU IMMEDIATELY DOWNSTREAM OF TAHOE DRIVE	11396	1017	10	12	HG	нн	RT	9	9	9				
ARMAND BAYOU AT GENOA-RED BLUFF RD NE OF ELLINGTON AFB	11404	1113A	11	12	HG	ΗН	RT	9	9	9				
ARMAND BAYOU AT FAIRMONT PARKWAY ALONG MEDIAN AT MIDPOINT BETWEEN BRIDGES	11405	1113A	11	12	HG	нн	RT	9	9	9				Added in FY2011 because dropped site 11409
ARMAND BAYOU TIDAL AT BAY AREA BLVD NORTH OF NASA AT MIDDLE OF MEDIAN BETWEEN 2 BRIDGES EASTERN SHORE	11503	1113	11	12	HG	нн	RT	9	9	9				
GREENS BAYOU 184 METERS DOWNSTREAM OF KNOBCREST DRIVE	13778	1016	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8075900

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	МТ	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
LITTLE CYPRESS CREEK IMMEDIATELY DOWNSTREAM OF KLUGE ROAD IN HOUSTON	14159	1009E	10	12	HG	нн	RT	9	9	9				
WHITEOAK BAYOU IMMEDIATELY DOWNSTREAM OF WEST 43RD STREET IN NORTHWEST HOUSTON	15829	1017	10	12	HG	нн	RT	9	9	9				
WHITEOAK BAYOU AT WEST TIDWELL ROAD IN NORTHWEST HOUSTON	15831	1017	10	12	HG	HH	RT	9	9	9				
BUFFALO BAYOU TIDAL IMMEDIATELY UPSTREAM OF JENSEN DRIVE IN HOUSTON	15841	1007	10	12	HG	нн	RT	9	9	9				
BUFFALO BAYOU TIDAL AT SABINE STREET NORTH OF ALLEN PARKWAY IN HOUSTON	15843	1013	10	12	HG	нн	RT	9	9	9				
BUFFALO BAYOU AT CHIMNEY ROCK ROAD IN HOUSTON	15845	1014	10	12	HG	HH	RT	9	9	9				
BUFFALO BAYOU IMMEDIATELY DOWNSTREAM OF BRIAR FOREST DRIVE IN WEST HOUSTON	15846	1014	10	12	HG	нн	RT	9	9	9				
TURKEY CREEK IMMEDIATELY DOWNSTREAM OF MEMORIAL DRIVE IN WEST HOUSTON	15847	1014K	10	12	HG	нн	RT	9	9	9				
BRAYS BAYOU IMMEDIATELY DOWNSTREAM OF SH 6 IN WEST HOUSTON	15848	1007B	10	12	HG	HH	RT	9	9	9				
BRAYS BAYOU AT DAIRY ASHFORD STREET IN WEST HOUSTON	15850	1007B	10	12	HG	HH	RT	9	9	9				
BRAYS BAYOU AT WILCREST DRIVE IN WEST HOUSTON	15851	1007B	10	12	HG	HH	RT	9	9	9				
BRAYS BAYOU IMMEDIATELY DOWNSTREAM OF BEECHNUT STREET IN WEST HOUSTON	15852	1007B	10	12	HG	нн	RT	9	9	9				
BRAYS BAYOU IMMEDIATELY DOWNSTREAM OF HILLCROFT STREET IN WEST HOUSTON	15853	1007B	10	12	HG	нн	RT	9	9	9				
BRAYS BAYOU IMMEDIATELY DOWNSTREAM OF SOUTH RICE AVENUE IN WEST HOUSTON	15854	1007B	10	12	HG	нн	RT	9	9	9				
BRAYS BAYOU IMMEDIATELY DOWNSTREAM OF STELLA LINK ROAD IN HOUSTON	15855	1007B	10	12	HG	нн	RT	9	9	9				
HALLS BAYOU AT HOMESTEAD ROAD IN NORTHEAST HOUSTON	15862	1006D	10	12	HG	HH	RT	9	9	9				
HALLS BAYOU AT HIRSCH RD IN NORTHEAST HOUSTON	15863	1006D	10	12	HG	HH	RT	9	9	9				
Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	МТ	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
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HALLS BAYOU AT MESA DR IN NORTHEAST HOUSTON	15864	1006D	10	12	HG	нн	RT	9	9	9				
HUNTING BAYOU AT JENSEN DRIVE IN NORTHEAST HOUSTON	15867	1007R	10	12	HG	ΗН	RT	9	9	9				
HUNTING BAYOU AT CAVALCADE ST IN NORTHEAST HOUSTON	15869	1007R	10	12	HG	нн	RT	9	9	9				
HUNTING BAYOU AT LOCKWOOD DRIVE IN NORTHEAST HOUSTON	15873	1007R	10	12	HG	нн	RT	9	9	9				
SIMS BAYOU IMMEDIATELY DOWNSTREAM OF ALMEDA ROAD IN SOUTH HOUSTON	15876	1007D	10	12	HG	нн	RT	9	9	9				
SIMS BAYOU AT MARTIN LUTHER KING JUNIOR BOULEVARD IN SOUTH HOUSTON	15877	1007D	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8075470
SIMS BAYOU AT SWALLOW STREET IN SOUTHEAST HOUSTON	15878	1007D	10	12	HG	НН	RT	9	9	9				
BRAYS BAYOU AT SOUTH WAYSIDE DRIVE 802 METERS UPSTREAM OF IH 45 IN SOUTHEAST HOUSTON	16479	1007B	10	12	HG	нн	RT	9	9	9				
GARNERS BAYOU IMMEDIATELY UPSTREAM OF OLD HUMBLE ROAD AT CONFLUENCE WITH RIENHARDT BAYOU IN NORTHEAST HOUSTON	16589	1016A	10	12	HG	нн	RT	9	9	9				
UNNAMED TRIBUTARY OF GREENS BAYOU AT MESA DR/E. HOUSTON- DYERSDALE ROAD IN NORTHEAST HOUSTON	16590	1016B	10	12	HG	нн	RT	9	9	9				
SPRING BRANCH CREEK IMMEDIATELY UPSTREAM OF WIRT ROAD 331 METERS DOWNSTREAM OF IH 10 IN WEST HOUSTON	16592	10140	10	12	HG	нн	RT	9	9	9				
COLE CREEK IMMEDIATELY UPSTREAM OF BOLIVIA BLVD 792 METERS UPSTREAM OF CONFLUENCE WITH WHITEOAK BAYOU IN NW HOUSTON	16593	1017B	10	12	HG	нн	RT	9	9	9				
BRICKHOUSE GULLY AT US 290 IN NORTHWEST HOUSTON 2.03 KM UPSTREAM OF CONFLUENCE WITH WHITEOAK BAYOU	16594	1017A	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8074250
UNNAMED TRIBUTARY OF WHITE OAK BAYOU AT US290 INTERSECTION AT MANGUM ROAD IN NORTHWEST HOUSTON	16595	1017D	10	12	HG	нн	RT	9	9	9				
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	нн	RT	9	9	9				
NEWMAN BRANCH / NEIMANS BAYOU AT MEMORIAL DRIVE IN WEST HOUSTON	16597	1014M	10	12	HG	нн	RT	9	9	9				

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	МТ	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
LITTLE WHITE OAK BAYOU AT WHITE OAK DRIVE IN NORTH HOUSTON	16648	1013A	10	12	HG	НН	RT	9	9	9				
UNNAMED TRIBUTARY OF BUFFALO BAYOU / JAPHET CREEK AT CLINTON DRIVE IN CENTRAL HOUSTON	16649	10070	10	12	HG	нн	RT	9	9	9				
COUNTRY CLUB BAYOU/TRIBUTARY OF BRAYS BAYOU IMMEDIATELY UPSTREAM OF SOUTH WAYSIDE DRIVE/US90A IN CENTRAL HOUSTON	16650	1007K	10	12	HG	нн	RT	9	9	9				
COUNTRY CLUB BAYOU/TRIBUTARY OF BRAYS BAYOU AT HUGHES STREET IN CENTRAL HOUSTON	16651	1007K	10	12	HG	нн	RT	9	9	9				
WILLOW WATERHOLE AT MCDERMED DRIVE IN SOUTHWEST HOUSTON	16652	1007E	10	12	HG	HH	RT	9	9	9				
KUHLMAN GULLY/TRIBUTARY OF BRAYS BAYOU AT BROCK STREET 311 METERS UPSTREAM OF WHEELER STREET IN SOUTHEAST CENTRAL HOUSTON	16653	1007G	10	12	HG	нн	RT	9	9	9				
UNNAMED TRIBUTARY OF BRAYS BAYOU AT DUMFRIES DRIVE IN SOUTH WEST HOUSTON	16654	1007L	10	12	HG	нн	RT	9	9	9				
UNNAMED TRIBUTARY OF SIMS BAYOU AT DULCIMER STREET IN SOUTH HOUSTON	16655	1007N	10	12	HG	нн	RT	9	9	9				
SIMS BAYOU SOUTH BRANCH AT TIFFANY DRIVE IN SOUTH HOUSTON	16656	1007D	10	12	HG	нн	RT	9	9	9				
UNNAMED TRIBUTARY OF HUNTING BAYOU IMMEDIATELY UPSTREAM OF JOHN RALSTON ROAD IN EAST HOUSTON	16657	1007M	10	12	HG	нн	RT	9	9	9				
PLUM CREEK/TRIBUTARY OF SIMS BAYOU AT OLD GALVESTON ROAD IN SOUTH EAST HOUSTON	16658	10071	10	12	HG	нн	RT	9	9	9				
PINE GULLY/TRIBUTARY OF SIMS BAYOU AT OLD GALVESTON ROAD IN SOUTH EAST HOUSTON	16659	1007H	10	12	HG	нн	RT	9	9	9				
BERRY BAYOU/TRIBUTARY OF SIMS BAYOU IMMEDIATELY UPSTREAM OF AHRENS DRIVE IN SOUTH EAST HOUSTON	16660	1007	10	12	HG	нн	RT	9	9	9				
BERRY BAYOU IMMEDIATELY UPSTREAM OF SOUTH RICHEY STREET IN SOUTH EAST HOUSTON	16661	1007F	10	12	HG	нн	RT	9	9	9				
BIG GULCH AT WALLISVILLE ROAD IN EAST HOUSTON	16662	1006F	10	12	HG	HH	RT	9	9	9				

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	МТ	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
SPRING GULLY AT WEST TERMINUS OF BARNESWORTH DRIVE IN NORTHEAST HOUSTON	16663	1006H	10	12	HG	нн	RT	9	9	9				
GOODYEAR CREEK TIDAL IMMEDIATELY UPSTREAM OF IH 10 IN EAST HOUSTON	16664	1006	10	12	HG	нн	RT	9	9	9				
UNNAMED TRIBUTARY OF HALLS BAYOU IMMEDIATELY DOWNSTREAM OF LANGLEY ROAD IN NORTH HOUSTON	16665	1006J	10	12	HG	нн	RT	9	9	9				
UNNAMED TRIBUTARY OF HALLS BAYOU AT TALTON STREET IN NORTH EAST HOUSTON	16666	10061	10	12	HG	нн	RT	9	9	9				
UNNAMED TRIBUTARY OF HALLS BAYOU AT WOODLYN ROAD IN NORTH EAST HOUSTON	16667	10061	10	12	HG	нн	RT	9	9	9				
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	нн	RT	9	9	9				
UNNAMED TRIBUTARY OF GREENS BAYOU AT SMITH RD IN NORTHEAST HOUSTON	16676	1016D	10	12	HG	нн	RT	9	9	9				
SPRING GULLY AT SPRING CREEK OAKS DRIVE IN TOMBALL	17481	1009D	10	12	HG	ΗН	RT	9	9	9				
LANGHAM CREEK AT SH 6 IN NORTHWEST HOUSTON	17482	1014E	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8072760
TURKEY CREEK AT TANNER ROAD APPROX 920 METERS EAST OF NORTH ELDRIDGE PARKWAY IN HOUSTON	17483	1014K	10	12	HG	нн	RT	9	9	9				
BEAR CREEK AT OLD GREENHOUSE ROAD WEST OF HOUSTON	17484	1014A	10	12	HG	ΗН	RT	9	9	9				
UNNAMED TRIBUTARY OF HORSEPEN BAYOU TIDAL AT PENN HILLS	17485	1113C	11	12	HG	нн	RT	9	9	9				
BIG ISLAND SLOUGH AT HILLRIDGE ROAD IN SOUTHEAST HOUSTON	17486	1113E	11	12	HG	нн	RT	9	9	9				
WILLOW SPRING AT BANDRIDGE ROAD IN SOUTHEAST HOUSTON	17487	1113D	11	12	HG	нн	RT	9	9	9				
SPRING CREEK IMMEDIATELY DOWNSTREAM OF KUYKENDAHL ROAD NORTHEAST OF HOUSTON	17489	1008	10	12	HG	нн	RT	4	4	4				
HALLS BAYOU AT AIRLINE ROAD IN NORTH HOUSTON	17490	1006D	10	12	HG	HH	RT	9	9	9				

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Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	МТ	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water		Comments
HALLS BAYOU AT DEER TRAIL DRIVE IN NORTH HOUSTON	17491	1006D	10	12	HG	нн	RT	9	9	9	9			Flow from gage 8076200	
BUFFALO BAYOU AT SOUTH MASON ROAD WEST OF HOUSTON	17492	1014B	10	12	HG	HH	RT	9	9	9					
MASON CREEK 151 METERS DOWNSTREAM OF PARK PINE DRIVE WEST OF HOUSTON	17494	1014L	10	12	HG	нн	RT	9	9	9					
GREENS BAYOU IMMEDIATELY UPSTREAM OF MILLS ROAD WEST OF HOUSTON	17495	1016	10	12	HG	нн	RT	9	9	9					
FAULKEY GULLY OF CYPRESS CREEK 105 METERS DOWNSTREAM OF LAKEWOOD FOREST DRIVE NORTHWEST OF HOUSTON	17496	1009C	10	12	HG	нн	RT	9	9	9					
SIMS BAYOU UPSTREAM TIDAL AT SOUTH POST OAK ROAD IN SOUTHWEST HOUSTON	17976	1007D	10	12	HG	нн	RT	9	9	9					
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	нн	RT	9	9	9					
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	нн	RT	9	9	9					
MIMOSA DITCH TRIBUTARY OF BRAYS BAYOU AT NEWCASTLE DR IN SOUTHWEST HOUSTON	18691	1007U	10	12	HG	нн	RT	9	9	9					
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	нн	RT	9	9	9					
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	нн	RT	9	9	9					
BUFFALO BAYOU NORTH SHORE IMMEDIATELY UNDERNEATH THE SOUTHBOUND FEEDER ROAD BRIDGE OF IH 610 WEST IN HOUSTON	20212	1014	10	12	HG	нн	RT	9	9	9					
WILLOW CREEK AT TUWA ROAD APPROXIMATELY 859 METERS DOWNSTREAM OF FM 2920 ROAD IN NORTHERN HARRIS COUNTY	20730	1008H	10	12	HG	нн	RT	9	9	9					

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	МТ	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
SIMS BAYOU AT GALVESTON ROAD IN HOUSTON	20736	1007	10	12	HG	нн	RT	9	9	9				This site replaces station 11304. HH using wrong station id for the location they were sampling at.
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	нн	RT	9	9	9				This site replaced 11277 in FY2012 due to safety issues.
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	нн	RT	9	9	9				Added in FY2013
SOUTH MAYDE CREEK AT SOUTH PARK VIEW DRIVE WEST OF HOUSTON	21813	1014H	10	12	HG	нн	RT	9	9	9				Replaced site 17493 in FY2017
LUCE BAYOU/SAN JACINTO RIVER EAST FORK AT HUFFMAN-NEW CANEY ROAD	11187	1002B	10	12	HG	нw	RT	6	6	6				Monitoring Entity changed from HH to HW in 2010
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	нw	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	нw	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	нw	RT	12	12	12				
EAST FORK SAN JACINTO RIVER AT FM 1485	11235	1003	10	12	HG	нw	RT	6	6	6	6			Flow from gage 8070200

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	МТ	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
EAST FORK SAN JACINTO RIVER IMMEDIATELY UPSTREAM OF SH 105 WEST OF CLEVELAND	11238	1003	10	12	HG	нw	RT	6	6	6	6			Site added in FY11. Flow from gage 8070000
WEST FORK SAN JACINTO RIVER IMMEDIATELY UPSTREAM OF SH 242	11243	1004	10	12	HG	нw	RT	6	6	6				This site ID replaces site ID 16624. Data was moved from 16624 to 11243.
WEST FORK SAN JACINTO RIVER IMMEDIATELY DOWNSTREAM OF SH 105 NW OF CONROE	11251	1004	10	12	HG	нw	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	нw	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	нw	RT	6	6	6	6			Flow from gage 8069000
CANEY CREEK IMMEDIATELY DOWNSTREAM OF FM 1485	11334	1010	10	12	HG	НW	RT	6	6	6				
PEACH CREEK BRIDGE AT FM 2090 IN SPLENDORA	11337	1011	10	12	HG	нw	RT	6	6	6				This site was substituted for 11336 in FY2012.
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	нw	RT	12	12	12				
PEACH CREEK IMMEDIATELY UPSTREAM OF OLD HWY 105	16625	1011	10	12	HG	НW	RT	6	6	6				
STEWARTS CREEK 175 METERS DOWNSTREAM OF SH LOOP 336 SOUTHEAST OF CONROE	16626	1004E	10	12	HG	НW	RT	6	6	6				
CRYSTAL CREEK AT SH 242 SOUTHEAST OF CONROE	16635	1004D	10	12	HG	нw	RT	6	6	6				Replaces site 11181 Crystal Creek at FM1314
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				

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	МТ	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
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	нw	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	нw	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	нw	RT	12	12	12				added site in FY 2011 want to know if OSSF community upstream is affecting ambient water quality
CANEY CREEK AT MILLMAC ROAD NORTHEAST OF CUT AND SHOOT	21465	1010	10	12	HG	нw	RT	6	6	6				Replaced site 14241 in FY2014
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				Replaced site 16628 in 2015 due to stream access from bank.
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	

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	MT	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
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	
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			2	
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			2	
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			2	
BEAR BRANCH 20 METERS DOWNSTREAM OF RESEARCH FOREST DRIVE	16631	1008E	10	12	HG	SJ	RT	12	4	4	4		2	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				

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	MT	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
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				
CEDAR BAYOU TIDAL MID CHANNEL 45 M DOWNSTREAM OF SH 146 NORTHEAST OF BAYTOWN	11115	0901	9	12	HG	UI	RT	4	4	4				Changed from HG to UI in Spring 2015
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				Changed from HG to UI in Spring 2015
CEDAR BAYOU ABOVE TIDAL 30 M DOWNSTREAM OF FM 1942 AT EAST BANK	11118	0902	9	12	HG	UI	RT	4	4	4	4			Changed from HG to UI in Spring 2015
CEDAR BAYOU ABOVE TIDAL 45 M DOWNSTREAM OF FM 1960 NORTHEAST OF HUFFMAN	11123	0902	9	12	HG	UI	RT	4	4	4	4			Changed from HG to UI in Spring 2015
MOSES BAYOU AT NORTHBOUND SH 146 BRIDGE AT MID-BRIDGE NORTH OF LA MARQUE	11400	2431A	24	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
HIGHLAND BAYOU AT FAIRWOOD ROAD IN LA MARQUE IN GALVESTON COUNTY	11415	2424A	24	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
HALLS BAYOU AT FM 2004 SW OF ALTO LOMA	11422	2432C	24	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
MUSTANG BAYOU AT FM 2917 SOUTH OF ALVIN	11423	2432A	24	12	HG	UI	RT	4	4	4	4			Added site in Fy2012
COWART CREEK AT FM 518 IN FRIENDSWOOD	11425	1102A	11	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
CEDAR CREEK AT FM 517 W OF DICKINSON	11434	1103E	11	12	HG	UI	RT	4	4	4	4			Reduced frequency for FY08
GUM BAYOU AT FM 517 E OF DICKINSON	11436	1103D	11	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
DICKINSON BAYOU TIDAL AT SH 146 BRIDGE EAST OF DICKINSON	11455	1103	11	12	HG	UI	RT	4	4	4				Reduced frequency for FY08

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	МТ	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
DICKINSON BAYOU TIDAL AT IH 45	11462	1103	11	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
CHOCOLATE BAYOU TIDAL FM 2004 BRIDGE SOUTH OF ALVIN	11478	1107	11	12	HG	UI	RT	4	4	4				Added chlorophyll a in FY2012; Reduced frequency for FY08
OYSTER CREEK TIDAL AT THAT-WAY DRIVE 0.5 MILES BELOW FM 2004	11486	1109	11	12	HG	UI	RT	4	4	4				Changed from HG to UI in Spring 2015
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			Changed from HG to UI in Spring 2015
LINVILLE BAYOU 35 M DOWNSTREAM OF SIMS ROAD APPROXIMATELY 5.20 KM UPSTREAM OF MOUTH	12138	1304A	13	12	HG	UI	RT	4	4	4				Changed from HG to UI in Spring 2015
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	4			Changed from HG to UI in Spring 2015
WEST BAY OFFAT BAYOU MID BAYOU OPPOSITE LAKE MADELINE CANAL	13322	2424D	24	12	HG	UI	RT	4	4	4				Reduced frequency for FY08.
WEST BAY AT RANGE MARKER D BETWEEN SOUTH DEER ISLAND AND TEICHMAN POINT	14622	2424	24	12	HG	UI	RT	4	4	4				Reduced frequency for FY08.
OFFATTS BAYOU OFF CM 18	14645	2424D	24	12	HG	UI	RT	4	4	4				Reduced frequency for FY08.
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			Changed from HG to UI in Spring 2015
BORDENS GULLEY AT FM517 BRIDGE 0.10MI UPSTREAM OF CONFLUENCE OF DICKINSON BAYOU IN DICKINSON	16469	1103B	11	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
GEISLER BAYOU AT FM517 BRIDGE 0.19MI UPSTREAM OF DICKINSON BAYOU IN DICKINSON	16470	1103C	11	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
BENSONS BAYOU AT FM 517 / PINE DR IN DICKINSON	16471	1103A	11	12	HG	UI	RT	4	4	4				Reduced frequency for FY08

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	МТ	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
MARYS CREEK AT MARYS CROSSING IN NORTH FRIENDSWOOD	16473	1102B	11	12	HG	UI	RT	4	4	4	4			Reduced frequency for FY08
ROBINSONS BAYOU AT FM270 IN LEAGUE CITY	16475	1101D	11	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
JARBO BAYOU AT FM2094 APPROX 0.3MI DOWNSTREAM OF CLEAR LAKE CONFLUENCE IN KEMAH	16476	2425B	24	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
JARBO BAYOU AT LAWRENCE ROAD IN KEMAH	16485	2425B	24	12	HG	UI	RT	4	4	4				Added in FY2015
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				Reduced frequency for FY08.
MARCHAND BAYOU TIDAL AT FM519 IN HITCHCOCK	16490	2424C	24	12	HG	UI	RT	4	4	4				Reduced frequency for FY08.
HIGHLAND BAYOU AT FM 2004 IN HITCHCOCK IN GALVESTON COUNTY	16491	2424A	24	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
CHIGGER CREEK AT FM528 BRIDGE IN FRIENDSWOOD	16493	1101B	11	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
MOSES LAKE FLOOD GATES AT GALVESTON BAY CONFLUENCE AT SHELL ISLAND	16551	2431	24	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
LAKE MADELINE AT CORNER OF BELUCHE DRIVE AND DOMINIQUE DRIVE IN GALVESTON	16564	2424B	24	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
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				Reduced frequency for FY08
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				Reduced frequency for FY08
HICKORY SLOUGH AT ROBINSON DRIVE IN PEARLAND	17068	1102C	11	12	HG	UI	RT	4	4	4	4			site added to UI schedule in Fy2012

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	МТ	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
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				this site replaces site 13346
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				this site replaces site 13347
MOSES BAYOU AT SH 3 IN TEXAS CITY	17910	2431A	24	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
NEW BAYOU AT FM 2004 S/SW OF HITCHCOCK	17911	2432E	24	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
PERSIMMON BAYOU AT FM 2004 S/SW OF HITCHCOCK	17913	2432D	24	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
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				Reduced frequency for FY08
AUSTIN BAYOU AT FM 2004 APPROXIMATELY 4 MILES SOUTHEAST OF ANGLETON TEXAS IN BRAZORIA COUNTY	18048	1105C	11	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
BASTROP BAYOU OFF BAYOU WOOD DR DUE EAST OF BRAZORIA CR 201 AT BASTROP BAYOU DR APPROX 1.1 KM UPSTREAM OF SH 288B IN RICHWOOD VILLAGE	18502	1105	11	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
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				Reduced frequency for FY08
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				Reduced frequency for FY08
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				Reduced frequency for FY08
AUSTIN BAYOU IMMEDIATELY UPSTREAM OF DANBURY-ANGLETON ROAD/BRAZORIA CR 210 EAST OF DANBURY	18506	1105C	11	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
AUSTIN BAYOU MID CHANNEL 189 M UPSTREAM OF CONFLUENCE WITH BASTROP BAYOU TIDAL UPSTREAM OF CR 227 IN BRAZORIA COUNTY	18507	1105B	11	12	HG	UI	RT	4	4	4				Reduced frequency for FY08

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	MT	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
FLORES BAYOU IMMEDIATELY UPSTREAM OF DANBURY-ANGLETON ROAD/BRAZORIA CR 210 EAST OF ANGLETON	18508	1105A	11	12	HG	UI	RT	4	4	4				Reduced frequency for FY08
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			site added in FY2012
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				Reduced frequency for FY08
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				Reduced frequency for FY08
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				Reduced frequency for FY08
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				Reduced frequency for FY08
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				Reduced frequency for FY08
CLEAR CREEK ABOVE TIDAL AT YOST ROAD TERMINUS IN PEARLAND IN BRAZORIA COUNTY	20010	1102	11	12	HG	UI	RT	4	4	4	4			site added to UI schedule in FY2012
SAN BERNARD RIVER TIDAL AT SH 35 SOUTHWEST OF WEST COLUMBIA	20460	1301	13	12	HG	UI	RT	4	4	4				Changed from HG to UI in Spring 2015
WEST BERNARD CREEK AT WHARTON CR 225 IN EAST OF HUNGERFORD	20721	1302B	13	12	HG	UI	RT	4	4	4	4			Changed from HG to UI in Spring 2015

Site Description	Station ID	Waterbody ID	Basin	Region	SE	CE	MT	Field	Conv	Bacteria	Flow	24 hr DO	Metal Water	Comments
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			Changed from HG to UI in Spring 2015
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			Changed from HG to UI in Spring 2015
BORDENS GULLY AT SPRUCE DRIVE IN DICKINSON	20724	1103B	11	12	HG	UI	RT	4	4	4	4			replaces temp id HG-188 collect for 2 years then compare results against 16469
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	4			replaces temp id HG-191 this site was added after site 11446 was dropped for being a duplicate with WCFO
CHOCOLATE BAYOU IMMEDIATELY UPSTREAM OF BRAZORIA CR 171 / MUSTANG CHOCOLATE BAYOU ROAD IN LIVERPOOL	21178	1107	11	12	HG	UI	RT	4	4	4				This is a corrected location id for a site sampled for several years. Replaces site id 11480.
MUSTANG BAYOU AT THE HEIGHTS-MANVEL ROAD /CARDINAL DRIVE BRIDGE NEAR ALVIN	21416	2432A	11	12	HG	UI	RT	4	4	4	4			Added in FY2014
BRUSHY BAYOU AT BRAZORIA CR 213 / SHELL ROAD 8.9 KILOMETERS EAST OF ANGLETON	21734	1105E	11	12	HG	UI	RT	4	4	4				Added site in FY16
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				Moved site downstream of prior location in FY16

Field No		Bu	Hou reau of F 832.393 FORM	iji: ;								
Date	Sa	mples Collec	ted By:									
Run No	Station ID _			_ Time	e (24 hr)			Field Meter #				
Stream Name & I	ntersecting Str	eet										
FIELD OBSERVA	TIONS				Num	ber of (days since	e significant rainfall				
Flow Severity	Tidal Stage	Color		Odor		Water	Surface	Current Weather	Wind Intensity			
1 – no flow 2 – low 3 – normal 4 – flood 5 – high 6 – dry*	1 – low 2 – falling 3 – slack 4 – rising 5 – high	1 – brown 2 – reddis 3 – greeni 4 – blackis 5 – clear 6 – other*	ish h sh sh	1 - se 2 - oil 3 - ro 4 - m 5 - fis 6 - nc 7 - ot	wage y/chemical tten egg usky hy ne her*	1 – calm 2 – ripples 3 – waves 4 - whitecaps		1 – clear 2 – partly cloudy 3 – cloudy 4 – rain 5 - other	1 – calm 2 – slight 3 – moderate 4 - strong			
Flow Method	Flow (cfs)	Secchi D (cm)	epth	Evider Primar Recrea	nce of ry Contact ation	# people observed		Sample Depth (ft)	Total Depth (ft)			
1 – flow-gauge stati 5 - Doppler	ion			1 – obser 0 – not o	ved bserved	1 - 1 > 10	10					
INSTRUMENT RE	ADINGS						*Other (Observations:				
Temp	Temp Conductivity Di				Salinity							
	02 ks (0 mC/sm)	(0.5.4.15.0.m.s.!!.)	(5.0 += 10	0)	(000 to 45 0 D00	~						
Request for Anal	vsis (circle wh	at is requested	(5.0 to 10	.0)	(.009 to 45.0 PSS	»						
1 – pH 2 – Conductivity 3 – TSS 4 – N-NO3	5 – CI- 6 – SO4 7 – N-NH3 8 – T-PO4	9 - 10 -	E. coli 100 mL sterile plastic - Enterococcus 1 L plastic 1 gallon plastic				<u>i s</u> . Ile plastic stic	200 mL sterile plastic 1 L plastic w/ H2SO4 1 L plastic(TKN) bottle w/H2SO4				
Samples Relinqu Samples Received on lo	ples Relinquished By:							Date:				
Lab Sample No FF&COC version 12 upda	ted 09/2015	*Note: If site is dry, p Maximum pool wie	hoto should	eceived I be taken. ength, and J	by: If water present percent pool cov	(signatu within 400 erage in 50	ure only) m, and pool is 00 m reach (if m	Date: 10+m long, and 0.4+m deep, neasureable) in observations	collect sample and record section.			

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