Seneca Army Depot Activity
Romulus, New York

USACE - New York District
US Army, Engineering & Support Center
Huntsville, AL

Addendum 3 to the Final UFP-QAPP

Seneca Army Depot Activity

Contract No. W912DY-09-D-0062
Task Order No. 0023
EPA SITE ID# NY0213820830
NY Site ID# 8-50-006

July 2020

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LIST OF ACRONYMS

ACRONYM	DEFINITION	ACRONYM	DEFINITION
APP	Accident Prevention Plan	NYS	New York State
BRAC	Base Realignment and Closure	NYSDEC	New York State Department of Environmental Conservation
B.A.	Bachelor of Arts	OD	Open Detonation
B.S.	Bachelor of Science	OED	Ordnance and Explosives Design Center
CCV	Continuing calibration verification	PAL	Projection Action Limit
CEHNC	USACE Huntsville District	Parsons	Parsons Government Services, Inc.
CENAN	USACE New York District	PM	Project Manager
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	QA	Quality Assurance
CoC	Chain of Custody	QC	Quality Control
COPC	Chemical of Potential Concern	QSM	Quality Systems Manual
COR	Contracting Officer Representative	RPD	Relative Percent Difference
CSM	Conceptual Site Model	RSL	Regional Screening Levels
DFW	Definable Feature of Work	RSD	Relative Standard Deviation
DL	Detection Limit	SEDA	Seneca Army Depot Activity
DoD	Department of Defense	SOPs	Standard Operating Procedures
DQO	Data Quality Objective	SSHP	Site Safety and Health Plan
DUSR	Data Usability Summary Report	SVOC	Semi Volatile Organic Compound
EDD	Electronic Data Deliverable	VOC	Volatile Organic Compounds
ELAP	Environmental Laboratory Accreditation Program	TAL	Target Analyte List
EPA	Environmental Protection Agency	THQ	Target Hazard Quotient
FW	freshwater	TO	Task Order
ICAL	Initial calibration	TR	Target Risk
ICS	Interference Check Standard	UFP-QAPP	Uniform Federal Policy – Quality Assurance Project Plan
ICV	Initial calibration verification	µG/l	Micrograms per liter
IDQTF	Intergovernmental Data Quality Task Force	µG/kg	Micrograms per kilogram
IS	Internal Standard	U.S.	United States
LCS	Laboratory Control Sample	USACE	U.S. Army Corps of Engineers
LIMS	Laboratory Information Management System	USEPA	United States Environmental Protection Agency
LOD	Limit of Detection		
LOQ	Limit of Quantitation		
LLCCV	Low-level Continuing Calibration Verification		
LTM	Long Term Monitoring		
MCL	Maximum contaminant level		
MEC	Munitions and Explosives of Concern		
MD	Munitions Debris		
MPC	Measurement Performance Criteria		
MS	Matrix Spike		
MSD	Matrix Spike Duplicate		
ND	Non-detect		

Executive Summary

ES.1 Introduction

This Addendum to the existing Final Uniform Federal Policy – Quality Assurance Project Plan (UFP-QAPP; Parsons, 2017) covers additional investigation activities at Open Detonation (OD) Grounds which includes collection of groundwater, surface water, and sediment samples for volatile organic compounds (VOCs), semi volatile organic compounds (SVOCs), perchlorate, metals, explosives, phosphorus, and orthophosphate as P. In addition, groundwater wells will be installed as discussed in the Final Work Plan for the OD Grounds Groundwater Sampling, March 2020 (herein referred to as the OD Grounds Work Plan). Information related to the other field programs already provided in the existing Final UFP-QAPP or in Addendum 1 to the Final UFP-QAPP were removed for clarity. A brief overview of any additional sites to be investigated or changes in scope is provided below. This UFP-QAPP Addendum 3 supersedes the previously submitted UFP-QAPP Addendum 2. This Addendum is intended to be used with the Final UFP-QAPP and Addendum 1; this Addendum is not a stand-alone document. A copy of the Final UFP-QAPP and UFP-QAPP Addendum 1 are included in **Appendix C**.

ES.1.1 OD GROUNDS

The OD Grounds Site is located in the northwestern corner of the Seneca Army Depot Activity (SEDA) and was used to perform open detonation of munitions. The Site is largely meadow with some wooded and heavily brushed areas. The detonation activities at the OD Grounds were conducted in an area known as the "OD Hill." The historic operations have resulted in munitions and explosives of concern (MEC) and munitions debris (MD) being "kicked out" from the OD Hill to the surrounding area. Several munitions response actions were conducted within the OD Grounds since the year 2000. Future munitions related cleanup is expected at this Site. This UFP-QAPP Addendum addresses the addition of VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P sampling in groundwater, surface water, and sediment at the OD Grounds.

ES.2 Project Objectives and Technical Approach

The project objectives are discussed in the Final UFP-QAPP. The objectives are being updated to include investigation of VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P in groundwater, surface water, and sediment at the OD Grounds. The Conceptual Site Model (CSM) for each site is described on **Worksheet #10** of the Final UFP-QAPP. **Section 2** of the Work Plan for the OD Grounds Groundwater Sampling includes a detailed summary of the CSM for the OD grounds.

Project-specific data quality objectives (DQOs) were developed based on this CSM and these are described on **Worksheet #11** of this UFP-QAPP Addendum. These DQOs include a design for obtaining data to support the planned sampling at the OD Grounds. The project approach is described in detail in the Work Plan for the OD Grounds Groundwater Sampling and on **Worksheet #17**, and specific analyzes are noted on **Worksheet #18**.

The general scope of the activities related to sampling at the OD Grounds is as follows:

- Assess the potential presence of chemicals of potential concern (COPCs) in shallow overburden and deeper bedrock groundwater in the immediate vicinity of previously identified potential source areas.
- Investigate groundwater flow directions and flow rates in the vicinity of the OD Grounds.
- Evaluate background metals concentrations in shallow overburden and deeper bedrock groundwater at locations up and cross gradient from the OD Grounds.
- Investigate surface water and sediment quality in the vicinity of the OD Grounds.

While these components are the focus of the project, the field operations involve multiple elements, or "definable features of work" (DFWs) that will be required to achieve the project goals. These DFWs are listed on **Worksheet #14** and they are explained further in **Worksheet #17**, with references to relevant standard operating procedures (SOPs) (**Worksheet #21** and **Appendix A** and **B**), measurement performance criteria (MPCs) (**Worksheet #12**), and other sections of the UFP-QAPP Addendum, as necessary.

ES.3 Document Organization

This UFP-QAPP Addendum was prepared under Task Order 0023 of Contract W912DY-09-D-0062, in accordance with UFP-QAPP, Optimized UFP-QAPP Worksheets (IDQTF, 2012), Environmental Protection Agency (EPA) QA/G-5 (EPA, 2002), and EM 200-1-15 to ensure environmental data collected are scientifically sound, of known and documented quality, and suitable for their intended purposes. This UFP-QAPP Addendum focuses on the site-specific details for the additional groundwater, surface water, and sediment sampling at the OD Grounds. This Addendum is intended to be reviewed and used with the Final UFP-QAPP, Addendum 1 to the Final UFP-QAPP, and the Work Plan for the OD Grounds Groundwater Sampling.

This UFP-QAPP addendum uses the "optimized" worksheets format published by the Intergovernmental Data Quality Task Force in March 2012 (IDQTF, 2012). Supporting plans and other information are included in the references section of this UFP-QAPP.

Crosswalk from UFP-QAPP Manual to Worksheets

This UFP-QAPP Addendum presents the plan for collecting data to support additional phosphorus sampling at OD Grounds. The UFP-QAPP uses "optimized" worksheets published by the Intergovernmental Data Quality Task Force (IDQTF) in March 2012. The optimized worksheets address all requirements of ANSI/ASQ E4-2004 and CIO 2106-G-05. The following table provides a "crosswalk" between the worksheets and the respective elements of CIO 2106-G-05. In addition, each revised worksheet includes a reference to the appropriate CIO 2106-G-05 element. Worksheets without changes were removed. These worksheets may be referenced in the Final UFP-QAPP (Parsons, 2017) or Addendum 1 to the Final UFP-QAPP (Parsons, 2018). This UFP-QAPP Addendum 3 supersedes the previously submitted UFP-QAPP Addendum 2.

OPTIMIZED UFP-QAPP WORKSHEETS		2106-G-05 QAPP GUIDANCE SECTION	
1&2	Title and Approval Page	2.2.1	Title, Version, and Approval / Sign-Off
3&5	Distribution List and Project Organization (removed, refer to Final UFP-QAPP)	2.2.3 2.2.4	Distribution List Project Organization and Schedule
4, 7 & 8	Personnel Qualifications and Sign-Off Sheet	2.2.1 2.2.7	Title, Version, and Approval / Sign-Off Special Training Requirements and Certification
6	Communication Pathways and Procedures (removed, refer to Final UFP-QAPP)	2.2.4	Project Organization and Schedule
9	Project Planning Session Summary (removed, refer to Final UFP-QAPP)	2.2.5	Project Background, Overview, and Intended Use of Data
10	Conceptual Site Model (removed, refer to Final UFP-QAPP)	2.2.5	Project Background, Overview, and Intended Use of Data
11	Data Quality Objectives	2.2.6	Data/Project Quality Objectives and Measurement Performance Criteria
12	Measurement Performance Criteria	2.2.6	Data/Project Quality Objectives and Measurement Performance Criteria
13	Secondary Data Uses and Limitations (removed, refer to Final UFP-QAPP)	Chapter 3	QAPP Elements for Evaluating Existing Data
14 & 16	Project Tasks & Schedule	2.2.4	Project Organization and Schedule
15	Project Action Limits and Laboratory-Specific Detection / Quantitation Limits	2.2.6	Data/Project Quality Objectives and Measurement Performance Criteria
17	Sampling Design and Rationale	2.3.1	Sample Collection Procedure, Experimental Design, and Sampling Tasks
18	Sampling Locations and Methods	2.3.1 2.3.2	Sample Collection Procedure, Experimental Design, and Sampling Tasks Sampling Procedures and Requirements
19 & 30	Sample Containers, Preservation, and Hold Times	2.3.2	Sampling Procedures and Requirements
20	Field Quality Control	2.3.5	Quality Control Requirements
21	Field Standard Operating Procedures	2.3.2	Sampling Procedures and Requirements
22	Field Equipment Calibration, Maintenance, Testing, and Inspection (removed, refer to Final UFP-QAPP)	2.3.6	Instrument/Equipment Testing, Calibration and Maintenance Requirements, Supplies and Consumables
23	Analytical Standard Operating Procedures	2.3.4	Analytical Methods Requirements and Task Description
24	Analytical Instrument Calibration	2.3.6	Instrument/Equipment Testing, Calibration and Maintenance Requirements, Supplies and Consumables
25	Analytical Instrument and Equipment Maintenance, Testing, and Inspection	2.3.6	Instrument/Equipment Testing, Calibration and Maintenance Requirements, Supplies and Consumables

OPTIMIZED UFP-QAPP WORKSHEETS		2106-G-05 QAPP GUIDANCE SECTION	
26 & 27	Sample Handling, Custody, and Disposal	2.3.3	Sample Handling, Custody Procedures, and Documentation
28	Analytical Quality Control and Corrective Action	2.3.5	Quality Control Requirements
29	Project Documents and Records (removed, refer to Final UFP-QAPP)	2.2.8	Documentation and Records Requirements
31, 32 & 33	Assessments and Corrective Action (removed, refer to Final UFP-QAPP)	2.4 2.5.5	Assessments and Data Review Reports to Management
34	Data Verification and Validation Inputs (removed, refer to Final UFP-QAPP)	2.5.1	Data Verification and Validation Targets and Methods
35	Data Verification Procedures	2.5.1	Data Verification and Validation Targets and Methods
36	Data Validation Procedures	2.5.1	Data Verification and Validation Targets and Methods
37	Usability Assessment	2.5.2 2.5.3 2.5.4	Quantitative and Qualitative Evaluations of Usability Potential Limitations on Data Interpretation Reconciliation with Project Requirements

Worksheets #1 & 2: Title and Approval Page

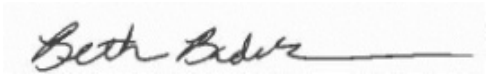
(EPA UFP-QAPP Guidance Manual, Section 2.1; Environmental Protection Agency (EPA) Guidance 2106-G-05 Section 2.2.1)

1.1 PROJECT IDENTIFYING INFORMATION

Site Name / Project Name:	Seneca Army Depot Activity / Remedial Action
Site Location / No.:	Romulus, NY, EPA Site ID# NY0213820830, NY Site ID# 8-50-006
Contract / TO No.:	W912DY-09-D-0062 / Task Order 0023

1.2 CONCURRING SIGNATURES

The below signatures indicate the representatives of the subject organizations have reviewed this UFP-QAPP and concur with its implementation as written.

Lead Organization / Contracting Officer Representative		
	Charles Heaton, U.S. Army Corps of Engineers (USACE), Huntsville - Ordnance and Explosives Design Center (CEHNC-OED) Point of Contract/ Contracting Officer Representative (COR) Project Manager	Date
Lead Organization / Project Manager		
	James T. Moore, USACE New York District (CENAN)	Date
Contractor Project Manager		4/15/20
	Beth Badik, Parsons Project Manager	Date
Federal Regulatory Agency		
	Bob Morse, United States Environmental Protection Agency (USEPA) Regional Project Manager	Date
State Regulatory Agency		
	Melissa Sweet, New York State Department of Environmental Conservation (NYSDEC) Project Manager	Date
Contractor Quality Assurance		4/15/20
	Beth Driskill, Parsons Quality Manager	Date

1.3 QAPP IDENTIFYING INFORMATION

Guidance Used:	Uniform Federal Policy for Quality Assurance Project Plans, Optimized UFP-QAPP Worksheets (IDQTF, 2012); EPA QA/G-5 (EPA, 2002); and EM 200-1-15
Regulatory Program:	Base Realignment and Closure (BRAC), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
Approval Entity:	US Army Engineering and Support Center, Huntsville
Data Users:	U.S. Army, USEPA, NYSDEC
QAPP Type:	Optimized UFP-QAPP
Scoping Sessions	See **Worksheet #9**
Previous UFP-QAPPs:	Final UFP-QAPP, Seneca Army Depot Activity, Romulus, New York (Parsons, 2017) Addendum 1 to the Final UFP-QAPP, Seneca Army Depot Activity (Parsons, 2018) This addendum supersedes the previously submitted Addendum 2.

Worksheets #4, 7, & 8: Personnel Qualifications and Sign-Off Sheet

(EPA UFP-QAPP Guidance Manual, Section 2.4.3, EPA Guidance QA/G-5, Section 2.1.8)

4.1 KEY PROJECT PERSONNEL

PROJECT TITLE/ROLE	NAME/ ORGANIZATION	CONTACT INFORMATION (TELEPHONE/E-MAIL)	EXPERIENCE	SPECIALIZED TRAINING/ CERTIFICATIONS	SIGNATURE/DATE (1)
USACE Contracting Officer Representative (COR)	Charles Heaton USACE, Huntsville - Ordnance and Explosives Design Center (CEHNC-OED)	256-895-1657 Charles.H.Heaton@usace.army.mil	n/a	n/a	*Signature on Worksheets #1 & 2*
USACE Project Manager (PM)	James T Moore CENAN	917-790-8230 James.T.Moore@usace.army.mil	n/a	n/a	*Signature on Worksheets #1 & 2*
Contractor PM	Beth Badik Parsons	617-449-1565 beth.badik@parsons.com	Over 10 years of experience as PM conducting environmental investigations	Bachelor of Science (B.S.), Chemical Engineering, 2001	*Signature on Worksheets #1 & 2*
Federal Regulator	Bob Morse USEPA Region 2	212-637-4331 Morse.Bob @epa.gov	n/a	n/a	*Signature on Worksheets #1 & 2*
State Regulator	Melissa Sweet NYSDEC	518-402-9614 melissa.sweet@dec.ny.gov	n/a	n/a	*Signature on Worksheets #1 & 2*
Data Validator	Maryanne Kosciewicz	315- 552-9703 Maryanne.Kosciewicz@parsons.com	QA officer and project chemist with more than 26 years' experience with various hydrogeologic and remedial investigations. Member of American Chemical Society	B.S. Mathematics B.S. Chemistry	n/a

4.2 OTHER PROJECT PERSONNEL

PROJECT TITLE/ROLE	NAME/ ORGANIZATION	CONTACT INFORMATION (TELEPHONE/E-MAIL)	EXPERIENCE	SPECIALIZED TRAINING/ CERTIFICATIONS (1)	RECEIVES COPY OF QAPP
Analytical Laboratory Project Manager	Janice Jaeger ALS Rochester, NY	585-672-7472 Janice.jaeger@alsglobal.com	31 years of analytical laboratory and chemistry-related experience	B.S, Pre-Veterinary Medicine Minor Chemistry	Yes
Analytical Laboratory QA Officer	Vicky Collom ALS- Rochester, NY	585-672-7474 Vicky.collom@alsglobal.com	22 years of analytical laboratory and chemistry-related experience	B.S, Environmental Science	Yes

PROJECT TITLE/ROLE	NAME/ ORGANIZATION	CONTACT INFORMATION (TELEPHONE/E-MAIL)	EXPERIENCE	SPECIALIZED TRAINING/ CERTIFICATIONS (1)	RECEIVES COPY OF QAPP
Analytical Laboratory Project Manager	Heather Manz Katahdin Analytical Services	207-874-2400x17 hmanzjobrin@katahdinlab.com	15 years of analytical laboratory and chemistry-related experience with Katahdin	B.S. Ocean Studies, 1999	Yes
Analytical Laboratory QA Officer	Leslie Dimond Katahdin Analytical Services	207-874-2400 ext. 20 ldimond@katahdinlab.com	22 years of analytical laboratory and chemistry-related experience with Katahdin	B.A., Chemistry	Yes

Worksheet #10: Conceptual Site Model

(EPA UFP-QAPP Guidance Manual, Section 2.5.2, EPA Guidance 2106-G-05 Section 2.2.5)

10.1 OVERVIEW

The primary objectives of the investigation activities are as follows:

- Assess the potential presence of chemicals of potential concern (COPCs) in shallow overburden and deeper bedrock groundwater in the immediate vicinity of previously identified potential source areas.
- Investigate groundwater flow directions and flow rates in the vicinity of the OD Grounds.
- Evaluate background metals concentrations in shallow overburden and deeper bedrock groundwater at locations up and cross gradient from the OD Grounds.
- Investigate surface water and sediment quality in the vicinity of the OD Grounds.

Section 2 of the Work Plan for the OD Grounds Groundwater Sampling includes a description of the site history, geology, hydrogeology at the OD Grounds.

Worksheet #11: Data Quality Objectives

(EPA UFP-QAPP Guidance Manual, Section 2.6.1; EPA Guidance QA/G-5, Section 2.1.7)

DQOs are qualitative and quantitative statements that specify the quality and level of data required to support the decision-making processes for a project. Guidance for DQO development is contained in *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA QA/G-4), February 2006, EPA/240/B-06/001.

Specific DQOs for the site are outlined in **Table 11.1**. These DQOs follow the USEPA's seven-step, iterative process for DQO development. In addition to these DQOs all data collected during this project are required to attain the MPCs described on **Worksheet #12** to be considered adequate to support environmental decisions, unless sufficient alternative justification is provided to and accepted by the project team. Before final environmental decisions are made, data will be verified and validated as described in **Worksheets #34** through **#37**.

Table 11.1 - Data Quality Objectives and Technical Approach Summary for Emerging Contaminant Sampling at SEDA

SITE	STATE THE PROBLEM	IDENTIFY THE GOAL OF THE STUDY	IDENTIFY INFORMATION INPUTS	DEFINE THE BOUNDARIES OF THE STUDY	DEVELOP THE ANALYTIC APPROACH	SPECIFY PERFORMANCE OR ACCEPTANCE CRITERIA (SEE WORKSHEET #17)	DEVELOP THE DETAILED PLAN FOR OBTAINING DATA (SEE WORKSHEET #17)
OD Grounds	• Previous studies within the OD ground have indicated the potential presence of COPCs at the site and the project team, through coordination with the NYSDEC and USEPA, has identified data gaps requiring further investigation.	• Assess the potential presence of COPCs in shallow overburden and deeper bedrock groundwater in the immediate vicinity of previously identified potential source areas. • Investigate groundwater flow directions and flow rates in the vicinity of the OD Grounds. • Evaluate background concentrations in shallow overburden and deeper bedrock groundwater at locations up and cross gradient from the OD Grounds. • Investigate surface water and sediment quality in the vicinity of the OD Grounds	• Analytical groundwater, surface water, and sediment data (VOCs, SVOCs, metals, explosives, perchlorate, total and dissolved phosphorus, and orthophosphate)	• The investigation will be in the groundwater, surface water, and sediment with potential to be impacted by OD Grounds activities. • Background samples will also be included in the study.	• Collect and analyze groundwater, surface water, and sediment samples and review concentrations of VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P compared to Project Action Limits (Worksheet #15).	• NYSDEC Ambient Water Quality Standards and EPA Regional Screening Levels (RSLs) (See Table 15.2 and 15.3) are for reference • Comparison to surface water/sediment upgradient and downgradient concentrations to evaluate potential impact from OD Grounds. • Comparison to groundwater background sample concentrations to evaluate potential impact from OD Grounds.	• Collect samples from groundwater, surface water, and sediment near the OD Grounds, as described in the Work Plan for the OD Grounds Groundwater Sampling.

Worksheet #12: Measurement Performance Criteria

(EPA UFP-QAPP Guidance Manual, Section 2.6.2; EPA Guidance QA/G-5, Section 2.1.7)

The tables below summarize the MPCs that have been established for the groundwater, surface water, and sediment sampling tasks to be conducted under this task order (TO). The quality of the sampling procedures and laboratory results will be evaluated for compliance with DQOs through a review in accordance with the procedures described in **Worksheet #37**. Data validation is conducted in accordance with the QAPP, DoD General Data Validation Guidelines (EDQW 2019), and the USEPA Region 2 SOPs for organic and inorganic data review. A data usability summary report (DUSR) will be provided upon request to the NYSDEC. Sample collection procedures and analytical methods/SOPs are summarized on **Worksheet #21** and **Worksheet #23**, respectively.

12.1 MEASUREMENT PERFORMANCE CRITERIA FOR VOCS

Laboratory: ALS Rochester
Matrix: Groundwater, Surface Water, and Sediment
Analytical Group or Method: VOC / 8260C
Concentration Level Low

DATA QUALITY INDICATORS	QC SAMPLE OR MEASUREMENT PERFORMANCE ACTIVITY	MEASUREMENT PERFORMANCE CRITERIA
Overall Precision	Field Duplicates	Relative Percent Difference (RPD) ≤ 30% for water matrix and ≤50% for soil matrix when target analytes are detected in both samples with concentrations are ≥ sample specific Limit of Quantitation (LOQ). If one result is > LOQ and the other ND, "J" flag the detected result and "UJ" the non-detect (ND) result. If one result is >LOQ and the other result is <LOQ, "J" flag will be applied to the result >LOQ
Analytical Precision (laboratory)	Laboratory Control Sample Duplicates	RPD ≤ 20%
Analytical Accuracy/Bias (laboratory)	Laboratory Control Samples	Within DoD QSM Version 5.3 Appendix C Table C-23 limits for solid matrix and Table C-24 limits for water matrix (See WS 28 Table 28.1b and 28.1c).
Analytical Accuracy/Bias (matrix interference)	Matrix Spikes	Within DoD QSM Version 5.3 Appendix C Table C-23 limits for solid matrix and Table C-24 limits for water matrix (See WS 28 Table 28.1b and 28.1c).
Analytical Precision/Bias (matrix interference)	Matrix Spike Duplicate	RPD ≤ 20%
Overall accuracy/bias (contamination)	Method Blank	No target analyte concentrations ≥ 1/2 LOQ or >1/10th the amount measured in any sample or 1/10th the regulatory limit, whichever is greater
Overall accuracy/bias (contamination)	Equipment Blanks/Trip Blanks	No target analyte concentrations ≥ 1/2 LOQ
Completeness	>90% sample collection, >90% laboratory analysis	Data Completeness Check

12.2 MEASUREMENT PERFORMANCE CRITERIA FOR SVOCS

Laboratory: ALS Rochester
Matrix: Groundwater, Surface Water, and Sediment
Analytical Group or Method: SVOC / 8270D
Concentration Level Low

DATA QUALITY INDICATORS	QC SAMPLE OR MEASUREMENT PERFORMANCE ACTIVITY	MEASUREMENT PERFORMANCE CRITERIA
Overall Precision	Field Duplicates	RPD ≤ 30% for water matrix and ≤50% for soil matrix when target analytes are detected in both samples with concentrations are ≥ sample specific LOQ. If one result is > LOQ and the other ND, "J" flag the detected result and "UJ" the ND result. If one result is >LOQ and the other result is <LOQ, "J" flag will be applied to the result >LOQ
Analytical Precision (laboratory)	Laboratory Control Sample Duplicates	RPD ≤ 20%
Analytical Accuracy/Bias (laboratory)	Laboratory Control Samples	Within DoD QSM Version 5.3 Appendix C Table C-25 limits for solid matrix and Table C-26 limits for water matrix. (See WS 28 Table 28.2b and 28.2c)
Analytical Accuracy/Bias (matrix interference)	Matrix Spikes	Within DoD QSM Version 5.3 Appendix C Table C-25 limits for solid matrix and Table C-26 limits for water matrix. (See WS 28 Table 28.2b and 28.2c)
Analytical Accuracy/Bias (matrix interference)	Matrix Spike Duplicates	RPD ≤ 20%
Overall accuracy/bias (contamination)	Method Blank	No target analyte concentrations ≥ 1/2 LOQ or >1/10th the amount measured in any sample or 1/10th the regulatory limit, whichever is greater
Overall accuracy/bias (contamination)	Equipment Blanks	No target analyte concentrations ≥ 1/2 LOQ
Completeness	>90% sample collection, >90% laboratory analysis	Data Completeness Check

12.3 MEASUREMENT PERFORMANCE CRITERIA FOR METALS: ANTIMONY, ARSENIC, BERYLLIUM, CADMIUM, LEAD, SELENIUM, AND THALLIUM

Laboratory: ALS Rochester
Matrix: Groundwater and Surface Water
Analytical Group or Method: Sb, As, Be, Cd, Pb, Se, Tl / 6020A
Concentration Level Low

DATA QUALITY INDICATORS	QC SAMPLE OR MEASUREMENT PERFORMANCE ACTIVITY	MEASUREMENT PERFORMANCE CRITERIA
Overall Precision	Field Duplicates	RPD ≤ 30% for water matrix and ≤50% when the target metals are detected in both samples ≥ sample-specific LOQ. If one result is > LOQ and the other ND, "J" flag the detected result and "UJ" the ND result. If one result is >LOQ and the other result is <LOQ, "J" flag will be applied to the result >LOQ
Analytical Precision (laboratory)	Laboratory Control Sample Duplicates	RPD ≤ 20%
Analytical Accuracy/Bias (laboratory)	Laboratory Control Samples	Within DoD QSM Version 5.3 Appendix C Table C 6 limits for water matrix (See WS 28 Table 28.4b)
Analytical Accuracy/Bias (matrix interference)	Matrix Spikes	Within DoD QSM Version 5.3 Appendix C Table C 6 limits for water matrix (See WS 28 Table 28.4b)
Analytical Accuracy/Bias (matrix interference)	Matrix Spike Duplicates	RPD ≤ 20%
Overall accuracy/bias (contamination)	Method Blank	The absolute values of all analytes must be < ½ LOQ or < 1/10th the amount measured in any sample or 1/10th the regulatory limit, whichever is greater
Overall accuracy/bias (contamination)	Equipment Blanks	No target analyte concentrations ≥ 1/2 LOQ
Completeness	>90% sample collection, >90% laboratory analysis	Data Completeness Check

12.4 MEASUREMENT PERFORMANCE CRITERIA FOR TARGET ANALYTE LIST (TAL) METALS (EXCLUDING MERCURY)

Laboratory: ALS Rochester
Matrix: Groundwater, Surface Water, and Sediment
Analytical Group or Method: Al, Ba, Ca, Cr, Co, Cu, Fe, Mg, Mn, Ni, K, Ag, Na, V, Zn/ 6010C
Concentration Level Low

DATA QUALITY INDICATORS	QC SAMPLE OR MEASUREMENT PERFORMANCE ACTIVITY	MEASUREMENT PERFORMANCE CRITERIA
Overall Precision	Field Duplicates	RPD ≤ 30% for water matrix and ≤50% for soil matrix when the target metals are detected in both samples ≥ sample-specific LOQ. If one result is > LOQ and the other ND, "J" flag the detected result and "UJ" the ND result. If one result is >LOQ and the other result is <LOQ, "J" flag will be applied to the result >LOQ
Analytical Precision (laboratory)	Laboratory Control Sample Duplicates	RPD ≤ 20%
Analytical Accuracy/Bias (laboratory)	Laboratory Control Samples	Within DoD QSM Version 5.3 Appendix C Table C 3 limits for solid matrix and Table C-4 limits for water matrix (See WS 28 Table 28.3b and 28.3c)
Analytical Accuracy/Bias (matrix interference)	Matrix Spikes	Within DoD QSM Version 5.3 Appendix C Table C 3 limits for solid matrix and Table C-4 limits for water matrix (See WS 28 Table 28.3b and 28.3c)
Analytical Accuracy/Bias (matrix interference)	Matrix Spike Duplicates	RPD ≤ 20%
Overall accuracy/bias (contamination)	Method Blank	The absolute values of all analytes must be < ½ LOQ or < 1/10th the amount measured in any sample or 1/10th the regulatory limit, whichever is greater
Overall accuracy/bias (contamination)	Equipment Blanks	No target analyte concentrations ≥ 1/2 LOQ
Completeness	>90% sample collection, >90% laboratory analysis	Data Completeness Check

12.5 MEASUREMENT PERFORMANCE CRITERIA FOR MERCURY

Laboratory: ALS Rochester
Matrix: Groundwater, Surface Water, and Sediment
Analytical Group or Method: Mercury / 7470A
Concentration Level Low

DATA QUALITY INDICATORS	QC SAMPLE OR MEASUREMENT PERFORMANCE ACTIVITY	MEASUREMENT PERFORMANCE CRITERIA
Overall Precision	Field Duplicates	RPD ≤ 30% for water matrix and ≤50% for soil matrix when mercury is detected in both samples ≥ sample-specific LOQ. If one result is > LOQ and the other ND, "J" flag the detected result and "UJ" the ND result. If one result is >LOQ and the other result is <LOQ, "J" flag will be applied to the result >LOQ
Analytical Precision (laboratory)	Laboratory Control Sample Duplicates	RPD ≤ 20%
Analytical Accuracy/Bias (laboratory)	Laboratory Control Samples	Within DoD QSM Version 5.3 Appendix C Table C-11 limits for solid matrix and Table C-12 limits for water matrix (See WS 28)
Analytical Accuracy/Bias (matrix interference)	Matrix Spikes	Within DoD QSM Version 5.3 Appendix C Table C-11 limits for solid matrix and Table C-12 limits for water matrix (See WS 28)
Analytical Accuracy/Bias (matrix interference)	Matrix Spike Duplicates	RPD ≤ 20%
Overall accuracy/bias (contamination)	Method Blank	The absolute values of all analytes must be < ½ LOQ or < 1/10th the amount measured in any sample or 1/10th the regulatory limit, whichever is greater.
Overall accuracy/bias (contamination)	Equipment Blanks	No mercury concentrations ≥ 1/2 LOQ
Completeness	>90% sample collection, >90% laboratory analysis	Data Completeness Check

12.6 MEASUREMENT PERFORMANCE CRITERIA FOR EXPLOSIVES

Laboratory: ALS Middletown
Matrix: Groundwater, Surface Water, and Sediment
Analytical Group or Method: Explosives / 8330B
Concentration Level Low

DATA QUALITY INDICATORS	QC SAMPLE OR MEASUREMENT PERFORMANCE ACTIVITY	MEASUREMENT PERFORMANCE CRITERIA
Overall Precision	Field Duplicates	RPD ≤ 30% for water matrix and ≤50% for soil matrix when target analytes are detected in both samples with concentrations ≥ sample specific LOQ. If one result is > LOQ and the other ND, "J" flag the detected result and "UJ" the ND result. If one result is >LOQ and the other result is <LOQ, "J" flag will be applied to the result >LOQ
Analytical Precision (laboratory)	Laboratory Control Sample Duplicates	RPD ≤ 20%
Analytical Accuracy/Bias (laboratory)	Laboratory Control Samples	Within DoD QSM Version 5.3 Appendix C Table C-36 limits for water matrix and Table C-37 limits for soil matrix (See WS 28 Table 28.8b and 28.8c)
Analytical Accuracy/Bias (matrix interference)	Matrix Spikes	Within DoD QSM Version 5.3 Appendix C Table C-36 limits for water matrix and Table C-37 limits for soil matrix (See WS 28 Table 28.8b and 28.8c)
Analytical Accuracy/Bias (matrix interference)	Matrix Spike Duplicates	RPD ≤ 20%
Overall accuracy/bias (contamination)	Method Blank	No target analyte concentrations ≥ 1/2 LOQ or >1/10th the amount measured in any sample or 1/10th the regulatory limit, whichever is greater
Overall accuracy/bias (contamination)	Equipment Blanks/Trip Blanks	No target analyte concentrations ≥ 1/2 LOQ
Completeness	>90% sample collection, >90% laboratory analysis	Data Completeness Check

12.7 MEASUREMENT PERFORMANCE CRITERIA FOR PERCHLORATE

Laboratory: ALS Houston
Matrix: Groundwater, Surface Water, and Sediment
Analytical Group or Method: Perchlorate / 6850
Concentration Level Low

DATA QUALITY INDICATORS	QC SAMPLE OR MEASUREMENT PERFORMANCE ACTIVITY	MEASUREMENT PERFORMANCE CRITERIA
Overall Precision	Field Duplicates	RPD ≤ 30% for water matrix and ≤50% for soil matrix when target analytes are detected in both samples with concentrations ≥ sample specific LOQ. If one result is > LOQ and the other ND, "J" flag the detected result and "UJ" the ND result. If one result is >LOQ and the other result is <LOQ, "J" flag will be applied to the result >LOQ.
Analytical Precision (laboratory)	Laboratory Control Sample Duplicates	RPD ≤ 15%
Analytical Accuracy/Bias (laboratory)	Laboratory Control Samples	Within DoD QSM Version 5.3 Appendix C Table C-7 limits for soil matrix and Table C-8 limits for water matrix (See WS 28)
Analytical Accuracy/Bias (matrix interference)	Matrix Spikes	Within DoD QSM Version 5.3 Appendix C Table C-7 limits for soil matrix and Table C-8 limits for water matrix (See WS 28)
Analytical Accuracy/Bias (matrix interference)	Matrix Spike Duplicates	RPD ≤ 15%
Overall accuracy/bias (contamination)	Method Blank	No target analyte concentrations ≥ 1/2 LOQ or >1/10th the amount measured in any sample or 1/10th the regulatory limit, whichever is greater
Overall accuracy/bias (contamination)	Equipment Blanks/Trip Blanks	No target analyte concentrations ≥ 1/2 LOQ
Completeness	>90% sample collection, >90% laboratory analysis	Data Completeness Check

12.8 MEASUREMENT PERFORMANCE CRITERIA FOR ORTHOPHOSPHATE AS P

Laboratory: ALS Rochester
Matrix: Groundwater and Surface Water
Analytical Group or Method: Orthophosphate as P / EPA 365.1
Concentration Level Low

DATA QUALITY INDICATORS	QC SAMPLE OR MEASUREMENT PERFORMANCE ACTIVITY	MEASUREMENT PERFORMANCE CRITERIA
Overall Precision	Field Duplicates	RPD ≤30% for water matrix when target analytes are detected in both samples with concentrations ≥ sample specific LOQ. If one result is > LOQ and the other ND, "J" flag the detected result and "UJ" the ND result. If one result is >LOQ and the other result is <LOQ, "J" flag will be applied to the result >LOQ
Analytical Precision (laboratory)	Laboratory Duplicates	RPD ≤ 20%
Analytical Accuracy/Bias (laboratory)	Laboratory Control Samples	90-110%
Analytical Accuracy/Bias (matrix interference)	Matrix Spikes	90-110%
Analytical Accuracy/Bias (matrix interference)	Matrix Spike Duplicates	RPD ≤ 20%
Overall accuracy/bias (contamination)	Method Blanks	No analytes detected >1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit, whichever is greater
Completeness	>90% sample collection, >90% laboratory analysis	Data Completeness Check

12.9 MEASUREMENT PERFORMANCE CRITERIA FOR ORTHOPHOSPHATE AS P

Laboratory: ALS Houston
Matrix: Sediment
Analytical Group or Method: Orthophosphate as P / 9056A
Concentration Level Low

DATA QUALITY INDICATORS	QC SAMPLE OR MEASUREMENT PERFORMANCE ACTIVITY	MEASUREMENT PERFORMANCE CRITERIA
Overall Precision	Field Duplicates	RPD ≤50% for solid matrix when target analytes are detected in both samples with concentrations ≥ sample specific LOQ. If one result is > LOQ and the other ND, "J" flag the detected result and "UJ" the ND result. If one result is >LOQ and the other result is <LOQ, "J" flag will be applied to the result >LOQ
Analytical Precision (laboratory)	Laboratory Duplicates	RPD ≤ 20%
Analytical Accuracy/Bias (laboratory)	Laboratory Control Samples	90-110%
Analytical Accuracy/Bias (matrix interference)	Matrix Spikes	80-120%
Analytical Accuracy/Bias (matrix interference)	Matrix Spike Duplicates	RPD ≤ 20%
Overall accuracy/bias (contamination)	Method Blanks	No analytes detected >1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit, whichever is greater
Completeness	>90% sample collection, >90% laboratory analysis	Data Completeness Check

12.10 MEASUREMENT PERFORMANCE CRITERIA FOR TOTAL PHOSPHORUS

Laboratory: ALS Rochester
Matrix: Sediment
Analytical Group or Method: Total Phosphorus / EPA 365.3
Concentration Level Low

DATA QUALITY INDICATORS	QC SAMPLE OR MEASUREMENT PERFORMANCE ACTIVITY	MEASUREMENT PERFORMANCE CRITERIA
Overall Precision	Field Duplicates	RPD ≤50% for solid matrix when target analytes are detected in both samples with concentrations ≥ sample specific LOQ. If one result is > LOQ and the other ND, "J" flag the detected result and "UJ" the ND result. If one result is >LOQ and the other result is <LOQ, "J" flag will be applied to the result >LOQ
Analytical Precision (laboratory)	Laboratory Duplicates	RPD ≤ 20%
Analytical Accuracy/Bias (laboratory)	Laboratory Control Samples	75-135%
Analytical Accuracy/Bias (matrix interference)	Matrix Spikes	75-135%
Analytical Accuracy/Bias (matrix interference)	Matrix Spike Duplicates	RPD ≤ 20%
Overall accuracy/bias (contamination)	Method Blanks	No target analyte concentrations ≥ LOQ
Completeness	>90% sample collection, >90% laboratory analysis	Data Completeness Check

12.11 MEASUREMENT PERFORMANCE CRITERIA FOR TOTAL AND DISSOLVED PHOSPHORUS

Laboratory: Katahdin
Matrix: Groundwater and Surface Water
Analytical Group or Method: Dissolved and Total Phosphorus / EPA 365.2
Concentration Level Low

DATA QUALITY INDICATORS	QC SAMPLE OR MEASUREMENT PERFORMANCE ACTIVITY	MEASUREMENT PERFORMANCE CRITERIA
Overall Precision	Field Duplicates	RPD ≤ 30% when detected in both samples with concentrations are ≥ sample specific LOQ. If one result is > LOQ and the other ND, "J" flag the detected result and "UJ" the ND result. If one result is >LOQ and the other result is <LOQ, "J" flag will be applied to the result >LOQ.
Analytical Precision (laboratory)	Laboratory Duplicates	RPD ≤ 20%
Analytical Accuracy/Bias (laboratory)	Laboratory Control Samples	80-120%.
Analytical Accuracy/Bias (matrix interference)	Matrix Spike	75-125%
Analytical Accuracy/Bias (matrix interference)	Matrix Spike Duplicates	RPD ≤ 20%
Overall accuracy/bias (contamination)	Method Blanks	No target analyte concentrations ≥ 1/2 LOQ or >1/10th the amount measured in any sample or 1/10th the regulatory limit, whichever is greater
Completeness	>90% sample collection, >90% laboratory analysis	Data Completeness Check

Worksheets #14 & 16: Project Tasks and Schedule

(EPA UFP-QAPP Guidance Manual, Section 2.8.2, EPA Guidance QA/G-5, Section 2.1.4)

The additional activities to be conducted at Seneca Army Depot Activity to achieve the project DQOs (**Worksheet #11**) comprise of one primary component: to obtain analytical data to monitor the concentration of potential COPCs in groundwater, surface water, and sediment at the OD Grounds. Multiple elements, or "DFWs," are required to achieve the project goals. Table 14.1 provides a summary of these DFWs and the associated component tasks. A detailed discussion of the primary project component at each site and the related DFWs is included on **Worksheet #17**, and the specific field procedures to be used for the activities described in this summary are included in the various SOPs appended to this UFP-QAPP. The task schedule for sampling preformed under this addendum is provided in Section 3.8 of the Work Plan for the OD Grounds Groundwater Sampling.

Table 14.1 - Project Tasks

DEFINABLE FEATURE OF WORK (ACTIVITY)	ASSOCIATED TASKS	RELATED SOPS
Mobilization	• Preparation (review plans, make travel arrangements, etc.) • Mobilize equipment and vehicles to the site • Set up site communications • Conduct site-specific training and briefing for required field personnel	--
Site Preparation	• Set up and calibrate sampling equipment • Prepare sample bottles and labels	--
Drilling, Well Installation, and Abandonment	• Drilling • Well Installation • Well Abandonment	• Parsons SOPs (Worksheet #21)
Well Development	• Well Development	• Parsons SOPs (Worksheet #21)
Sampling and Analysis	• Collect and analyze samples • Conduct QC evaluation of analytical data for validation • Document data validation and sample results	• Parsons SOPs (Worksheet #21); • Analytical SOPs (Worksheet #23)
Demobilization	• Upon completion of field activities all personnel, equipment and materials will be removed from the site	--
Reports	• OD Grounds: The results of the sampling will be reported in an analytical results letter report	--

Worksheet #15: Project Action Limits and Laboratory-Specific Detection / Quantitation Limits

(EPA UFP-QAPP Guidance Manual, Section 2.8.1)

This worksheet provides the parameters to be analyzed and their associated limits of quantitation (LOQ), limits of detection (LOD), and detection limits (DL) in order to satisfy the overall DQOs. The Project Action Limits (PALs), as referenced in the DQOs on **Worksheet #11**, are also included. The PALs for this project were selected to use applicable New York State (NYS) criteria where available. If a promulgated NYS value was not available, an EPA source was used as an alternative. References for the criteria used are available in the Table footnotes below.

In some cases, the LOQ is greater than the screening value due to limitations in the analytical method. This is common in some analyses due to sample preparation and analytical limitations. The selected laboratory is using the appropriate analytical method and no approved alternative method has been identified that would achieve lower LOD/LOQs. This could lead to a situation where the analyte is present at a concentration greater than the screening value, but is reported as "not detected or estimated," leading to a potential underestimate of risk. In such a case, detections between the LOQ and LOD are J qualified and addressed as detects, the data will be considered usable for determining nature and extent and all detects will be used for planning purposes. If the sensitivity requirements are not met for a particular analyte, the Parsons Team will evaluate whether the data can still be used for project decisions. The LOD/LOQs are considered sufficient for determining data usability at this site. Any analytes that are not detected in any well at the site will be considered to not be present at the site and used for site-related decisions.

Table 15.1 - Project Action Limits and ALS Rochester Reference Limits for VOCs in Groundwater (Method SW-846 8260C)

ANALYTE	PROJECT ACTION LIMIT (µG/L) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (µG/L)	LOD (µG/L)	DL (µG/L)
1,1,1,2-Tetrachloroethane	5	NYSDEC	5.0	1.0	0.20
1,1,1-Trichloroethane	5	NYSDEC	5.0	1.0	0.20
1,1,2,2-Tetrachloroethane	5	NYSDEC	5.0	1.0	0.20
1,1,2-Trichloroethane	1	NYSDEC	5.0	1.0	0.20
1,1-Dichloroethane	5	NYSDEC	5.0	1.0	0.20
1,1-Dichloroethene	5	NYSDEC	5.0	1.0	0.20
1,1-Dichloropropene	5	NYSDEC	5.0	1.0	0.20
1,2,3-Trichlorobenzene	7	EPA 2019	5.0	1.0	0.25
1,2,3-Trichloropropane	0.04	NYSDEC	5.0	1.0	0.26
1,2,4-Trichlorobenzene	70	EPA 2019	5.0	1.0	0.34
1,2,4-Trimethylbenzene	5	NYSDEC	5.0	1.0	0.20
1,2-Dibromo-3-Chloropropane	0.04	NYSDEC	5.0	1.0	0.45
1,2-Dibromoethane	0.0006	NYSDEC	5.0	1.0	0.20
1,2-Dichlorobenzene	3	NYSDEC	5.0	1.0	0.20
1,2-Dichloroethane	0.6	NYSDEC	5.0	1.0	0.20
1,2-Dichloropropane	1	NYSDEC	5.0	1.0	0.20
1,3,5-Trimethylbenzene	5	NYSDEC	5.0	1.0	0.27
1,3-Dichlorobenzene	3	NYSDEC	5.0	1.0	0.20
1,3-Dichloropropane	5	NYSDEC	5.0	1.0	0.20
1,4-Dichlorobenzene	3	NYSDEC	5.0	1.0	0.20
2,2-Dichloropropane	5	NYSDEC	5.0	1.0	0.24

ANALYTE	PROJECT ACTION LIMIT (µG/L) [1]	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (µG/L)	LOD (µG/L)	DL (µG/L)
2-Butanone (MEK)	5600	EPA 2019	5.0	1.0	0.78
2-Chlorotoluene	5	NYSDEC	5.0	1.0	0.20
2-Hexanone	38	EPA 2019	5.0	1.0	0.20
4-Chlorotoluene	5	NYSDEC	5.0	1.0	0.20
4-Methyl-2-pentanone (MIBK)	6300	EPA 2019	5.0	1.0	0.20
Acetone	14000	EPA 2019	10.0	5.0	2.1
Benzene	1	NYSDEC	5.0	1.0	0.20
Bromobenzene	5	NYSDEC	5.0	1.0	0.20
Bromochloromethane	5	NYSDEC	5.0	1.0	0.20
Bromodichloromethane	80	EPA 2019	5.0	1.0	0.20
Bromoform	80	EPA 2019	5.0	1.0	0.25
Bromomethane	5	NYSDEC	5.0	1.0	0.70
cis-1,2-Dichloroethene	5	NYSDEC	5.0	1.0	0.23
cis-1,3-Dichloropropene (sum of cis- and trans- isomers)	0.4	NYSDEC	5.0	1.0	0.20
Carbon disulfide	60	NYSDEC	5.0	1.0	0.42
Carbon tetrachloride	5	NYSDEC	5.0	1.0	0.34
Chlorobenzene	5	NYSDEC	5.0	1.0	0.20
Chloroethane	5	NYSDEC	5.0	1.0	0.23
Chloroform	7	NYSDEC	5.0	1.0	0.24
Chloromethane	5	NYSDEC	5.0	1.0	0.28
Dibromochloromethane	80	EPA 2019	5.0	1.0	0.20
Dibromomethane	5	NYSDEC	5.0	1.0	0.20
Ethylbenzene	5	NYSDEC	5.0	1.0	0.20
Hexachlorobutadiene	0.5	NYSDEC	5.0	1.0	0.33
Isopropylbenzene	5	NYSDEC	5.0	1.0	0.20
m-, p-Xylenes	5	NYSDEC	10.0	2.0	0.33
Methylene Chloride	5	NYSDEC	5.0	1.0	0.65
MTBE	14	EPA 2019	5.0	1.0	0.20
Naphthalene	0.17	EPA 2019	5.0	1.0	0.24
n-Butylbenzene	5	NYSDEC	5.0	1.0	0.20
o-Xylene	5	NYSDEC	5.0	1.0	0.20
p-Isopropyltoluene	5	NYSDEC	5.0	1.0	0.20
n-Propylbenzene	5	NYSDEC	5.0	1.0	0.20
sec-Butylbenzene	5	NYSDEC	5.0	1.0	0.20
Styrene	5	NYSDEC	5.0	1.0	0.20
trans-1,2-Dichloroethene	5	NYSDEC	5.0	1.0	0.20
trans-1,3-Dichloropropene	NA	NA	5.0	1.0	0.23
tert-Butylbenzene	5	NYSDEC	5.0	1.0	0.20
Tetrachloroethene	5	NYSDEC	5.0	1.0	0.21
Toluene	5	NYSDEC	5.0	1.0	0.20
Trichloroethene	5	NYSDEC	5.0	1.0	0.20
Vinyl chloride	2	NYSDEC	5.0	1.0	0.20

ANALYTE	PROJECT ACTION LIMIT (µG/L) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (µG/L)	LOD (µG/L)	DL (µG/L)
Total Xylenes	10000	EPA 2019	15.0	3.0	0.23

(1) PAL was determined by selecting first the NYS Class GA (6 CRR-NY 703.5), if not available, the EPA Maximum contaminant level (MCL) standard and if both not available the EPA RSL Tap Water (Target Risk[TR]=1E-06, Target Hazard Quotient[THQ]=1).

a. https://govt.westlaw.com/nycrr/Document/I4ed90418cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)
b. https://www.epa.gov/ground-water-and-drinking-water/table-regulated-drinking-water-contaminants
c. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

(2) Gray highlighted values indicate that the value is greater than the PAL.

NA = Not available; µG/l = Micrograms per liter

Table 15.2 - Project Action Limits and ALS Rochester Reference Limits for VOCs in Surface Water (Method SW-846 8260C)

ANALYTE	PROJECT ACTION LIMIT (µG/L) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (µG/L)	LOD (µG/L)	DL (µG/L)
1,1,1,2-Tetrachloroethane	85	EPA 2018, Freshwater (FW) Chronic	5.0	1.0	0.20
1,1,1-Trichloroethane	76	EPA 2018, FW Chronic	5.0	1.0	0.20
1,1,2,2-Tetrachloroethane	200	EPA 2018, FW Chronic	5.0	1.0	0.20
1,1,2-Trichloroethane	730	EPA 2018, FW Chronic	5.0	1.0	0.20
1,1-Dichloroethane	410	EPA 2018, FW Chronic	5.0	1.0	0.20
1,1-Dichloroethene	130	EPA 2018, FW Chronic	5.0	1.0	0.20
1,1-Dichloropropene	NA	NA	5.0	1.0	0.20
1,2,3-Trichlorobenzene	5	NYSDEC(1)	5.0	1.0	0.25
1,2,3-Trichloropropane	0.04	NYSDEC	5.0	1.0	0.26
1,2,4-Trichlorobenzene	5	NYSDEC(1)	5.0	1.0	0.34
1,2,4-Trimethylbenzene	15	EPA 2018, FW Chronic	5.0	1.0	0.20
1,2-Dibromo-3-Chloropropane	NA	NA	5.0	1.0	0.45
1,2-Dibromoethane	NA	NA	5.0	1.0	0.20
1,2-Dichlorobenzene	5	NYSDEC(1)	5.0	1.0	0.20
1,2-Dichloroethane	2000	EPA 2018, FW Chronic	5.0	1.0	0.20
1,2-Dichloropropane	520	EPA 2018, FW Chronic	5.0	1.0	0.20
1,3,5-Trimethylbenzene	26	EPA 2018, FW Chronic	5.0	1.0	0.27
1,3-Dichlorobenzene	5	NYSDEC(1)	5.0	1.0	0.20
1,3-Dichloropropane	NA	NA	5.0	1.0	0.20
1,4-Dichlorobenzene	5	NYSDEC(1)	5.0	1.0	0.20
2,2-Dichloropropane	NA	NA	5.0	1.0	0.24
2-Butanone (MEK)	22000	EPA 2018, FW Chronic	5.0	1.0	0.78
2-Chlorotoluene	5	NYSDEC	5.0	1.0	0.20
2-Hexanone	99	EPA 2018, FW Chronic	5.0	1.0	0.20
4-Chlorotoluene	5	NYSDEC	5.0	1.0	0.20
4-Methyl-2-pentanone (MIBK)	170	EPA 2018, FW Chronic	5.0	1.0	0.20
Acetone	1700	EPA 2018, FW Chronic	10.0	5.0	2.1
Benzene	10	NYSDEC, Human (Fish Consumption) [H(FC)]	5.0	1.0	0.20
Bromobenzene	NA	NA	5.0	1.0	0.20

ANALYTE	PROJECT ACTION LIMIT (µG/L) [1]	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (µG/L)	LOD (µG/L)	DL (µG/L)
Bromochloromethane	5	NYSDEC[3]	5.0	1.0	0.20
Bromodichloromethane	340	EPA 2018, FW Chronic	5.0	1.0	0.20
Bromoform	230	EPA 2018, FW Chronic	5.0	1.0	0.25
Bromomethane	16	EPA 2018, FW Chronic	5.0	1.0	0.70
cis-1,2-Dichloroethene	620	EPA 2018, FW Chronic	5.0	1.0	0.23
cis-1,3-Dichloropropene	1.7	EPA 2018, FW Chronic[4]	5.0	1.0	0.20
Carbon disulfide	15	EPA 2018, FW Chronic	5.0	1.0	0.42
Carbon tetrachloride	77	EPA 2018, FW Chronic	5.0	1.0	0.34
Chlorobenzene	5	NYSDEC[1]	5.0	1.0	0.20
Chloroethane	NA	NA	5.0	1.0	0.23
Chloroform	140	EPA 2018, FW Chronic	5.0	1.0	0.24
Chloromethane	NA	NA	5.0	1.0	0.28
Dibromochloromethane	320	EPA 2018, FW Chronic	5.0	1.0	0.20
Dibromomethane	5	NYSDEC[3]	5.0	1.0	0.20
Ethylbenzene	17	NYSDEC[1]	5.0	1.0	0.20
Hexachlorobutadiene	0.01	NYSDEC[1]	5.0	1.0	0.33
Isopropylbenzene	2.6	NYSDEC[1]	5.0	1.0	0.20
m-, p-Xylenes	65	NYSDEC[1]	10.0	2.0	0.33
Methylene Chloride	200	NYSDEC[1]	5.0	1.0	0.65
MTBE	730	EPA 2018, FW Chronic	5.0	1.0	0.20
Naphthalene	13	NYSDEC[1]	5.0	1.0	0.24
n-Butylbenzene	5	NYSDEC[3]	5.0	1.0	0.20
o-Xylene	65	NYSDEC[1]	5.0	1.0	0.20
p-Isopropyltoluene	16	EPA 2018, FW Chronic	5.0	1.0	0.20
n-Propylbenzene	5	NYSDEC[3]	5.0	1.0	0.20
sec-Butylbenzene	5	NYSDEC[3]	5.0	1.0	0.20
Styrene	32	EPA 2018, FW Chronic	5.0	1.0	0.20
trans-1,2-Dichloroethene	558	EPA 2018, FW Chronic	5.0	1.0	0.20
trans-1,3-Dichloropropene	1.7	EPA 2018, FW Chronic[4]	5.0	1.0	0.23
tert-Butylbenzene	5	NYSDEC[3]	5.0	1.0	0.20
Tetrachloroethene	53	EPA 2018, FW Chronic	5.0	1.0	0.21

ANALYTE	PROJECT ACTION LIMIT (µG/L) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (µG/L)	LOD (µG/L)	DL (µG/L)
Toluene	62	EPA 2018, FW Chronic	5.0	1.0	0.20
Trichloroethene	40	NYSDEC(1), H(FC)	5.0	1.0	0.20
Vinyl chloride	930	EPA 2018, FW Chronic	5.0	1.0	0.20
Total Xylenes	27	EPA 2018, FW Chronic	15.0	3.0	0.23

(1) PAL was determined by selecting the lower of NYS 6 CRR-NY 703.5 Class C, Aquatic (Chronic) and Human (Fish Consumption) water quality standards and, if not available, the EPA Region 4 Surface Water Screening Values [Freshwater Screening Values; Chronic].

a. https://govt.westlaw.com/nycrr/Document/I4ed90418cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)&bhcp=1

b. https://www.epa.gov/sites/production/files/2018-03/documents/era_regional_supplemental_guidance_report-march-2018_update.pdf

(2) Gray highlighted values indicate that the value is greater than the PAL.

(3) NYSDEC A(C). H(FC) and EPA values not available. NYSDEC H(WS) value used for comparison only.

(4) Value applicable to 1,3-Dichloropropene (cis and trans) combined.

NA = Not available

Table 15.3 - Project Action Limits and ALS Rochester Reference Limits for VOCs in Sediment (Method SW-846 8260C)

ANALYTE	PROJECT ACTION LIMIT (µG/KG) [1]	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (µG/KG)	LOD (µG/KG)	DL (µG/KG)
1,1,1,2-Tetrachloroethane	2,000	EPA 2019	5.0	2.5	0.20
1,1,1-Trichloroethane	680	NYSDEC	5.0	2.5	0.20
1,1,2,2-Tetrachloroethane	600	EPA 2019	5.0	2.5	0.20
1,1,2-Trichloroethane	1,100	EPA 2019	5.0	2.5	0.20
1,1-Dichloroethane	270	NYSDEC	5.0	2.5	0.20
1,1-Dichloroethene	330	NYSDEC	5.0	2.5	0.29
1,1-Dichloropropene	NA	NA	5.0	2.5	0.20
1,2,3-Trichlorobenzene	63,000	EPA 2019	5.0	2.5	0.52
1,2,3-Trichloropropane	5.1	EPA 2019	5.0	2.5	0.20
1,2,4-Trichlorobenzene	24,000	EPA 2019	5.0	2.5	0.42
1,2,4-Trimethylbenzene	3,600	NYSDEC	5.0	2.5	0.20
1,2-Dibromo-3-Chloropropane	5.3	EPA 2019	5.0	2.5	0.29
1,2-Dibromoethane	36	EPA 2019	5.0	2.5	0.20
1,2-Dichlorobenzene	1,100	NYSDEC	5.0	2.5	0.20
1,2-Dichloroethane	20	NYSDEC	5.0	2.5	0.20
1,2-Dichloropropane	2,500	EPA 2019	5.0	2.5	0.20
1,3,5-Trimethylbenzene	8,400	NYSDEC	5.0	2.5	0.31
1,3-Dichlorobenzene	2,400	NYSDEC	5.0	2.5	0.20
1,3-Dichloropropane	1,600,000	EPA 2019	5.0	2.5	0.20
1,4-Dichlorobenzene	1,800	NYSDEC	5.0	2.5	0.22
2,2-Dichloropropane	NA	NA	5.0	2.5	0.20
2-Butanone (MEK)	120	NYSDEC	5.0	2.5	2.0
2-Chlorotoluene	1,600,000	EPA 2019	5.0	2.5	0.20
2-Hexanone	200,000	EPA 2019	5.0	2.5	0.36
4-Chlorotoluene	1,600,000	EPA 2019	5.0	2.5	0.20
4-Methyl-2-pentanone (MIBK)	33,000,000	EPA 2019	5.0	2.5	0.23
Acetone	50	NYSDEC	20.0	5.0	4.7
Benzene	60	NYSDEC	5.0	2.5	0.20
Bromobenzene	290,000	EPA 2019	5.0	2.5	0.20
Bromochloromethane	150,000	EPA 2019	5.0	2.5	0.20
Bromodichloromethane	290	EPA 2019	5.0	2.5	0.20
Bromoform	19,000	EPA 2019	5.0	2.5	0.50
Bromomethane	6,800	EPA 2019	5.0	2.5	2.1
cis-1,2-Dichloroethene	250	NYSDEC	5.0	2.5	0.20
cis-1,3-Dichloropropene	NA	NA	5.0	2.5	0.20
Carbon disulfide	7.7E+08	EPA 2019	5.0	2.5	0.29
Carbon tetrachloride	760	NYSDEC	5.0	2.5	0.26
Chlorobenzene	1100	NYSDEC	5.0	2.5	0.20
Chloroethane	1.4E+10	EPA 2019	5.0	2.5	0.20
Chloroform	370	NYSDEC	5.0	2.5	0.20
Chloromethane	110,000	EPA 2019	5.0	2.5	1.4

ANALYTE	PROJECT ACTION LIMIT (µG/KG) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (µG/KG)	LOD (µG/KG)	DL (µG/KG)
Dibromochloromethane	8,300	EPA 2019	5.0	2.5	0.20
Dibromomethane	24,000	EPA 2019	5.0	2.5	0.20
Ethylbenzene	1,000	NYSDEC	5.0	2.5	0.20
Hexachlorobutadiene	1,200	EPA 2019	5.0	2.5	0.47
Isopropylbenzene	1,900,000	EPA 2019	5.0	2.5	0.20
m-, p-Xylenes	260	NYSDEC(3)	10.0	5.0	0.37
Methylene Chloride	50	NYSDEC	5.0	3.0	2.8
MTBE	930	NYSDEC	5.0	2.5	0.20
Naphthalene	12,000	NYSDEC	5.0	2.5	0.55
n-Butylbenzene	12,000	NYSDEC	5.0	2.5	0.20
o-Xylene	650,000	EPA 2019	5.0	2.5	0.20
p-Isopropyltoluene	NA	NA	5.0	2.5	0.20
n-Propylbenzene	3,900	NYSDEC	5.0	2.5	0.20
sec-Butylbenzene	11,000	NYSDEC	5.0	2.5	0.20
Styrene	6,000,000	EPA 2019	5.0	2.5	0.20
trans-1,2-Dichloroethene	190	NYSDEC	5.0	2.5	0.20
trans-1,3-Dichloropropene	NA	NA	5.0	2.5	0.20
tert-Butylbenzene	5,900	NYSDEC	5.0	2.5	0.20
Tetrachloroethene	1,300	NYSDEC	5.0	2.5	0.23
Toluene	700	NYSDEC	5.0	2.5	0.20
Trichloroethene	470	NYSDEC	5.0	2.5	0.22
Trichlorofluoromethane	20	NYSDEC	5.0	2.5	0.26
Vinyl chloride	20	NYSDEC	5.0	2.5	0.46
Total Xylenes	260	EPA 2019	15.0	7.5	0.52

(1) PAL was determined by selecting the NYS 6 CRR-NY 375-6.8 (a), Unrestricted Use Soil Cleanup Objectives. If a NYSDEC value was not available, EPA RSL Summary Table (TR=1E-06, HQ=1) November 2019 Resident Soil.
   a. https://semspub.epa.gov/work/HQ/199626.pdf
   b. https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?transitionType=Default&contextData=%28sc.Default%29

(2) Gray highlighted values indicate that the value is greater than the PAL.

(3) Individual isomers not found. NYSDEC value for Xylene (mixed) provided for comparison.

NA = Not available; µG/kg = micrograms per kilogram

Table 15.4 - Project Action Limits and ALS Rochester Reference Limits for SVOCs in Groundwater (Method SW-846 8270D)

ANALYTE	PROJECT ACTION LIMIT (µG/L) [1]	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ [2] (µG/L)	LOD (µG/L)	DL (µG/L)
1,2,4,5-Tetrachlorobenzene	1.7	EPA 2019	10.0	5.0	1.2
1,2,4-Trichlorobenzene	70	EPA 2019	10.0	5.0	1.2
1,2-Dichlorobenzene	600	EPA 2019	10.0	5.0	1.2
1,2-Diphenylhydrazine (Azobenzene)	5	NYSDEC	10.0	5.0	1.4
1,3-Dichlorobenzene	5	NYSDEC	10.0	5.0	1.1
1,4-Dichlorobenzene	2	EPA 2019	10.0	5.0	1.2
1-Methylnaphthalene	1.1	EPA 2019	10.0	5.0	1.5
2,3,4,6-Tetrachlorophenol	240	EPA 2019	10.0	5.0	1.2
2,4,5-Trichlorophenol	1200	EPA 2019	10.0	5.0	1.1
2,4,6-Trichlorophenol	4.1	EPA 2019	10.0	5.0	1.4
2,4-Dichlorophenol	1	NYSDEC	10.0	5.0	1.3
2,4-Dimethylphenol	1	NYSDEC	10.0	5.0	1.4
2,4-Dinitrophenol	1	NYSDEC	50.0	25.0	20.0
2,4-Dinitrotoluene	5	NYSDEC	10.0	5.0	2.4
2,6-Dichlorophenol	NA	NA	10.0	5.0	1.2
2,6-Dinitrotoluene	5	NYSDEC	10.0	5.0	1.4
2-Chloronaphthalene	750	EPA 2019	10.0	5.0	1.4
2-Chlorophenol	91	EPA 2019	10.0	5.0	1.1
2-Methylnaphthalene	36	EPA 2019	10.0	5.0	1.3
2-Methylphenol	930	EPA 2019	10.0	5.0	1.0
2-Nitroaniline	5	NYSDEC	50.0	25.0	1.4
2-Nintrophenol	NA	NA	10.0	5.0	1.5
3,3'-Dichlorobenzidine	5	NYSDEC	10.0	5.0	1.2
3+4-Methylphenol	18	EPA 2019	10.0	10.0	1.2
3-Nitroaniline	5	NYSDEC	50.0	25.0	2.5
4,6-Dinitro-2-Methylphenol	1.5	EPA 2019	50.0	25.0	20.0
4-Bromophenyl-phenylether	NA	NA	10.0	5.0	1.7
4-Chloro-3-Methylphenol	1400	EPA 2019	10.0	5.0	1.1
4-Chloroaniline	5	NYSDEC	10.0	5.0	1.0
4-Chlorophenyl-phenylether	NA	NA	10.0	5.0	1.5
4-Nitroaniline	5	NYSDEC	50.0	25.0	2.7
4-Nitrophenol	NA	NA	50.0	25.0	6.4
Acenaphthene	530	EPA 2019	10.0	5.0	1.4
Acenaphthylene	NA	NA	10.0	5.0	1.4
Acetophenone	1900	EPA 2019	20.0	10.0	1.3
Anthracene	1800	EPA 2019	10.0	5.0	1.3
Atrazine	7.5	NYSDEC	20.0	10.0	2.1
Benzaldehyde	19	EPA 2019	10.0	5.0	3.7
Benzidine	5	NYSDEC	200	50.0	13.0
Benzo(a)anthracene	0.03	EPA 2019	10.0	5.0	1.6

ANALYTE	PROJECT ACTION LIMIT (µG/L) [1]	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ [2] (µG/L)	LOD (µG/L)	DL (µG/L)
Benzo(a)pyrene	0	NYSDEC	10.0	5.0	1.2
Benzo(b)fluoranthene	0.25	EPA 2019	10.0	5.0	1.2
Benzo(g,h,i)perylene	NA	NA	10.0	5.0	1.0
Benzo(k)fluoranthene	2.5	EPA 2019	10.0	5.0	1.3
Benzoic acid	75000	EPA 2019	200	100	55.0
Benzyl alcohol	2000	EPA 2019	10.0	5.0	1.6
Biphenyl	5	NYSDEC	10.0	5.0	1.4
Bis(1-Chloroisopropyl)ether	5	NYSDEC	10.0	5.0	1.4
Bis(-2-Chloroethoxy)methane	5	NYSDEC	10.0	5.0	1.9
Bis(2-Chloroethyl)ether	1	NYSDEC	10.0	5.0	1.3
Bis(2-ethylhexyl)phthalate	5	NYSDEC	20.0	10.0	7.8
Butyl benzyl phthalate	16	EPA 2019	10.0	5.0	1.4
Caprolactam	9900	EPA 2019	10.0	5.0	1.0
Carbazole	NA	NA	10.0	5.0	1.6
Chrysene	25	EPA 2019	10.0	5.0	1.2
Dibenzo(a,h)anthracene	0.025	EPA 2019	10.0	5.0	1.1
Dibenzofuran	7.9	EPA 2019	10.0	5.0	1.4
Diethylphthalate	15000	EPA 2019	10.0	5.0	1.1
Dimethyl phthalate	NA	NA	10.0	5.0	1.3
Di-n-butyl phthalate	50	NYSDEC	10.0	5.0	1.7
Di-n-octyl phthalate	200	EPA 2019	10.0	5.0	3.3
Fluoranthene	800	EPA 2019	10.0	5.0	1.5
Fluorene	290	EPA 2019	10.0	5.0	1.3
Hexachlorobenzene	0.04	NYSDEC	10.0	5.0	1.6
Hexachlorobutadiene	0.5	NYSDEC	10.0	5.0	1.0
Hexachlorocyclopentadiene	5	NYSDEC	10.0	5.0	2.2
Hexachloroethane	5	NYSDEC	10.0	5.0	1.1
Indeno(1,2,3-cd)pyrene	0.25	EPA 2019	10.0	5.0	1.8
Isophorone	78	EPA 2019	10.0	5.0	1.4
Naphthalene	0.17	EPA 2019	10.0	5.0	1.2
Nitrobenzene	0.4	NYSDEC	10.0	5.0	1.5
n-Nitrosodimethylamine	0.00011	EPA 2019	10.0	5.0	1.0
n-Nitroso-di-n-propylamine	0.011	EPA 2019	10.0	5.0	1.2
n-Nitrosodiphenylamine	0.00017	EPA 2019	10.0	5.0	2.7
Pentachlorophenol	1	NYSDEC	50.0	25.0	9.7
Phenanthrene	NA	NA	10.0	5.0	1.4
Phenol	1	NYSDEC	10.0	5.0	1.0
Pyrene	120	EPA 2019	10.0	5.0	1.5

(1) PAL was determined by selecting the NYS Class GA (6 CRR-NY 703.5), if not available, the EPA MCL standard and if both not available the EPA RSL Tap Water (TR=1E-06, THQ=1).

a. https://govt.westlaw.com/nycrr/Document/I4ed90418cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)

b. https://www.epa.gov/ground-water-and-drinking-water/table-regulated-drinking-water-contaminants

c. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

(2) Gray highlighted values indicate that the value is greater than the PAL.

NA = Not available

Table 15.5 - Project Action Limits and ALS Rochester Reference Limits for SVOCs in Surface Water (Method SW-846 8270D)

ANALYTE	PROJECT ACTION LIMIT (µG/L) [1]	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ [2] (µG/L)	LOD (µG/L)	DL (µG/L)
1,2,4,5-Tetrachlorobenzene	8.3	EPA 2018, FW Chronic	10.0	5.0	1.2
1,2,4-Trichlorobenzene	5	NYSDEC	10.0	5.0	1.2
1,2-Dichlorobenzene	5	NYSDEC	10.0	5.0	1.2
1,2-Diphenylhydrazine (Azobenzene)	20	NYSDEC[3]	10.0	5.0	1.4
1,3-Dichlorobenzene	5	NYSDEC	10.0	5.0	1.1
1,4-Dichlorobenzene	5	NYSDEC[4]	10.0	5.0	1.2
1-Methylnaphthalene	6.1	EPA 2018, FW Chronic	10.0	5.0	1.5
2,3,4,6-Tetrachlorophenol	1	EPA 2018, FW Chronic	10.0	5.0	1.2
2,4,5-Trichlorophenol	1.9	EPA 2018, FW Chronic	10.0	5.0	1.1
2,4,6-Trichlorophenol	4.9	EPA 2018, FW Chronic	10.0	5.0	1.4
2,4-Dichlorophenol	1	NYSDEC	10.0	5.0	1.3
2,4-Dimethylphenol	1	NYSDEC	10.0	5.0	1.4
2,4-Dinitrophenol	5	NYSDEC	50.0	25.0	20.0
2,4-Dinitrotoluene	44	EPA 2018, FW Chronic	10.0	5.0	2.4
2,6-Dichlorophenol	NA	NA	10.0	5.0	1.2
2,6-Dinitrotoluene	81	EPA 2018, FW Chronic	10.0	5.0	1.4
2-Chloronaphthalene	5	NYSDEC[3]	10.0	5.0	1.4
2-Chlorophenol	18	EPA 2018, FW Chronic	10.0	5.0	1.1
2-Methylnaphthalene	4.7	NYSDEC	10.0	5.0	1.3
2-Methylphenol	67	EPA 2018, FW Chronic	10.0	5.0	1.0
2-Nitroaniline	17	EPA 2018, FW Chronic	50.0	25.0	1.4
2-Nintrophenol	73	EPA 2018, FW Chronic	10.0	5.0	1.5
3,3'-Dichlorobenzidine	4.5	EPA 2018, FW Chronic	10.0	5.0	1.2
3+4-Methylphenol	62/53	EPA 2018, FW Chronic [5]	10.0	10.0	1.2
3-Nitroaniline	5	NYSDEC[3]	50.0	25.0	2.5
4,6-Dinitro-2-Methylphenol	NA	NA	50.0	25.0	20.0
4-Bromophenyl-phenylether	1.5	EPA 2018, FW Chronic	10.0	5.0	1.7
4-Chloro-3-Methylphenol	1	EPA 2018, FW Chronic	10.0	5.0	1.1
4-Chloroaniline	0.8	EPA 2018, FW Chronic	10.0	5.0	1.0
4-Chlorophenyl-phenylether	NA	NA	10.0	5.0	1.5

ANALYTE	PROJECT ACTION LIMIT (µG/L) [1]	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ [2] (µG/L)	LOD (µG/L)	DL (µG/L)
4-Nitroaniline	5	NYSDEC[3]	50.0	25.0	2.7
4-Nitrophenol	58	EPA 2018, FW Chronic	50.0	25.0	6.4
Acenaphthene	5.3	NYSDEC	10.0	5.0	1.4
Acenaphthylene	13	EPA 2018, FW Chronic	10.0	5.0	1.4
Acetophenone	NA	NA	20.0	10.0	1.3
Anthracene	0.02	EPA 2018, FW Chronic	10.0	5.0	1.3
Atrazine	0.03	EPA 2018, FW Chronic	20.0	10.0	2.1
Benzaldehyde	143	EPA 2018, FW Chronic	10.0	5.0	3.7
Benzidine	0.1	NYSDEC	200	50.0	13.0
Benzo(a)anthracene	0.03	NYSDEC	10.0	5.0	1.6
Benzo(a)pyrene	0.06	EPA 2018, FW Chronic	10.0	5.0	1.2
Benzo(b)fluoranthene	0.68	EPA 2018, FW Chronic, Narcotic Mode	10.0	5.0	1.2
Benzo(g,h,i)perylene	0.012	EPA 2018, FW Chronic	10.0	5.0	1.0
Benzo(k)fluoranthene	0.06	EPA 2018, FW Chronic	10.0	5.0	1.3
Benzoic acid	42	EPA 2018, FW Chronic	200	100	55.0
Benzyl alcohol	8.6	EPA 2018, FW Chronic	10.0	5.0	1.6
Biphenyl	6.5	EPA 2018, FW Chronic	10.0	5.0	1.4
Bis(2-Chloroisopropyl)ether	NA	NA	10.0	5.0	1.4
Bis(-2-Chloroethoxy)methane	NA	NA	10.0	5.0	1.9
Bis(2-Chloroethyl)ether	NA	NA	10.0	5.0	1.3
Bis(2-ethylhexyl)phthalate	0.6	NYSDEC	20.0	10.0	7.8
Butyl benzyl phthalate	18	EPA 2018, FW Chronic, Narcotic Mode	10.0	5.0	1.4
Caprolactam	NA	NA	10.0	5.0	1.0
Carbazole	4	EPA 2018, FW Chronic	10.0	5.0	1.6
Chrysene	2	EPA 2018, FW Chronic, Narcotic Mode	10.0	5.0	1.2
Dibenzo(a,h)anthracene	0.012	EPA 2018, FW Chronic	10.0	5.0	1.1
Dibenzofuran	4	EPA 2018, FW Chronic	10.0	5.0	1.4
Diethylphthalate	220	EPA 2018, FW Chronic	10.0	5.0	1.1

ANALYTE	PROJECT ACTION LIMIT (µG/L) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (2) (µG/L)	LOD (µG/L)	DL (µG/L)
Dimethyl phthalate	1100	EPA 2018, FW Chronic	10.0	5.0	1.3
Di-n-butyl phthalate	19	EPA 2018, FW Chronic	10.0	5.0	1.7
Di-n-octyl phthalate	215	EPA 2018, FW Chronic	10.0	5.0	3.3
Fluoranthene	0.8	EPA 2018, FW Chronic	10.0	5.0	1.5
Fluorene	0.54	NYSDEC	10.0	5.0	1.3
Hexachlorobenzene	0.00003	NYSDEC	10.0	5.0	1.6
Hexachlorobutadiene	0.01	NYSDEC	10.0	5.0	1.0
Hexachlorocyclopentadiene	0.45	NYSDEC	10.0	5.0	2.2
Hexachloroethane	0.6	NYSDEC	10.0	5.0	1.1
Indeno(1,2,3-cd)pyrene	0.012	EPA 2018, FW Chronic	10.0	5.0	1.8
Isophorone	920	EPA 2018, FW Chronic	10.0	5.0	1.4
Naphthalene	13	NYSDEC	10.0	5.0	1.2
Nitrobenzene	230	EPA 2018, FW Chronic	10.0	5.0	1.5
n-Nitrosodimethylamine	NA	NA	10.0	5.0	1.0
n-Nitroso-di-n-propylamine	NA	NA	10.0	5.0	1.2
n-Nitrosodiphenylamine	NA	NA	10.0	5.0	2.7
Pentachlorophenol	15	EPA 2018, FW Chronic	50.0	25.0	9.7
Phenanthrene	5	NYSDEC	10.0	5.0	1.4
Phenol	5	NYSDEC	10.0	5.0	1.0
Pyrene	4.6	NYSDEC	10.0	5.0	1.5

(1) PAL was determined by selecting the lower of the NYS 6 CRR-NY 703.5 Class C, Aquatic (Chronic) and Human (Fish Consumption) water quality standards and, if not available, the EPA Region 4 Surface Water Screening Values [Freshwater Screening Values; Chronic].

a. https://govt.westlaw.com/nycrr/Document/I4ed90418cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)&bhcp=1

b. https://www.epa.gov/sites/production/files/2018-03/documents/era_regional_supplemental_guidance_report-march-2018_update.pdf

(2) Gray highlighted values indicate that the value is greater than the PAL.

(3) NYSDEC A(C) and EPA values not available. NYSDEC H(WS) value used for comparison only.

(4) Applies to the sum of 1,2-, 1,3- and 1,4-dichlorobenzene

(5) Individual values for 3-Methylphenol (Cresol, m-) and 4-Methylphenol (Cresol, p-) provided for comparison.

NA = Not available

Table 15.6 - Project Action Limits and ALS Rochester Reference Limits for SVOCs in Sediment (Method SW-846 8270D)

ANALYTE	PROJECT ACTION LIMIT (µG/KG) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (2) (µG/KG)	LOD (µG/KG)	DL (µG/KG)
1,2,4,5-Tetrachlorobenzene	23,000	EPA 2019	670	330	78
1,2,4-Trichlorobenzene	24,000	EPA 2019	330	167	78
1,2-Dichlorobenzene	1,100	NYSDEC	330	167	80
1,2-Diphenylhydrazine (Azobenzene)	5,600	EPA 2019	330	167	120
1,3-Dichlorobenzene	2,400	NYSDEC	330	167	77
1,4-Dichlorobenzene	6,300	EPA 2019	330	167	78
1-Methylnaphthalene(3)	18,000	EPA 2019	330	167	76
2,3,4,6-Tetrachlorophenol	1,900,000	EPA 2019	330	167	69
2,4,5-Trichlorophenol	6,300,000	EPA 2019	670	330	280
2,4,6-Trichlorophenol	49,000	EPA 2019	330	167	58
2,4-Dichlorophenol	190,000	EPA 2019	330	167	70
2,4-Dimethylphenol	190,000	EPA 2019	330	167	72
2,4-Dinitrophenol	130,000	EPA 2019	1700	833	120
2,4-Dinitrotoluene	1,700	EPA 2019	330	167	130
2,6-Dichlorophenol	NA	NA	330	167	58
2,6-Dinitrotoluene	360	EPA 2019	330	167	96
2-Chloronaphthalene	4,800,000	EPA 2019	330	167	79
2-Chlorophenol	390,000	EPA 2019	330	167	81
2-Methylnaphthalene	240,000	EPA 2019	330	167	72
2-Methylphenol	330	NYSDEC	330	167	71
2-Nitroaniline	630,000	EPA 2019	1700	833	98
2-Nintrophenol	NA	NA	330	167	95
3,3'-Dichlorobenzidine	1,200	EPA 2019	330	167	69
3+4-Methylphenol	NA	NA	330	167	63
3-Nitroaniline	NA	NA	1700	833	70
4,6-Dinitro-2-Methylphenol	5,100	EPA 2019	1700	833	140
4-Bromophenyl-phenylether	NA	NA	330	167	120
4-Chloro-3-Methylphenol	6,300,000	EPA 2019	330	167	72
4-Chloroaniline	2,700	EPA 2019	330	167	78
4-Chlorophenyl-phenylether	NA	NA	330	167	79
4-Nitroaniline	27,000	EPA 2019	1700	833	70
4-Nitrophenol	NA	NA	1700	833	110
Acenaphthene	20,000	NYSDEC	330	167	74
Acenaphthylene	100,000	NYSDEC	330	167	87
Acetophenone	7,800,000	EPA 2019	1000	500	75
Anthracene	100,000	NYSDEC	330	167	92
Atrazine	2,400	EPA 2019	667	333	130
Benzaldehyde	170,000	EPA 2019	333	167	65
Benzidine	0.53	EPA 2019	3300	1670	240

ANALYTE	PROJECT ACTION LIMIT (µG/KG) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS LOQ (2) (µG/KG)	LOD (µG/KG)	DL (µG/KG)
Benzo(a)anthracene	1,000	NYSDEC	330	167	97
Benzo(a)pyrene	1,000	NYSDEC	330	167	120
Benzo(b)fluoranthene	1,000	NYSDEC	330	167	110
Benzo(g,h,i)perylene	100,000	NYSDEC	330	167	87
Benzo(k)fluoranthene	800	NYSDEC	330	167	120
Benzoic acid	250,000,000	EPA 2019	1700	833	400
Benzyl alcohol	6,300,000	EPA 2019	667	333	81
Biphenyl	47,000	EPA 2019	330	167	81
Bis(2-Chloroisopropyl)ether	NA	NA	330	167	130
Bis(-2-Chloroethoxy)methane	190,000	EPA 2019	330	167	88
Bis(2-Chloroethyl)ether	230	EPA 2019	330	167	86
Bis(2-ethylhexyl)phthalate	39,000	EPA 2019	1700	833	88
Butyl benzyl phthalate	290,000	EPA 2019	330	167	82
Caprolactam	31,000,000	EPA 2019	330	167	86
Carbazole	NA	NA	330	167	95
Chrysene	1,000	NYSDEC	330	167	120
Dibenzo(a,h)anthracene	330	NYSDEC	330	167	98
Dibenzofuran	7,000	NYSDEC	330	167	65
Diethyl phthalate	51,000,000	EPA 2019	667	330	70
Dimethyl phthalate	NA	NA	330	167	74
Di-n-butyl phthalate	6,300,000	EPA 2019	330	167	100
Di-n-octyl phthalate	630,000	EPA 2019	330	167	97
Fluoranthene	100,000	NYSDEC	330	167	120
Fluorene	30,000	NYSDEC	330	167	76
Hexachlorobenzene	330	NYSDEC	330	167	100
Hexachlorobutadiene	1,200	EPA 2019	330	167	80
Hexachlorocyclopentadiene	1,800	EPA 2019	330	167	72
Hexachloroethane	1,800	EPA 2019	330	167	85
Indeno(1,2,3-cd)pyrene	500	NYSDEC	330	167	110
Isophorone	570,000	EPA 2019	330	167	90
Naphthalene	12,000	NYSDEC	330	167	85
Nitrobenzene	5,100	EPA 2019	330	167	85
n-Nitrosodimethylamine	2.0	EPA 2019	330	167	110
n-Nitroso-di-n-propylamine	78	EPA 2019	330	167	88
n-Nitrosodiphenylamine	0.81	EPA 2019	670	330	220
Pentachlorophenol	800	NYSDEC	1700	833	110
Phenanthrene	100,000	NYSDEC	330	167	96
Phenol	330	NYSDEC	330	167	78
Pyrene	100,000	NYSDEC	330	167	130

(1) PAL was determined by selecting the NYS 6 CRR-NY 375-6.8 (a), Unrestricted Use Soil Cleanup Objectives. If a NYS value was not available, EPA Regional Screening Level (RSL) Summary Table (TR=1E-06, HQ=1) November 2019 Resident Soil.

a. https://semspub.epa.gov/work/HQ/199626.pdf

b. https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?transitionType=Default&contextData=%28sc.Default%29

(2) Gray highlighted values indicate that the value is greater than the PAL.

The laboratory is not DoD ELAP certified for 1-Methylnaphthalene in soil/sediment. This analyte is not on the laboratory's DoD ELAP scope of accreditation. NA = Not available

Table 15.7 - Project Action Limits ALS Rochester Reference Limits for TAL Metals in Groundwater, Excluding Mercury (Method SW-846 6010C and 6020A)

ANALYTE(1)	PROJECT ACTION LIMIT (µG/L) (2)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (µG/L)	LOD (µG/L)	DL (µG/L)
Aluminum	20000	EPA 2019	400	200	23
Antimony	3	NYSDEC	2.0	1.0	0.17
Arsenic	25	NYSDEC	1.0	0.50	0.32
Barium	1000	NYSDEC	40	20	3.0
Beryllium	4	EPA 2019	1.0	0.50	0.078
Cadmium	5	NYSDEC	1.0	0.50	0.38
Calcium	NA	NA	1000	500	220
Chromium	50	NYSDEC	10	5.0	0.59
Cobalt	6	EPA 2019	50	25	0.89
Copper	200	NYSDEC	20	10	3.9
Iron	500	NYSDEC	200	100	61
Lead	25	NYSDEC	2.0	1.0	0.57
Magnesium	NA	NA	1000	500	29
Manganese	300	NYSDEC	20	10	3.7
Nickel	100	NYSDEC	40	20	2.6
Potassium	NA	NA	2000	1000	200
Selenium	10	NYSDEC	2.0	1.0	0.6
Silver	50	NYSDEC	10	5.0	0.57
Sodium	20000	NYSDEC	1000	500	130
Thallium	2	EPA 2019	1.0	0.50	0.031
Vanadium	86	EPA 2019	50	25	0.67
Zinc	6000	EPA 2019	40	20	9.4

(1) The following analytes will be analyzed by SW-846 6020A: Antimony Arsenic, Beryllium, Cadmium, Lead, Selenium, and Thallium. All others analyzed by SW-846 6010C.

(2) PAL was determined by selecting first the NYS Class GA (6 CRR-NY 703.5), if not available, the EPA MCL standard and if both not available the EPA RSL Tap Water (TR=1E-06, THQ=1).

a. https://govt.westlaw.com/nycrr/Document/I4ed90418cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)

b. https://www.epa.gov/ground-water-and-drinking-water/table-regulated-drinking-water-contaminants

c. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

(3) Gray highlighted values indicate that the value is greater than the PAL.

NA=Not available

Table 15.8 - Project Action Limits ALS Rochester Reference Limits for TAL Metals in Surface Water, Excluding Mercury (Method SW-846 6010C and 6020A)

ANALYTE(1)	PROJECT ACTION LIMIT (µG/L) (2)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (µG/L)	LOD (µG/L)	DL (µG/L)
Aluminum	100	NYSDEC	400	200	23
Antimony	190	EPA 2018, FW Chronic	2.0	1.0	0.17
Arsenic	150	NYSDEC	1.0	0.50	0.32
Barium	220	EPA 2018, FW Chronic	40	20	3.0
Beryllium	1,100	NYSDEC(4)	1.0	0.50	0.078
Cadmium	3.6	NYSDEC(4)	1.0	0.50	0.38
Calcium	NA	NA	1000	500	220
Chromium	131	NYSDEC(4)	10	5.0	0.59
Cobalt	5	NYSDEC	50	25	0.89
Copper	16.3	NYSDEC(4)	20	10	3.9
Iron	1,000	EPA 2018, FW Chronic	200	100	61
Lead	8	NYSDEC(4)	2.0	1.0	0.57
Magnesium	82,000	EPA 2018, FW Chronic	1000	500	29
Manganese	93	EPA 2018, FW Chronic	20	10	3.7
Nickel	93.9	NYSDEC(4)	40	20	2.6
Potassium	53,000	EPA 2018, FW Chronic	2000	1000	200
Selenium	4.6	NYSDEC	2.0	1.0	0.6
Silver	0.1	NYSDEC	10	5.0	0.57
Sodium	680,000	EPA 2018, FW Chronic	1000	500	130
Thallium	8	NYSDEC	1.0	0.50	0.031
Vanadium	14	NYSDEC	50	25	0.67
Zinc	150	NYSDEC(4)	40	20	9.4

(1) The following analytes will be analyzed by SW-846 6020A: Antimony Arsenic, Beryllium, Cadmium, Lead, Selenium, and Thallium. All others analyzed by SW-846 6010C.

(2) PAL was determined by selecting the NYS 6 CRR-NY 703.5 Class C, Aquatic (Chronic) water quality standards and, if not available, the EPA Region 4 Surface Water Screening Values [Freshwater Screening Values; Chronic].

a. https://govt.westlaw.com/nycrr/Document/I4ed90418cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)&bhcp=1

b. https://www.epa.gov/sites/production/files/2018-03/documents/era_regional_supplemental_guidance_report-march-2018_update.pdf

(3) Gray highlighted values indicate that the value is greater than the PAL.

(4) Water hardness based on lowest water hardness value (201 mg/L as $CaCO_3$) calculated from samples collected during the 1991 Reeder Creek survey.

NA=Not available

Table 15.9 - Project Action Limits ALS Rochester Reference Limits for TAL Metals in Sediment, Excluding Mercury (Method SW-846 6010C)

ANALYTE	PROJECT ACTION LIMIT (MG/KG) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (MG/KG)	LOD (MG/KG)	DL (MG/KG)
Aluminum	77000	EPA 2019	20	15	12
Antimony	31	EPA 2019	6	3	0.54
Arsenic	13	NYSDEC	1.0	0.8	0.7
Barium	350	NYSDEC	4.0	2.0	1.5
Beryllium	7.2	NYSDEC	0.50	0.25	0.06
Cadmium	2.5	NYSDEC	0.50	0.25	0.24
Calcium	NA	NA	100	50	32
Chromium	30	NYSDEC(3)	1.0	0.50	0.35
Cobalt	23	EPA 2019	5.0	2.5	0.46
Copper	50	NYSDEC	2.0	1.0	0.63
Iron	55,000	EPA 2019	40	20	13
Lead	63	NYSDEC	5.0	2.5	0.40
Magnesium	NA	NA	100	50	13
Manganese	1,600	NYSDEC	4.0	2.0	1.5
Nickel	30	NYSDEC	4.0	2.0	0.66
Potassium	NA	NA	200	100	50
Selenium	3.9	NYSDEC	2.0	1.0	0.54
Silver	2	NYSDEC	1.0	0.50	0.09
Sodium	NA	NA	200	100	52
Thallium	0.78	EPA 2019	2.0	1.0	0.65
Vanadium	390	EPA 2019	5.0	2.5	0.71
Zinc	109	NYSDEC	4.0	2.0	1.4

(1) PAL was determined by selecting the NYS 6 CRR-NY 375-6.8 (a), Unrestricted Use Soil Cleanup Objectives. If a NYS value was not available, EPA RSL Summary Table (TR=1E-06, HQ=1) November 2019 Resident Soil.
   a. https://semspub.epa.gov/work/HQ/199626.pdf
   b. https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?transitionType=Default&contextData=%28sc.Default%29

(2) Gray highlighted values indicate that the value is greater than the PAL.

(3) Value for trivalent chromium presented.

NA=Not available

Table 15.10 - Project Action Limits and ALS Rochester Reference Limits for Mercury in Groundwater (Method SW-846 7470A)

ANALYTE	PROJECT ACTION LIMIT (µG/L) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (µG/L)	LOD (µG/L)	DL (µG/L)
Mercury	0.7	NYSDEC	0.20	0.10	0.077

(1) PAL is from the NYS Class GA (6 CRR-NY 703.5). https://govt.westlaw.com/nycrr/Document/I4ed90418cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)

Table 15.11 - Project Action Limits and ALS Rochester Reference Limits for Mercury in Surface Water (Method SW-846 7470A)

ANALYTE	PROJECT ACTION LIMIT (µG/L) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (µG/L)	LOD (µG/L)	DL (µG/L)
Mercury	0.0007	NYSDEC	0.20	0.10	0.077

(1) PAL is from the NYS 6 CRR-NY 703.5 Class C, Human (Fish Consumption) water quality standard https://govt.westlaw.com/nycrr/Document/I4ed90418cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)&bhcp=1

Table 15.12 - Project Action Limits and ALS Rochester Reference Limits for Mercury in Sediment (Method SW-846 7471B)

ANALYTE	PROJECT ACTION LIMIT (MG/KG) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (MG/KG)	LOD (MG/KG)	DL (MG/KG)
Mercury	11	EPA 2019	0.033	0.0167	0.0058

(1) PAL is from the EPA RSL Summary Table (TR=1E-06, HQ=1) November 2019 Resident Soil. https://semspub.epa.gov/work/HQ/199626.pdf

Table 15.13 - Project Action Limits ALS Middletown Reference Limits for Explosives in Groundwater (Method SW-846 8330B)

ANALYTE	PROJECT ACTION LIMIT (µG/L) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (µG/L)	LOD (µG/L)	DL (µG/L)
1,3,5-Trinitrobenzene	5	NYSDEC	0.30	0.25	0.08
1,3-Dinitrobenzene	5	NYSDEC	0.30	0.25	0.09
2,4,6-Trinitrotoluene	5	NYSDEC	0.30	0.25	0.08
2,4-Dinitrotoluene	5	NYSDEC	0.30	0.25	0.10
2,6-Dinitrotoluene	5	NYSDEC	0.30	0.25	0.14
2-Amino-4,6-dinitrotoluene	39	EPA 2019	0.30	0.25	0.11
2-Nitrotoluene	5	NYSDEC	0.30	0.25	0.14
3,5-Dinitroaniline	NA	NA	0.30	0.25	0.10
3-Nitrotoluene	5	NYSDEC	0.30	0.25	0.07
4-Amino-2,6-dinitrotoluene	39	EPA 2019	0.30	0.25	0.13
4-Nitrotoluene	5	NYSDEC	0.30	0.25	0.16
HMX	1,000	EPA 2019	0.30	0.25	0.09
Nitrobenzene	0.4	NYSDEC	0.30	0.25	0.09
Nitroglycerin	2	EPA 2019	1.5	1.0	0.23
Pentaerythritol tetranitrate (PETN)	19	EPA 2019	1.5	1.0	0.49
RDX	0.97	EPA 2019	0.30	0.25	0.09
Tetryl	39	EPA 2019	0.30	0.25	0.09

(1) PAL was determined by selecting first the NYS Class GA (6 CRR-NY 703.5), if not available, the EPA MCL standard and if both not available the EPA RSL Tap Water (TR=1E-06, THQ=1).
   a. https://govt.westlaw.com/nycrr/Document/I4ed90418cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)
   b. https://www.epa.gov/ground-water-and-drinking-water/table-regulated-drinking-water-contaminants
   c. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

(2) Gray highlighted values indicate that the value is greater than the PAL.

NA = Not available

Table 15.14 - Project Action Limits ALS Middletown Reference Limits for Explosives in Surface Water (Method SW-846 8330B)

ANALYTE	PROJECT ACTION LIMIT (µG/L) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (µG/L)	LOD (µG/L)	DL (µG/L)
1,3,5-Trinitrobenzene	11	EPA 2018, FW Chronic	0.30	0.25	0.08
1,3-Dinitrobenzene	22	EPA 2018, FW Chronic	0.30	0.25	0.09
2,4,6-Trinitrotoluene	13	EPA 2018, FW Chronic	0.30	0.25	0.08
2,4-Dinitrotoluene	44	EPA 2018, FW Chronic	0.30	0.25	0.10
2,6-Dinitrotoluene	81	EPA 2018, FW Chronic	0.30	0.25	0.14
2-Amino-4,6-dinitrotoluene	18	EPA 2018, FW Chronic	0.30	0.25	0.11
2-Nitrotoluene	71	EPA 2018, FW Chronic	0.30	0.25	0.14
3,5-Dinitroaniline	70	EPA 2018, FW Chronic	0.30	0.25	0.10
3-Nitrotoluene	42	EPA 2018, FW Chronic	0.30	0.25	0.07
4-Amino-2,6-dinitrotoluene	11	EPA 2018, FW Chronic	0.30	0.25	0.13
4-Nitrotoluene	46	EPA 2018, FW Chronic	0.30	0.25	0.16
HMX	220	EPA 2018, FW Chronic	0.30	0.25	0.09
Nitrobenzene	230	EPA 2018, FW Chronic	0.30	0.25	0.09
Nitroglycerin	18	EPA 2018, FW Chronic	1.5	1.0	0.23
Pentaerythritol tetranitrate (PETN)	NA	NA	1.5	1.0	0.49
RDX	79	EPA 2018, FW Chronic	0.30	0.25	0.09
Tetryl	NA	NA	0.30	0.25	0.09

(1) PAL was determined by selecting the NYS 6 CRR-NY 703.5 Class C, Aquatic (Chronic) water quality standards and, if not available, the EPA Region 4 Surface Water Screening Values [Freshwater Screening Values; Chronic].

a. https://govt.westlaw.com/nycrr/Document/I4ed90418cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)&bhcp=1

b. https://www.epa.gov/sites/production/files/2018-03/documents/era_regional_supplemental_guidance_report-march-2018_update.pdf

NA = Not available

Table 15.15 - Project Action Limits ALS Middletown Reference Limits for Explosives in Sediment (Method SW-846 8330B)

ANALYTE	PROJECT ACTION LIMIT (MG/KG) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (MG/KG)	LOD (MG/KG)	DL (MG/KG)
1,3,5-Trinitrobenzene	2200	EPA 2019	0.25	0.20	0.100
1,3-Dinitrobenzene	6.3	EPA 2019	0.20	0.15	0.040
2,4,6-Trinitrotoluene	21	EPA 2019	0.20	0.15	0.040
2,4-Dinitrotoluene	1.7	EPA 2019	0.20	0.15	0.060
2,6-Dinitrotoluene	0.36	EPA 2019	0.20	0.15	0.060
2-Amino-4,6-dinitrotoluene	150	EPA 2019	0.20	0.15	0.040
2-Nitrotoluene	3.2	EPA 2019	0.20	0.15	0.060
3,5-Dinitroaniline	NA	NA	0.20	0.15	0.040
3-Nitrotoluene	6.3	EPA 2019	0.20	0.15	0.050
4-Amino-2,6-dinitrotoluene	150	EPA 2019	0.20	0.15	0.050
4-Nitrotoluene	34	EPA 2019	0.25	0.20	0.100
HMX	3900	EPA 2019	0.20	0.15	0.050
Nitrobenzene	5.1	EPA 2019	0.20	0.15	0.040
Nitroglycerin	6.3	EPA 2019	1.2	1.0	0.45
Pentaerythritol tetranitrate (PETN)	130	EPA 2019	1.2	1.0	0.5
RDX	8.3	EPA 2019	0.20	0.15	0.070
Tetryl	160	EPA 2019	0.20	0.15	0.040

(1) PAL was determined by selecting the NYS 6 CRR-NY 375-6.8 (a), Unrestricted Use Soil Cleanup Objectives. If a NYS value was not available, EPA RSL Summary Table (TR=1E-06, HQ=1) November 2019 Resident Soil.

a. https://semspub.epa.gov/work/HQ/199626.pdf

b. https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?transitionType=Default&contextData=%28sc.Default%29

NA = Not available

Table 15.16 - Project Action Limits and ALS Houston Reference Limits for Perchlorate in Groundwater (Method SW-846 6850)

ANALYTE	PROJECT ACTION LIMIT (µG/L) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (µG/L)	LOD (µG/L)	DL (µG/L)
Perchlorate	14	EPA 2019	0.1	0.05	0.025

(1) PAL is the EPA RSL Tap Water (TR=1E-06, THQ=1)
https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table 15.17 - Project Action Limits and ALS Houston Reference Limits for Perchlorate in Surface Water (Method SW-846 6850)

ANALYTE	PROJECT ACTION LIMIT (µG/L) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (µG/L)	LOD (µG/L)	DL (µG/L)
Perchlorate	NA	NA	0.1	0.05	0.025

Table 15.18 - Project Action Limits and ALS Houston Reference Limits for Perchlorate in Sediment (Method SW-846 6850)

ANALYTE	PROJECT ACTION LIMIT (µG/KG) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (µG/KG)	LOD (µG/KG)	DL (µG/KG)
Perchlorate	55	EPA 2019	1.0	0.75	0.30

(1) PAL is the EPA RSL Summary Table (TR=1E-06, HQ=1) November 2019 Resident Soil.
https://semspub.epa.gov/work/HQ/199626.pdf

Table 15.19 - Project Action Limits and ALS Rochester Reference Limits for Orthophosphate as P in Groundwater and Surface Water (EPA Method 365.1)

ANALYTE	PROJECT ACTION LIMIT (MG/L) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (MG/L)	LOD (MG/L)	DL (MG/L)
Orthophosphate as P	970	EPA 2019	0.010	NA(2)	0.0049

(1) No NYSDEC value available for orthophosphate. Used Inorganic Phosphates and Phosphoric Acid USEPA RSLs or Resident Tap Water, Target risk (TR) = 1E-06.
https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

(2) An LOD is not available. The laboratory is not DoD ELAP certified for method 365.1 for Orthophosphate as P.

NA=Not available

Table 15.20 - Project Action Limits and ALS Houston Reference Limits for Orthophosphate as P in Sediment (EPA Method 9056A)

ANALYTE	PROJECT ACTION LIMIT (MG/KG) (1)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (MG/KG)	LOD (MG/KG)	DL (MG/KG)
Orthophosphate as P	3,800	EPA 2019	1.0	1.0	0.30

(1) PAL is the EPA RSL Summary Table (TR=1E-06, HQ=1) November 2019 Resident Soil.
https://semspub.epa.gov/work/HQ/199626.pdf

Table 15.21 - Project Action Limits and Katahdin Reference Limits for Total and Dissolved Phosphorus in Groundwater and Surface Water (EPA Method 365.2)

ANALYTE	PROJECT ACTION LIMIT (µG/L)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (µG/L)	LOD (µG/L)	DL (µG/L)
Total and Dissolved Phosphorus	20	NYSDEC(1)	10	8.0	4.0

(1) NYSDEC, 1998. New York Department of Environmental Conservation. Division of Water Technical and Operational Guidance Series (1.1.1). Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998.
http://www.dec.ny.gov/docs/water_pdf/togs111.pdf

Table 15.22- Project Action Limits and ALS Kelso Reference Limits for Total Phosphorus in Sediment (EPA Method 365.3)

ANALYTE	PROJECT ACTION LIMIT (MG/KG)	PAL REFERENCE	ACHIEVABLE LABORATORY LIMITS		
			LOQ (MG/KG)	LOD (MG/KG)	DL (MG/KG)
Total Phosphorus	NA	NA	1.0	0.60	0.20

Worksheet #17: Sampling Design and Rationale

(EPA UFP-QAPP Guidance Manual, Section 3.1.1)

17.1 INTRODUCTION

Sampling for VOCs, SVOCs, metals, explosives, perchlorate, total and dissolved phosphorus, and orthophosphate will be conducted at the Seneca Open Detonation Grounds (OD Grounds). The boundaries of the site are shown on **Figure 1** of the Work Plan for the OD Grounds Groundwater Sampling.

This worksheet describes the project design and the tasks that will be required to successfully complete field operations during this project and achieve the DQOs described on **Worksheet #11**. The field operations involve multiple elements, or "definable features of work," that will be required to achieve the project goals. These definable features are listed on **Worksheet #14** and they are explained further in this worksheet, with references to relevant SOPs (**Worksheet #21** and **Appendix A** and **B**), MPCs (**Worksheet #12**), and other sections of the UFP-QAPP Addendum, as necessary.

17.2 DEFINEABLE FEATURES OF WORK

17.2.1 MOBILIZATION

It is anticipated that two mobilizations will be necessary to complete the field tasks preformed under this QAPP. Upon receipt of document approval, the field team will be notified, travel and lodging arrangements will be made, and the requisite copies of applicable documents will be assembled. The field management team will have already reviewed the available documentation relating to the site and this UFP-QAPP.

Equipment and materials will either be shipped to the site via commercial carrier, transported to the site by the field team, or obtained locally, as appropriate. Equipment may include, but is not limited to, sampling supplies, sample containers, documents, first aid kits, fire extinguishers, digital cameras, tubing, etc. Site vehicles will be rented and, in most cases, will be four-wheel drive vehicles that will accommodate all site personnel and equipment. A subcontractor with equipment and personnel for drilling will also be mobilized to the site.

The primary means of onsite communication will be achieved using cellular telephones. If separated from one another, each member of the field sampling team will have an operational cell phone available at all times for emergency use. Additional information can be found in the Accident Prevention Plan (APP) / Site Safety and Health Plan (SSHP) (Parsons, 2017).

Prior to field activities, all field team members will be given site-specific training involving:

- Activities to be performed;
- Safe work practices; and
- Installation-specific procedures.

In addition to this training, the field team will be briefed each day prior to commencement of field activities by the field team lead. Daily briefings will include a discussion of weather conditions and the coming day's activities.

17.2.2 SITE PREPARATION

The field teams will utilize the field office on-site to prepare for the sample collection and inspection activities. The sampling equipment will be calibrated and inspected daily to ensure proper functionality (**Worksheet #22**). The appropriate number of sample bottles, and the respective bottle labels will also be prepared at the field office (**Worksheet #18**).

17.2.3 DRILLING, WELL INSTALLATION, AND ABANDONMENT

The design and rationale for drilling, well installation, and abandonment are described in Section 3.1 of the Work Plan for the OD Grounds Groundwater Sampling.

17.2.4 WELL DEVELOPMENT

The design and rationale for well development are described in Section 3.1 of the Work Plan for the OD Grounds Groundwater Sampling.

17.2.5 SAMPLING AND ANALYSIS

The design and rationale for groundwater, surface water, and sediment sampling and analysis are described in Sections 3.2 through 3.5 of the Work Plan for the OD Grounds Groundwater Sampling.

Samples from the proposed locations will be collected in accordance with SOP (**Worksheet #21**). The samples will be analyzed for VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P using the methods listed in **Worksheet #19**. A comprehensive list showing analyses to be performed at each location is included on **Worksheet #18**.

Sample concentrations will be compared with PALs (**Worksheet #15**). There are potential sources of phosphorus and orthophosphate within Reeder Creek from routine farming activities and/or water treatment plant effluent. As such, site surface water and sediment samples will be compared to upgradient and downgradient samples to determine if the OD Grounds contributes a significant load of phosphorous or orthophosphate to Reeder Creek.

17.2.6 DEMOBILIZATION

Upon completion of the field activities, all equipment and materials will be packaged and removed from the site. The samples will be packaged in coolers and shipped to the analytical laboratory as described in **Worksheets #26** and **#27**. All field documentation will be electronically scanned and the rental sampling equipment will be returned to the vendor. The field office shall be cleaned and organized to facilitate efficient sampling preparation during the next field event.

Worksheet #18: Sampling Locations and Methods

(EPA UFP-QAPP Guidance Manual, Section 3.1.1 and 3.1.2, EPA Guidance 2106-G-05 Section 2.3.1 and 2.3.2)

The sample locations are summarized in **Tables 18.1 and 18.2** and sampling locations at OD Grounds are shown in **Figures 1 to 3** of the Work Plan for the OD Grounds Groundwater Sampling. Sample ID nomenclature is explained in **Worksheet #26**. Sample locations and IDs are provided in **Tables 18.1**.

Table 18.1 –Surface Water/Sediment Sampling Locations and Methods at OD Grounds

GEOGRAPHIC LOCATION	LOCATION ID	MATRIX	SAMPLE ID(1)	TYPE	ANALYTE / ANALYTICAL GROUP	SAMPLING SOP	ALTERNATIVE SAMPLE ID
Drainage	ODSW-01	SW	45MI30008	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSW-01	SD	45MI40001	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSW-02	SW	45MI30009	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSW-02	SD	45MI40002	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSW-03	SW	45MI30010	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSD-03	SD	45MI40003	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSW-04	SW	45MI30011	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSD-04	SD	45MI40004	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSW-05	SW	45MI30012	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSD-05	SD	45MI40005	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSW-06	SW	45MI30013	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSD-06	SD	45MI40006	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSW-07	SW	45MI30014	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	

GEOGRAPHIC LOCATION	LOCATION ID	MATRIX	SAMPLE ID(1)	TYPE	ANALYTE / ANALYTICAL GROUP	SAMPLING SOP	ALTERNATIVE SAMPLE ID
Drainage	ODSD-07	SD	45MI40007	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSW-08	SW	45MI30015	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSD-08	SD	45MI40008	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSW-09	SW	45MI30016	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSD-09	SD	45MI40009	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSW-10	SW	45MI30017	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSD-10	SD	45MI40010	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSW-11	SW	45MI30018	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
Drainage	ODSD-11	SD	45MI40011	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
TBD – DU 1	TBD	SW	45MI30019	DU	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
TBD – DU 2	TBD	SW	45MI30020	DU	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
TBD – DU 1	TBD	SD	45MI40012	DU	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
TBD – DU 2	TBD	SD	45MI40013	DU	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
TBD – MS/MSD 1	TBD	SW	45MI3000#-MS/MSD	MS/MSD	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
TBD – MS/MSD 1	TBD	SD	45MI4000#-MS/MSD	MS/MSD	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	
As Needed	TB	TB	45MI000##-TB	TB	VOCs	ENV-04	
IF Applicable	TBD	EB	45MI000##-EB	EB	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-04	

Key: SW = Surface water; SD = Sediment; SA = Sample; DU = Duplicate; MS/MSD = Matrix Spike / Duplicate; EB = Equipment Blank; TB = Trip Blank

(1) MS/MSDs and field duplicates will be collected from each matrix at the frequency described in Worksheet 20. The locations of the MS/MSD and field duplicate will be determined in the field based on site conditions. One of the existing sample IDs in the table above will be appended with MS and MSD. The field duplicates will be collected at the same location as a normal field sample and the sample ID will be one larger than the last ID shown in the table.

Table 18.2 – Groundwater Sampling Locations and Methods at OD Grounds

GEOGRAPHIC LOCATION	LOCATION ID	MATRIX	SAMPLE ID[1]	TYPE	ANALYTE / ANALYTICAL GROUP	SAMPLING SOP	ALTERNATIVE SAMPLE ID
New Shallow Well	MW45-5	GW	45MI20001	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
New Shallow Well	MW45-6	GW	45MI20002	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
New Shallow Well	MW45-7	GW	45MI20003	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
New Shallow Well	MW45-8	GW	45MI20004	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
New Shallow Well	MW45-9	GW	45MI20005	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
New Shallow Well	MW45-10	GW	45MI20006	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
New Shallow Well	MW45-11	GW	45MI20007	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
New Shallow Well	MW45-12	GW	45MI20008	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
New Shallow Well	MW45-13	GW	45MI20009	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
New Shallow Well	MW45-14	GW	45MI20010	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
New Shallow Well	MW45-BG1	GW	45MI20011	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
New Shallow Well	MW45-BG2	GW	45MI20012	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Shallow Well	MW25-24	GW	45MI20013	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Shallow Well	MW1R	GW	45MI20014	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Shallow Well	MW2R	GW	45MI20015	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Shallow Well	MW3R	GW	45MI20016	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Shallow Well	MW45-1	GW	45MI20017	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	

GEOGRAPHIC LOCATION	LOCATION ID	MATRIX	SAMPLE ID(1)	TYPE	ANALYTE / ANALYTICAL GROUP	SAMPLING SOP	ALTERNATIVE SAMPLE ID
Shallow Well	MW45-2	GW	45MI20018	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Shallow Well	MW45-3	GW	45MI20019	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Shallow Well	MW23-1	GW	45MI20020	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Shallow Well	MW23-2	GW	45MI20021	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Shallow Well	MW23-3	GW	45MI20022	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Shallow Well	MW23-5	GW	45MI20023	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Shallow Well	MW23-6	GW	45MI20024	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Deep Well	MW1D	GW	45MI20025	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Deep Well	MW3D	GW	45MI20026	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Deep Well	MW45-2D	GW	45MI20027	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Deep Well	MW45-4D	GW	45MI20028	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Deep Well	MW45-9D	GW	45MI20029	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Deep Well	MW45-11D	GW	45MI20030	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Deep Well	MW45-13D	GW	45MI20031	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Deep Well	MW45-BG1D	GW	45MI20032	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
Deep Well	MW45-BG2D	GW	45MI20033	SA	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
TBD – DU 1	TBD	GW	45MI200##	DU	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
TBD – DU 2	TBD	GW	45MI200##	DU	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	

GEOGRAPHIC LOCATION	LOCATION ID	MATRIX	SAMPLE ID(1)	TYPE	ANALYTE / ANALYTICAL GROUP	SAMPLING SOP	ALTERNATIVE SAMPLE ID
TBD – DU 3	TBD	GW	45MI200##	DU	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
TBD – DU 4	TBD	GW	45MI200##	DU	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
TBD – MS/MSD 1	TBD	GW	45MI200##-MS/MSD	MS/MSD	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
TBD – MS/MSD 2	TBD	GW	45MI200##-MS/MSD	MS/MSD	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	
As Needed	TB	TB	45MI000##-TB	TB	VOCs	ENV-04	
IF Applicable	TBD	EB	45MI000##-EB	EB	VOCs, SVOCs, perchlorate, metals, explosives, phosphorus, and orthophosphate as P	ENV-03	

Key: GW = Groundwater; SA = Sample; DU = Duplicate; MS/MSD = Matrix Spike / Duplicate; EB = Equipment Blank

(1) MS/MSDs and field duplicates will be collected from each matrix at the frequency described in Worksheet 20. The locations of the MS/MSD and field duplicate will be determined in the field based on site conditions. Existing sample IDs will be appended with MS and MSD as seen in the table above. The field duplicates will be collected at the same location as a normal field sample and the sample ID will be one larger than the last ID shown in the table.

Worksheets #19 & 30: Sample Containers, Preservation, and Hold Times

(EPA UFP-QAPP Guidance Manual, Section 3.1.1)

This worksheet summarizes the analytical methods for each sampling matrix, including the required sample volume, containers, preservation, and holding time requirements. Details concerning sampling handling are included on **Worksheets #26 & 27**. All samples will be delivered to ALS, located in Rochester, NY with exception of Total and Dissolved Phosphorus in water which will be shipped directly to Katahdin in Scarborough, ME. All samples will be sent on ice via UPS or FedEx next day delivery.

ANALYTE/ ANALYTICAL GROUP	MATRIX	METHOD/SOP REFERENCE (1)	ACCREDITATION EXPIRATION DATE(2)	CONTAINERS (NUMBER, SIZE, AND TYPE) (3)	PRESERVATION REQUIREMENTS	PREPARATION HOLDING TIME	ANALYTICAL HOLDING TIME	DATA PACKAGE TURNAROUND
VOCs	Water	8260C / VOC-8260	5/31/2020	3, 40-ml VOA vials w/ PTFE-faced silicone septum	0-6°C, HCl, pH <2	14 days	14 days	21 days
VOCs	Solid	8260C, 5035A/VOC-8260, VOC-5035	5/31/2020	2, 40-ml VOA vials with stir bar and 5mL DI water; 1, 40mL VOA vial with 10 mL MeOH (5 g. sampling device required to collect the sample)	0-6°C	48-hours for unpreserved vials (DI water) 14 days for preserved vials (MeOH)	14 days	21 days
SVOCs	Water	8270D, 3510/SOC-8270, EXT-3510	5/31/2020	2, 1000 mL amber glass, Teflon lined cap	0-6°C	7 days	40 days	21 days
SVOCs	Solid	8270D, 3541/SOC-8270, EXT-3541	5/31/2020	1, 4 oz. glass jar	0-6°C	14 days	40 days	21 days
ICP-MS Metals `	Water	6020A/MET-6020A/200.8, MET-CLPDIG	5/31/2020	1, 125 mL polyethylene bottle	Nitric Acid, pH<2	180 days	180 days	21 days
ICP-MS Metals	Solid	6020A, 3050/MET-6020A/200.8, MET-3050	5/31/2020	1, 4 oz. glass jar	None	180 days	180 days	21 days
ICP-AES Metals	Water	6010C, 3010A/MET-200.7, MET-3010A	5/31/2020	1, 150 mL polyethylene bottle	Nitric Acid, pH<2	180 days	180 days	21 days
ICP-AES Metals	Solid	6010C, 3050/MET-200.7, MET-3050	5/31/2020	1, 4 oz. glass jar	None	180 days	180 days	21 days
Mercury	Water	7470A/MET-HG	5/31/2020	1, 150 mL polyethylene bottle	Nitric Acid, pH<2	28 days	28 days	21 days

ANALYTE/ ANALYTICAL GROUP	MATRIX	METHOD/SOP REFERENCE (1)	ACCREDITATION EXPIRATION DATE(2)	CONTAINERS (NUMBER, SIZE, AND TYPE) (3)	PRESERVATION REQUIREMENTS	PREPARATION HOLDING TIME	ANALYTICAL HOLDING TIME	DATA PACKAGE TURNAROUND
Mercury	Solid	7471B/MET-HG	5/31/2020	1, 4 oz. glass jar	0-6°C	28 days	28 days	21 days
Orthophosphate as P	Water	EPA 365.1/GEN-365.1	NA(4)	1, 150 mL polyethylene bottle	0-6°C	Not applicable	48 hours	21 days
Explosives	Water	8330B/1B-8330, 09-8330W	2/28/2022	2, 1L amber glass bottle	0-6°C	7 days	40 days	21 days
Explosives	Solid	8330B/1B-8330, 09-8330S	2/28/2022	1, 4 oz. glass jar	0-6°C	14 days	40 days	21 days
Perchlorate	Water	6850/HE-LCMSPER001	12/22/2021	1, 125 mL polyethylene bottle	0-6°C	Not applicable	28 days	21 days
Perchlorate	Solid	6850/HE-LCMSPER001	12/22/2021	1, 4oz. amber glass jar	0-6°C	Not applicable	28 days	21 days
Orthophosphate as P	Solid	9056A/HS-IC001	2/28/2022	1, 4oz. glass jar	0-6°C	Not applicable	28 days	21 days
Total Phosphorus	Solid	365.3/GEN-365.3	6/30/2020	1, 4oz. glass jar	0-6°C	Not Applicable	No holding time established for solids	21 days
Total and Dissolved Phosphorus	Water	EPA 365.2/ CA-781	2/1/2022	1, 125-ml glass or plastic bottle	0-6°C, H2SO4 to pH < 2	Not Applicable	28 days	21 days

(1) Laboratory SOPs (Appendix B) are subject to revision and updates during duration of the project, lab will use the most current revision of the SOP at the time of analysis.
(2) Accreditation Expiration date refers to the DoD Environmental Laboratory Accreditation Program (ELAP) certification.
(3) Sample size is a minimum, the containers listed will be filled to compensate for any required re-analysis or re-extractions. For samples requiring Matrix Spike/Matrix Spike Duplicate (MS/MSD) containers listed should be tripled.
(4) ALS Rochester is not DoD ELAP accredited for this method but is certified by NYSDEC.

Worksheet #20: Field Quality Control

(EPA UFP-QAPP Guidance Manual, Section 3.1.1)

This worksheet summarizes the QC samples to be collected and analyzed for the project. It shows the relationship between the number of field samples and associated QC samples for each combination of analyte/analytical group and matrix. Note if samples are collected over the estimated number shown, additional QC samples will be collected at the rate shown.

Table 20.1 –OD Grounds Field and Quality Control Samples

SITE	MATRIX	ANALYTICAL GROUP	ESTIMATED NO. OF FIELD SAMPLES	TRIP BLANK (FOR VOC ONLY)	EQUIPMENT BLANK(1)	FIELD DUPLICATES	MATRIX SPIKE / MATRIX SPIKE DUPLICATES	ESTIMATED NUMBER OF TOTAL ANALYSES
OD Grounds	Groundwater	All parameters(2)	66(3)	1 per cooler	1 per week	10%	5%	84
	Surface Water		11					16
	Sediment		11					16

(1) Equipment blanks will not be applicable if dedicated tubing or disposable equipment is used to collect samples.
(2) Full list of parameters includes VOCs, SVOCs, metals, explosives, perchlorate, total and/or dissolved phosphorus, and orthophosphate as P
(3) Two rounds of 33 samples each.

Worksheet #21: Field Standard Operating Procedures

(EPA UFP-QAPP Guidance Manual, Section 3.1.2)

The field SOPs to be used during the investigation are included in Worksheet #21 of the Final UFPP QAPP. The additional SOPs to be used for analysis of samples collected during the investigation are listed in the below table. Copies of these field SOPs are provided in **Appendix A**. of the Work Plan for the OD Grounds Groundwater Sampling

Table 21.1 –Field SOPs

REFERENCE NUMBER	TITLE, REVISION DATE, AND/OR NUMBER	SOP ORIGINATING ORGANIZATION	RELATED EQUIPMENT TYPES	MODIFIED FOR PROJECT? (Y/N)	COMMENTS
CHEM-01	Chemistry Data Review and Management, Rev 01, 7/27/2018	Parsons	N/A	N	See Appendix A
ENV-01	PFAS Sampling Guidance, Rev 00, 02/24/2020	Parsons	N/A	N	See Appendix A
ENV-02	Soil Sampling, Rev 00, 02/24/2020	Parsons	N/A	Y	See Appendix A, PFAS procedures were removed
ENV-03	Groundwater Sampling, Rev 00, 02/24/2020	Parsons	N/A	N	See Appendix A
ENV-04	Surface Water and Sediment Sampling, Rev 00, 02/24/2020	Parsons	N/A	Y	See Appendix A, PFAS procedures were removed.
ENV-05	Monitoring Well Development, Rev 00, 02/24/2020	Parsons	N/A	N	See Appendix A
ENV-06	Hydraulic Conductivity (Slug) Testing, Rev 00, 02/24/2020	Parsons	N/A	N	See Appendix A
ENV-07	Soil Borings and Monitoring Well Installation, Rev 00, 02/24/2020	Parsons	N/A	N	See Appendix A
MEC-03	MEC Avoidance and Escort, Rev 00, 02/18/2015	Parsons	N/A	N	See Appendix A

Worksheet #23: Analytical Standard Operating Procedures

(EPA UFP-QAPP Guidance Manual, Section 3.2.1)

The applicable SOPs to be used for analysis of samples collected during the investigation are listed in the below tables. The laboratory SOP references were provided by ALS and Katahdin and are presented in Appendix B.

SOP #	TITLE, DATE, AND/OR NUMBER	DEFINITIVE OR SCREENING DATA	MATRIX/ ANALYTICAL GROUP	SOP OPTION OR EQUIPMENT TYPE	MODIFIED FOR PROJECT?
VOC-8260	Volatile Organic Compounds by GC/MS, Revision 17, 6/24/19.	Definitive	Water and Solid/VOCs	Gas Chromatography (GC)/Mass Spectrometry (MS)	N
VOC-5035	Closed System Purge and Trap/Extraction for Volatile Organics in Soil and Waste Samples, Revision 5, 6/23/14. Last verified 12/10/19.	Definitive	Solid/VOCs	NA	N
SOC-8270	Semivolatile Organic Compounds by GC/MS, Rev 13. 4/1/18.	Definitive	Water and Solid/SVOCs	GC/MS	N
EXT-3510	Separatory Funnel Liquid-Liquid Extraction, Rev 9. 3/23/2020.	Definitive	Water/SVOCs	NA	N
EXT-3541	Automated Soxhlet Extraction, Rev.6, 3/25/15, last verified 12/4/19	Definitive	Solid/SVOCs	NA	N
MET-6020A/200.8	Determination of Metal and Trace Elements by Inductively Coupled Plasma - Mass Spectrometry, Revision 5, 4/1/18. Verified 3/21/19.	Definitive	Water and Solid/Metals	Inductively Coupled Plasma (ICP)/MS	N
MET-CLPDIG	Digestion for 200.7, 200.8 and 6020A Waters, Revision 6, 10/30/17. Verified 12/12/19.	Definitive	Water/Metals	NA	N
MET-3050	Metals Digestion, Soils, Sediments, Sludge, Wipes, and Filters for ICP-AES and ICP-MS Analysis, Revision 6, 2/9/15. Verified 12/12/19.	Definitive	Solid/Metals	NA	N
MET-200.7	Determination of Metal and Trace Elements by Inductively Coupled Plasma Atomic Emission Spectrometry, Revision 16, 5/17/16, Verified 12/12/19.	Definitive	Water and Solid/Metals	ICP-Atomic Emission Spectrometry (AES)	N
MET-3010A	Metals Digestion, Waters for ICP Analysis, Revision 8, 4/1/18, verified 12/12/19.	Definitive	Water/Metals	NA	N
MET-HG	Determination of Mercury in Water and Solid or Semisolid Waste by Cold Vapor Atomic Absorption Spectrometry, Revision 2, 7/24/17, verified 12/12/19	Definitive	Water and Solid/Mercury	Cold Vapor Atomic Absorption (CVAA)	N
GEN-365.1	Orthophosphate by Colorimetric Determination, Revision 7, 11/6/17, verified 12/4/19.	Definitive	Water/Orthophosphate as P	Colorimeter	N

SOP #	TITLE, DATE, AND/OR NUMBER	DEFINITIVE OR SCREENING DATA	MATRIX/ ANALYTICAL GROUP	SOP OPTION OR EQUIPMENT TYPE	MODIFIED FOR PROJECT?
1B-8330	Nitroaromatic and Nitroamines by HPLC with Ultraviolet Detection Revision 18 02/04/2020	Definitive	Water and Solid/Explosives	High-Performance Liquid Chromatography (HPLC)	N
09-8330S	Extraction of Solids for the Analysis of Explosives by EPA 8330B (HPLC) Revision 8, 03/24/2017	Definitive	Solid/Explosives	NA	N
09-8330W	Solid Phase Extraction of Water for the Analysis of Explosives by EPA Method 8330B Revision 10, 03/24/2017	Definitive	Water/Explosives	NA	N
09-8330 Grinding	Drying and Particle Size Reduction of Solids/Soil Revision 13, 01/03/2019	Definitive	Solid/Explosives	NA	N
HE-LCMSPER001	Perchlorate in Water, Soil and Solid Waste using Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS) Revision 1.3, 12/12/2019	Definitive	Water and Solid/Perchlorate	LCMSMS	N
HS-IC001	Anions by Ion Chromatography EPA 300.0/SW846-9056A/SW846-9056 Revision 9.3, 03/05/2020	Definitive	Solid/Orthophosphate as P	Ion Chromatography (IC)	N
GEN-365.3	Phosphorus Determination Using Colorimeteric Procedure EPA Method 365.3, Revision 14, 11/29/2018	Definitive	Solid/Phosphorus	Spectrophotometer	N
CA-781	Colorimetric Determination Low Level Total Phosphorus (LL TPO4) In Aqueous Samples Method: EPA 365.2 & SM 4500P E, 11/19, Revision 0.	Definitive	Water / Total and Dissolved Phosphorus	Spectrophotometer	N

Worksheet #24: Analytical Instrument Calibration

(EPA UFP-QAPP Guidance Manual, Section 3.2.2)

The Analytical Instrument Calibration Table and the specific analytical method SOP references are provided in **Appendix B**.

INSTRUMENT	CALIBRATION PROCEDURE	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	TITLE/POSITION FOR RESPONSIBLE CORRECTIVE ACTION	SOP REFERENCE[1]
GC/MS	Instrument tune check	Prior to initial calibration (ICAL) and prior to each 12-hour period of sample analysis	Specific ion abundance criteria from method.	Retune instrument and verify	Analyst, Department Manager	VOC-8260 SOC-8270
GC/MS (8270 analysis only)	Breakdown Check	At the beginning of each 12-hour period prior to analysis of samples	Degradation ≤20% for DDT. Benzidine and pentachlorophenol should be present at their normal responses and should not exceed a tailing factor or 2	Correct problem and repeat breakdown check	Analyst, Department Manager	SOC-8270
GC/MS	ICAL	At instrument set-up, prior to sample analysis	Each analyte must meet one of the three options below: • Option 1: relative standard deviation (RSD) for each analyte ≤15%; • Option 2: linear least squares regression for each analyte: $r^2 \geq 0.99$; • Option 3: non-linear least squares regression (quadratic) for each analyte: $r^2 \geq 0.99$.	Correct problem then repeat ICAL.	Analyst, Department Manager	VOC-8260 SOC-8270
GC/MS	Second Source Calibration Verification (ICV)	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All reported analytes within ± 20% of true value.	Correct problem. Rerun ICV. If that fails, repeat ICAL.	Analyst, Department Manager	VOC-8260 SOC-8270
GC/MS	Continuing Calibration (CCV)	Daily before sample analysis; after every 12 hours of analysis time; and at the end of the analytical batch run.	All reported analytes and surrogates within ± 20% of true value. All reported analytes and surrogates within ± 50% for end of analytical batch CCV.	Recalibrate, and reanalyze all affected samples since the last acceptable CCV; or Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either	Analyst, Department Manager	VOC-8260 SOC-8270

INSTRUMENT	CALIBRATION PROCEDURE	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	TITLE/POSITION FOR RESPONSIBLE CORRECTIVE ACTION	SOP REFERENCE(1)
				fails, take corrective action(s) and re-calibrate and reanalyze all samples since last acceptable CCV. Non-detect samples may be reported with a high bias CCV.		
ICP/AES	ICAL 3 standards plus blank	Daily ICAL prior to sample analysis.	If more than one calibration standard is used, r^2 ≥0.99.	Correct problem, then repeat ICAL.	Analyst, Department Manager	MET-200.7
ICP/AES	ICV	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All reported analytes within ± 10% of true value.	Correct problem. Rerun ICV. If that fails, repeat ICAL.	Analyst, Department Manager	MET-200.7
ICP/AES	CCV	After every 10 field samples, and at the end of the analysis sequence.	All reported analytes within ± 10% of the true value.	Correct problem, rerun CCV. If that fails then repeat ICAL. Reanalyze all samples since the last acceptable CCV.	Analyst, Department Manager	MET-200.7
ICP/AES	High Level Check Standard (Linear Dynamic Range)	Daily	Analytes must agree within 10% of the expected value	Correct problem, reanalyze	Analyst, Department Manager	MET-200.7
ICP/AES	Low Level Calibration Check Standard (LLCCV)	Beginning of daily run	80-120%	Correct problem, reanalyze	Analyst, Department Manager	MET-200.7
ICP/AES	Calibration Blank	Immediately after the ICV and every CCV	The absolute value of all analytes must be < ½ LOQ or <1/10th the amount measured in any sample. Samples <LOD may be reported with a failed blank without qualification.	Correct problem. Re-prep and reanalyze calibration blank. All samples following the last acceptable calibration blank must be reanalyzed except samples <LOD.	Analyst, Department Manager	MET-200.7
ICP/AES	Interference Check Standard (ICS)	After ICAL and prior to sample analysis and at the end of the daily sequence	ICS-A: Absolute value of concentration for all non-spiked analytes <1/2 LOQ (unless a verified trace impurity from spiked analytes). ICS-AB: Within 20% of true value	Terminate analysis; locate and correct problem; reanalyze ICS, reanalyze affected samples	Analyst, Department Manager	MET-200.7

INSTRUMENT	CALIBRATION PROCEDURE	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	TITLE/POSITION FOR RESPONSIBLE CORRECTIVE ACTION	SOP REFERENCE[1]
ICP/MS	Tune	Each analytical sequence prior to ICAL	Mass calibration ≤ 0.1 amu from the true value; Resolution < 0.9 amu full width at 10% peak height.	Correct problem, retune instrument	Analyst, Department Manager	MET-6020A/200.8
ICP/MS	ICAL – 3 standard calibration plus blank	Daily ICAL prior to sample analysis.	If more than one calibration standard is used, $r^2 \geq 0.99$.	Correct problem, then repeat ICAL.	Analyst, Department Manager	MET-6020A/200.8
ICP/MS	ICV	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All reported analytes, within ± 10% of true value.	Correct problem. Rerun ICV. If that fails, repeat ICAL.	Analyst, Department Manager	MET-6020A/200.8
ICP/MS	CCV	After every 10 field samples and at the end of the analysis sequence.	All reported analytes within ± 10% of the true value.	Correct problem, rerun CCV. If that fails, then repeat ICAL. Reanalyze all samples since the last acceptable CCV.	Analyst, Department Manager	MET-6020A/200.8
ICP/MS	LLCCV	Beginning of daily run	80-120%	Correct problem, reanalyze	Analyst, Department Manager	MET-6020A/200.8
ICP/MS	Calibration Blank	Immediately after the ICV and every CCV.	Absolute values of all analytes must be <1/2 LOQ or <1/10th the amount measured in any sample.	Correct problem. Re-prep and reanalyze calibration blank. All samples following the last acceptable calibration blank must be reanalyzed except samples <LOQ.	Analyst, Department Manager	MET-6020A/200.8
ICP/MS	ICS	At beginning of the daily sequence	ICS-A: Absolute value of concentration for all non-spiked analytes < ½ LOQ ICS-AB: Within 20% of true value	Terminate analysis; locate and correct problem; reanalyze ICS, reanalyze affected samples.	Analyst, Department Manager	MET-6020A/200.8
CVAA	ICAL - 5 points plus a calibration blank	Daily ICAL prior to sample analysis.	Correlation coefficient of calibration curve ≥0.995	Correct problem, then repeat ICAL.	Analyst, Department Manager	MET-HG
CVAA	ICV	Once after each ICAL, analysis of a second source standard prior	All reported analytes within ± 10% of the true value.	Correct problem. Rerun ICV. If that fails, Rerun ICAL.	Analyst, Department Manager	MET-HG

INSTRUMENT	CALIBRATION PROCEDURE	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	TITLE/POSITION FOR RESPONSIBLE CORRECTIVE ACTION	SOP REFERENCE[1]
		to sample analysis.				
CVAA	CCV	After every 10 field samples and at the end of the analysis sequence.	Analyte within ± 10% of the true value.	Correct problem, rerun CCV. If that fails, then repeat ICAL. Reanalyze all samples since the last acceptable CCV.	Analyst, Department Manager	MET-HG
CVAA	Calibration Blank	Before beginning a sample run, after every 10 samples, and at the end of the analysis sequence.	The absolute values of all analyte must be < ½ LOQ or < 1/10th the amount measured in any sample or 1/10th the regulatory limit, whichever is greater	Correct problem. Re-prep and reanalyze calibration blank. All samples following the last acceptable calibration blank must be reanalyzed.	Analyst, Department Manager	MET-HG
CVAA	LLCCV	Daily	Within 20% of the true value.	Correct problem and repeat ICAL.	Analyst, Department Manager	MET-HG
HPLC	ICAL	At instrument setup and after ICV or CCV failure, prior to sample analysis	ICAL must meet one of the three options below: Option 1: RSD for each analyte ≤ 15%; Option 2: linear least squares regression for each analyte: r2 ≥ 0.99; Option 3: non-linear least squares regression (quadratic) for each analyte: r2 ≥ 0.99	Correct problem then repeat ICAL	Analyst, Department Manager	1B-8330
HPLC	ICV	After each ICAL prepared from a second source standard prior to sample analysis	All reported analytes within ± 20% of the expected value	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat ICAL. Flagging is not appropriate.	Analyst, Department Manager	1B-8330
HPLC	CCV	Daily before sample analysis; after every 10 field samples, and at the end of the analysis sequence	All reported analytes and surrogates within ± 20% of true value.	Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails or if two consecutive CCVs cannot be run, perform corrective action(s) and repeat CCV and all associated samples since	Analyst, Department Manager	1B-8330

INSTRUMENT	CALIBRATION PROCEDURE	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	TITLE/POSITION FOR RESPONSIBLE CORRECTIVE ACTION	SOP REFERENCE(1)
				last successful CCV. Alternately, recalibrate if necessary; then reanalyze all associated samples since the last acceptable CCV. Flagging is only appropriate in cases where the samples cannot be reanalyzed.		
LC/MS/MS	Interference Threshold Study	Initial setup and after major changes	Measure the threshold of common suppressors can be present without affecting quantitation	NA	Analyst, Department Manager	HE-LCMSPER001 and DoD QSM 5.3 Table B-13
LC/MS/MS	Mass calibration	Prior to sample analysis	Mass calibration range must bracket the ion masses of interest. The most recent mass calibration must be used for an analytical run, and the same mass calibration must be used for all data files in an analytical run. Mass calibration must be verified by acquiring a full scan continuum mass spectrum of a perchlorate stock standard.	If the mass calibration fails, recalibrate. If it still fails, consult manufacturer instructions on corrective maintenance.	Analyst, Department Manager	HE-LCMSPER001 and DoD QSM 5.3 Table B-13
LC/MS/MS	Tune Check	Prior to ICAL and after any mass calibration or maintenance is performed.	Tuning standard must contain analytes of interest or appropriate substitute. Mass assignments of tuning standard within 0.5 amu of true value.	Retune instrument. If the tuning will not meet acceptance criteria, an instrument mass calibration must be performed and the tuning redone.	Analyst, Department Manager	HE-LCMSPER001 and DoD QSM 5.3 Table B-13
LC/MS/MS	ICAL	Initial calibration prior to sample analysis	1. % RSD≤20% 2. r ≥ 0.995 (linear) 3. r 2 ≥ 0.995 (quadratic)	Correct problem then re-calibrate	Analyst, Department Manager	HE-LCMSPER001 and DoD QSM 5.3 Table B-13

INSTRUMENT	CALIBRATION PROCEDURE	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	TITLE/POSITION FOR RESPONSIBLE CORRECTIVE ACTION	SOP REFERENCE[1]
LC/MS/MS	ICV	After each ICAL prepared from a second source standard prior to sample analysis	All reported analytes within ± 15% of the true value.	Correct problem and verify second source standard. Rerun second source standard. If that fails, correct problem and repeat ICAL.	Analyst, Department Manager	HE-LCMSPER001 and DoD QSM 5.3 Table B-13
LC/MS/MS	CCV	Before sample analysis, after every 10 samples, and at the end of the sequence any mass calibration or maintenance is performed.	All reported analytes and surrogates within ± 15% of true value	Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails or if two consecutive CCVs cannot be run, perform corrective action(s) and repeat CCV and all associated samples since last successful CCV. Alternately, recalibrate if necessary; then reanalyze all associated samples since the last acceptable CCV.	Analyst, Department Manager	HE-LCMSPER001 and DoD QSM 5.3 Table B-13

INSTRUMENT	CALIBRATION PROCEDURE	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	TITLE/POSITION FOR RESPONSIBLE CORRECTIVE ACTION	SOP REFERENCE(1)
IC	ICAL	Initial calibration prior to sample analysis.	ICAL must meet r ≥0.995	Correct problem then repeat initial calibration. No samples shall be analyzed until ICAL has passed.	Analyst, Department Manager	HS-IC001
IC	ICV	Once immediately following three-point initial calibration.	All analytes within ± 10% of expected value.	Correct problem and/or prepare fresh ICV, then rerun ICV. If that fails, repeat initial calibration. No samples shall be analyzed until ICV has passed.	Analyst, Department Manager	HS-IC001
IC	CCV	CCV a daily before samples and then after every 10 injections and at the end of the analysis sequence.	All reported analytes within ± 10% of expected value for CCV	I Correct problem, repeat calibration verification and reanalyze all samples since last successful calibration verification.	Analyst, Department Manager	HS-IC001
Colorimeter	ICAL	Each analytical sequence - 5 Standards and a Blank	cc ≥ 0.997	Recalibrate	Analyst, Department Manager	GEN-365.1
Colorimeter	ICV	Once after each ICAL, prior to beginning a sample run	Analyte must agree within 10% of the expected value	Correct problem and rerun ICV. If that fails, correct problem and repeat ICAL.	Analyst, Department Manager	GEN-365.1
Colorimeter	CCV	Every 10 samples and at the end of the analytical sequence	Analytes must agree within 10% of the expected value	Correct problem, rerun CCV. If that fails, then repeat ICAL. Reanalyze all samples since the last acceptable CCV.	Analyst, Department Manager	GEN-365.1
Colorimeter	Calibration Blank	Immediately after the ICV and every CCV.	The absolute value of all analytes must be < LOQ or <1/10th the amount measured in any sample. Samples <LOQ may be reported with a failed blank without qualification.	Correct problem. Re-prep and reanalyze calibration blank. All samples following the last acceptable calibration blank must be reanalyzed except samples <LOQ.	Analyst, Department Manager	GEN-365.1

INSTRUMENT	CALIBRATION PROCEDURE	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	TITLE/POSITION FOR RESPONSIBLE CORRECTIVE ACTION	SOP REFERENCE[1]
Spectrophotometer	ICAL	Prior to sample analysis	r ≥ 0.995	Correct problem then repeat ICAL	Analyst, Department Manager	GEN-365.3
Spectrophotometer	ICV	After the ICAL	within 10% of the expected value	Correct problem and verify second source standard. If fails, correct problem and repeat ICAL.	Analyst, Department Manager	GEN-365.3
Spectrophotometer	CCV	Prior to sample analysis	within 10% of the expected value	Correct problem then repeat CCV. If fails repeat ICAL.	Analyst, Department Manager	GEN-365.3
Spectrophotometer	Calibration Blank	Prior to sample analysis	<LOQ	If above LOQ, reanalyze	Analyst, Department Manager	GEN-365.3
Spectrophotometer –Total and Dissolved Phosphorus	ICAL – Minimum of a 5-point calibration curve plus a blank is prepared.	Prior to sample analysis	Linear Regression Correlation Coefficient ≥0.995	(1) Investigate source of problem (2) Recalibrate	Analyst, Department Manager	CA-781
Spectrophotometer –Total and Dissolved Phosphorus	ICV	Once after each ICAL, prior to beginning a sample run.	%R must within 80-120% for all	(1) If the ICV fails high, report samples that are not detected. (2) Redigest, recalibrate and/or reanalyze other samples.	Analyst, Department Manager	CA-781
Spectrophotometer –Total and Dissolved Phosphorus	CCV	One after every 10 samples	%R must within 80-120%	(1) If the CCV fails high, report samples that are not detected. (2) Redigest, recalibrate and/or reanalyze other samples back to last acceptable CCV recovery	Analyst, Department Manager	CA-781

1. Refer to the Analytical SOP References table (Worksheet #23).

Worksheet #25: Analytical Instrument and Equipment Maintenance, Testing, and Inspection

(EPA UFP-QAPP Guidance Manual, Section 3.2.3)

This worksheet provides information on analytical instruments and equipment, maintenance, testing, and inspection. To ensure that the analytical instruments and equipment are available and in working order when needed, all laboratory analytical equipment will undergo maintenance and testing procedure in accordance with the laboratory SOPs (provided in **Appendix B**).

INSTRUMENT/ EQUIPMENT	MAINTENANCE ACTIVITY	TESTING ACTIVITY	INSPECTION ACTIVITY	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION	RESPONSIBLE PERSON	SOP REFERENCE [1]
GC/MS	Check pressure and gas supply daily. Clean Source. Change glass insert/sleeve, o-rings, septa, injection port liner as needed, system baking, cut column as needed, clean autosampler syringe, change trap as needed.	VOCs SVOCs	ICAL, CCV, Tune, Analytical QC.	Initial start-up and as needed.	Same as ICAL, CCV, Tune, and accuracy criteria	Correct the problem and repeat ICAL or CCV.	Analyst, Department Manager	VOC-8260 SOC-8270
ICP-AES	Clean plasma torch; clean filters; clean spray and nebulizer chambers; replace pump tubing	Metals	Torch, filters, nebulizer chamber, pump, pump tubing	Perform as needed.	Acceptable calibration or CCV	Repeat maintenance activity or remove from service.	Analyst, Department Manager	MET-200.7
Cold Vapor AA	Clean or replace dehydrator tubing and sample mixing coil tubing; replace sample probe; replace pump tubing; clean optical cell.	Mercury	Tubing, sample probe, optical cell	Perform as needed.	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service	Analyst, Department Manager	MET-HG
ICP-MS	Removal and Cleaning of Cone, extraction lens, ion stack lens, glassware and fittings, and air filters. Add or change rotary pump oil.	Metals	Instrument Performance/ Visual inspection	Perform as needed.	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service.	Analyst, Department Manager	MET-6020A/200.8
Colorimeter	Maintenance Wash, change needle	Orthophosphate as P	Visual inspection	Monthly maintenance wash, change needle as needed.	Must meet initial and/or continuing calibration criteria, blank criteria, no carryover	Repeat maintenance activity or remove from service.	Analyst, Department Manager	GEN-365.1
HPLC	Check pressure and check for leaks. Replace worn fittings. Replace frit, replace guard column.	Explosives	Inspect fittings and connections for leaks. Monitor system pressure.	Each day of analysis	No leaks identified. System	Determine source of problem.	Analyst, Department Manager	1B-8330

INSTRUMENT/ EQUIPMENT	MAINTENANCE ACTIVITY	TESTING ACTIVITY	INSPECTION ACTIVITY	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION	RESPONSIBLE PERSON	SOP REFERENCE [1]
			Monitor signal intensity and baseline noise.		pressure not excessive. Acceptable baseline noise levels	Performs appropriate maintenance		
LC/MS/MS	Access column performance, signal, and needle spray	Perchlorate	Inspect for excessive system pressure and changes to chromatography; Noticeable decrease in signal; Inspect for irregular needle spray or noticeable decrease in signal	Ongoing monitoring and when decrease in signal is apparent	System pressure normalized. Peak shape good and acceptable retention time, normal signal, and normal spray pattern	Back flush analytical column; remove and clean curtain cone and inlet assembly per manufacturer's instructions; Replace electroneedle or clean the needle sheath if pray appears irregular or signal discreases noticeably.	Analyst, Department Manager	HE-LCMSPER001
Ion Chromatograph (IC)	Replace column, seals	Anions	Check gas supply, check for leaks, check pistons	Daily or as needed	ICV/CCV 90-110% of true value	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data.	Analyst, Department Manager	HS-IC001
Spectrophotometer	Clean the Probe Rinse and Wash Station Bottle reservoirs and the Wash Station Probes as described in the Westco Scientific Instruments, Inc. Maintenance Manual, Chapter 7.1 and 7.2. Replace the peristaltic pump tubing and hydraulic circuit tubing Clean hydraulic line and cuvette	Total Phosphorus	Visual inspection tubing, reservoirs, probe, cuvette	For periods of continuous use, perform this maintenance every 2 weeks. Replace tubing after continuous use or every year per	Acceptable QC and proper instrument function.	Clean or replace part as needed.	Analyst, Department Manager	GEN-365.3

INSTRUMENT/ EQUIPMENT	MAINTENANCE ACTIVITY	TESTING ACTIVITY	INSPECTION ACTIVITY	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION	RESPONSIBLE PERSON	SOP REFERENCE (1)
				Instrument Manual. Clean hydraulic line and cuvette when discoloration is apparent.				
Spectrophotometer	Clear cuvettes and lens as necessary. Outside calibration annually.	Total and Dissolved Phosphorus	Cuvettes, cuvette holder, lenses	As necessary	Acceptable calibration or CCV	Correct the problem and repeat calibration or CCV	Analyst, Department Manager	CA-781

(1) Laboratory SOPs are subject to revision and updates during duration of the project, lab will use the most current revision of the SOP at the time of analysis.

Worksheets #26 & 27: Sample Handling, Custody, and Disposal

(EPA UFP-QAPP Guidance Manual, Section 3.3)

26.1 SAMPLE NUMBERING

The sample numbering system will continue to be implemented to identify each sample collected. This numbering system will ensure that each sample is uniquely labeled and will provide a tracking procedure to allow retrieval of information about each sample collected. QC samples will be numbered using the same sequential system and notes will be made in the field notebook to record which samples are QC samples; however, duplicates will not be identified to the laboratory. The sample numbering will use the AAST##### nomenclature, where AA = Area/Site Code, ST = Study ID, and ##### = 5-digit numerical code.

Table 26.1 – Sample Numbering Nomenclature

AA = AREA/SITE CODE	ST = STUDY ID	##### = 5 DIGIT NUMERICAL CODE
45 = OD Grounds	SI = Site Investigation	000## = Field QC items (e.g., Rinsate Blanks)
	LM= Long Term Monitoring	001## = Shipment QC samples (e.g., Trip Blanks)
	MI = Mini-Investigation	2#### = Groundwater Samples
	--	3#### = Surface Water Samples
	--	4#### = Sediment Samples

Every sample number will be preceded by the site name designation to identify the site from which the sample was collected. The numerical component for each sample will building upon past LTM events. For database consistency, the next event sample sequence will begin with a sample ID that is one increment higher than the last sample from the previous LTM event. Sample name/numbering examples are shown in **Table 26.2**, and the complete sample list for the next round of sampling for each site is detailed on **Worksheet #18**.

Table 26.2 – Sample Name/Numbering System by Matrix

SITE	SITE NAME DESIGNATION	MATRIX	EXAMPLE SAMPLE ID
OD Grounds	45MI	Groundwater	45MI20001
OD Grounds	45MI	Surface Water	45MI30008
OD Grounds	45MI	Sediment	45MI40001

26.2 SAMPLE HANDLING

To ensure sample authenticity and data defensibility, proper sample handing system procedures will be followed from the time of sample collection to final sample disposal. The Contractor Sample Team Lead or designee is responsible for completing the sample bottle label and chain of Custody CoC form, sample collection, sample packing, and coordination of sample shipment. The Total and Dissolved Phosphorus water samples will be sent for analytical testing to Katahdin in Scarborough, Maine via FedEx or UPS Next Day Delivery service. All other samples will be sent to the analytical laboratory, ALS in Rochester, New York via FedEx or UPS Next Day Delivery service.

The laboratory receiving staff and/or custodians will acknowledge the sample receipts upon arrival. The laboratory analytical technicians will prepare and analyze the field samples in accordance with the analytical SOPs. The field samples and all extracts will be stored at the laboratory for 30 days after a final report has been submitted to Parsons. The laboratory hazardous waste manager will be responsible for the final sample disposal upon notice from the Contractor Project Chemist.

Table 26.1 – Responsibilities for Sample Handling, Custody, and Disposal

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT	
Sample Collection (Personnel/Organization)	Parsons Sample Team Lead or designee
Sample Packaging (Personnel/Organization)	Parsons Sample Team Lead or designee
Coordination of Shipment (Personnel/Organization)	Parsons Project Chemist
Type of Shipment/Carrier	FedEx or UPS Next Day Delivery
SAMPLE RECEIPT AND ANALYSIS	
Sample Receipt (Personnel/Organization)	Sample receiving supervisor, ALS/Katahdin
Sample Custody and Storage (Personnel/Organization)	Sample receiving supervisor, ALS/Katahdin
Sample Preparation (Personnel/Organization)	Analyst, ALS/Katahdin
Sample Determinative Analysis (Personnel/Organization)	Analyst, ALS/Katahdin
SAMPLE ARCHIVING	
Field Sample Storage (No. of days from sample collection)	60 days
Sample Extract/Digestate Storage (No. of days from extraction/digestion)	40 days
SAMPLE DISPOSAL	
Personnel/Organization	Sample receiving supervisor, ALS/Katahdin
Number of Days from Analysis	60 days, or when notified by Parsons project chemist

26.2.1 Sample Labeling

Sample labels will include, at a minimum, project name, project number, sample ID, date/time collected, analysis group or method, preservative, and sampler's name. Labels will be taped to the jar or sample bag prior to sample collection to ensure that they do not separate.

26.3 FIELD SAMPLE CUSTODY PROCEDURES (SAMPLE COLLECTION, PACKAGING, SHIPMENT, AND DELIVERY TO LABORATORY)

Samples will be collected by field team members under the supervision of the Contractor Sample Team Lead. The sampling team will document the sample collection in a field logbook. Samples will be cushioned if necessary with packaging material and placed into coolers along with the CoC. Coolers will be shipped to the laboratory via next day delivery, with the bill number indicated on the CoC (to relinquish custody). Upon delivery, the laboratory will log in each cooler and report the status of the samples.

The following address will be used for sample shipments of Total and Dissolved Phosphorus in waters:

Katahdin Analytical Services
600 Technology Way
Scarborough, ME 04074
Tel.: (207) 874-2400

The following address will be used for all other sample shipments:

ALS Rochester
1565 Jefferson Road, Bldg. 300, Suite 360
Rochester, NY 14623
Tel.: (585) 288-5380

26.3.1 LABORATORY SAMPLE CUSTODY PROCEDURES (RECEIPT OF SAMPLES, ARCHIVING, DISPOSAL)

All laboratory sample receipt, internal custody and sample archiving, and disposal procedures shall be completed in accordance with Katahdin SOPs: SD-902-13 and SD-903-06 and ALS Rochester SOPs: SMO-GEN, ADM-ARCH, SMO-SPLDIS (sub labs: Houston- SMO-001, SMO-003, HE-QA002; Kelso- SMO-GEN, SMO-SCOC, SMO-DISP; Middletown- 19-Rec-Han, 19-Waste Disposal, 99-Document Control).

26.3.2 SAMPLE IDENTIFICATION PROCEDURES

Upon opening the cooler at the analytical laboratory, the receiving clerk will sign the CoC. Then the sample containers in the cooler will be unpacked and checked against the client's CoC. Any discrepancies noted with the samples will be noted on the COC upon receipt. The clerk will deliver the CoC (and any other paperwork) to the Laboratory PM for entry into the Laboratory Information Management System (LIMS) and for client notification.

The laboratory will send sample login forms to the data validator to check sample IDs and parameters are correct. The field logbook will identify the sample ID with the location, depth, date/time collected, and the parameters requested. The laboratory will assign each field sample a laboratory sample ID based on information in the CoC.

26.3.3 CHAIN-OF-CUSTODY (COC) PROCEDURES

CoC forms will include, at a minimum, laboratory contact information, client contact information, sample information, and relinquished by/received by information. Sample information will include sample ID, date/time collected, number and type of containers, preservative information, analysis method, and comments. The CoC will also have the sampler's name and signature. The CoC will link the location of the sample from the field logbook to the laboratory receipt of the sample. The laboratory will use the sample information to populate the LIMS database for each sample.

26.3.4 NON-CONFORMANCE

The Laboratory Project Managers will contact the Contractor Project Chemist to resolve any issues encountered during sample receipt and login. The Contractor Project Chemist will coordinate with the Contractor Sample Team Lead and other personnel as necessary to resolve the issues.

Worksheet #28: Analytical Quality Control and Corrective Action

(EPA UFP-QAPP Guidance Manual, Section 3.4 and Tables 4, 5, and 6)

The tables in this worksheet describe the requirements for laboratory analysis of QC samples (e.g., laboratory control samples, method blanks, matrix spikes, etc.) for each analytical method used. The tables below detail the QC sample frequency, method/SOP QC acceptance criteria, corrective actions to be taken in the event analyses do not meet the acceptance criteria and the person(s) responsible for implementing corrective actions, and measurement performance criteria.

28.1 VOCS BY EPA SW-846 METHOD 8260C

Matrix: Groundwater, Surface water, and Sediment
Analytical Group: VOCs
Analytical Method: EPA SW-846 Method 8260C
SOP: VOC-8260

Table 28.1a - Quality Control and Corrective Actions for Analysis of VOCs

QC SAMPLE	NUMBER/ FREQUENCY	METHOD/SOP ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	PERSON(S) RESPONSIBLE FOR CA	PROJECT-SPECIFIC MPC
Method Blank (MB)	One per preparatory batch of 20 or fewer samples of similar matrix.	No analytes detected > ½ LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater. Common contaminants must not be detected > LOQ.	Reprep and reanalyze the method blank and all samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified and explained in the case narrative.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
Surrogate	All field and QC samples	QSM 5.3 Appendix C limits as listed in the table 28.1b and 28.1c below.	Correct problem, then reprep and reanalyze all failed samples for all surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, or historical results verify interference reanalysis may not be necessary.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
Laboratory Control Sample (LCS)	One per preparation batch of 20 or fewer samples of similar matrix.	QSM 5.3 Appendix C Limits used for batch control. See table 28.1b and 28.1c below.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified and explained in the case narrative	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.

QC SAMPLE	NUMBER/ FREQUENCY	METHOD/SOP ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	PERSON(S) RESPONSIBLE FOR CA	PROJECT-SPECIFIC MPC
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	As specified on the chain-of-custody by Parsons or one pair per 20 or fewer samples of similar matrix.	Recovery QC acceptance criteria same as LCS. RPD of all analytes ≤ 20% (between MS and MSD	Recovery - assume matrix interference if LCS is acceptable. Apply Flag to parent sample. RPD - Examine chromatogram for interferences. Examine sample for possible heterogeneity. Flag parent sample and narrate.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
Internal Standard (IS)	Every field sample, standard, and QC sample	Retention time within ± 10 seconds from retention time of the midpoint standard in the ICAL; EICP area within - 50% to +100% of ICAL midpoint standard.	Inspect mass spectrometer and GC for malfunctions and correct problem. Reanalysis of samples analyzed while system was malfunctioning is mandatory.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.

Table 28.1b - LCS/MS/MSD Control Limits for VOCs in water

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
1,1,1,2-Tetrachloroethane	78-124
1,1,1-Trichloroethane	74-131
1,1,2,2-Tetrachloroethane	71-121
1,1,2-Trichloroethane	80-119
1,1-Dichloroethane	77-125
1,1-Dichloroethene	71-131
1,1-Dichloropropene	79-125
1,2,3-Trichlorobenzene	69-129
1,2,3-Trichloropropane	73-122
1,2,4-Trichlorobenzene	69-130
1,2,4-Trimethylbenzene	76-124
1,2-Dibromo-3-Chloropropane	62-128
1,2-Dibromoethane	77-121
1,2-Dichlorobenzene	80-119
1,2-Dichloroethane	73-128
1,2-Dichloropropane	78-122
1,3,5-Trimethylbenzene	75-124
1,3-Dichlorobenzene	80-119
1,3-Dichloropropane	80-119

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
1,4-Dichlorobenzene	79-118
2,2-Dichloropropane	60-139
2-Butanone (MEK)	56-143
2-Chlorotoluene	79-122
2-Hexanone	57-139
4-Chlorotoluene	78-122
4-Methyl-2-pentanone (MIBK)	67-130
Acetone	39-160
Benzene	79-120
Bromobenzene	80-120
Bromochloromethane	78-123
Bromodichloromethane	79-125
Bromoform	66-130
Bromomethane	53-141
cis-1,2-Dichloroethene	78-123
cis-1,3-Dichloropropene	75-124
Carbon disulfide	64-133
Carbon tetrachloride	72-136
Chlorobenzene	82-118
Chloroethane	60-138
Chloroform	79-124
Chloromethane	50-139
Dibromochloromethane	74-126
Dibromomethane	79-123
Ethylbenzene	79-121
Hexachlorobutadiene	66-134
Isopropylbenzene	72-131
m-, p-Xylenes	80-121
Methylene Chloride	74-124
MTBE	71-124
Naphthalene	61-128

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
n-Butylbenzene	75-128
o-Xylene	78-122
p-Isopropyltoluene	77-127
n-Propylbenzene	76-126
sec-Butylbenzene	77-126
Styrene	78-123
trans-1,2-Dichloroethene	75-124
trans-1,3-Dichloropropene	73-127
tert-Butylbenzene	78-124
Tetrachloroethene	74-129
Toluene	80-121
Trichloroethene	79-123
Vinyl chloride	58-137
Xylenes, total	79-121
1,2-Dichloroethane-d4 (Surrogate)	81-118
4-Bromofluorobenzene (Surrogate)	85-114
Dibromofluoromethane (Surrogate)	80-119
Toluene-d8 (Surrogate)	89-112

Table 28.1c - LCS/MS/MSD Control Limits for VOCs in soil/sediment

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
1,1,1,2-Tetrachloroethane	78-125
1,1,1-Trichloroethane	73-130
1,1,2,2-Tetrachloroethane	70-124
1,1,2-Trichloroethane	78-121
1,1-Dichloroethane	76-125
1,1-Dichloroethene	70-131
1,1-Dichloropropene	76-125
1,2,3-Trichlorobenzene	66-130
1,2,3-Trichloropropane	73-125

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
1,2,4-Trichlorobenzene	67-129
1,2,4-Trimethylbenzene	75-123
1,2-Dibromo-3-Chloropropane	61-132
1,2-Dibromoethane	78-122
1,2-Dichlorobenzene	78-121
1,2-Dichloroethane	73-128
1,2-Dichloropropane	76-123
1,3,5-Trimethylbenzene	73-124
1,3-Dichlorobenzene	77-121
1,3-Dichloropropane	77-121
1,4-Dichlorobenzene	75-120
2,2-Dichloropropane	67-133
2-Butanone (MEK)	51-148
2-Chlorotoluene	75-122
2-Hexanone	53-145
4-Chlorotoluene	72-124
4-Methyl-2-pentanone (MIBK)	65-135
Acetone	36-164
Benzene	77-121
Bromobenzene	78-121
Bromochloromethane	78-125
Bromodichloromethane	75-127
Bromoform	67-132
Bromomethane	53-143
cis-1,2-Dichloroethene	77-123
cis-1,3-Dichloropropene	74-126
Carbon disulfide	63-132
Carbon tetrachloride	70-135
Chlorobenzene	79-120
Chloroethane	59-139
Chloroform	78-123

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
Chloromethane	50-136
Dibromochloromethane	74-126
Dibromomethane	78-125
Ethylbenzene	76-122
Hexachlorobutadiene	61-135
Isopropylbenzene	68-134
m-, p-Xylenes	77-124
Methylene Chloride	70-128
MTBE	73-125
Naphthalene	62-129
n-Butylbenzene	70-128
o-Xylene	77-123
p-Isopropyltoluene	73-127
n-Propylbenzene	73-125
sec-Butylbenzene	73-126
Styrene	76-124
trans-1,2-Dichloroethene	74-125
trans-1,3-Dichloropropene	71-130
tert-Butylbenzene	73-125
Tetrachloroethene	73-128
Toluene	77-121
Trichloroethene	77-123
Trichlorofluoromethane	62-140
Vinyl chloride	56-135
Xylenes, total	78-124
1,2-Dichloroethane-d4 (Surrogate)	71-136
4-Bromofluorobenzene (Surrogate)	79-119
Dibromofluoromethane (Surrogate)	78-119
Toluene-d8 (Surrogate)	85-116

28.2 SVOCS BY EPA SW-846 METHOD 8270D

Matrix: Groundwater, Surface Water, and Sediment
Analytical Group: SVOCs
Analytical Method: EPA SW-846 Method 8270D
SOP: SOC-8270

Table 28.2a - Quality Control and Corrective Actions for Analysis of SVOCs

QC SAMPLE	NUMBER/ FREQUENCY	METHOD/SOP ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	PERSON(S) RESPONSIBLE FOR CA	PROJECT-SPECIFIC MPC
Method Blank	One per preparatory batch of 20 or fewer samples of similar matrix.	No analytes detected > ½ LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater. Common contaminants must not be detected > LOQ.	Reprep and reanalyze the method blank and all samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified and explained in the case narrative.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
Surrogate	All field and QC samples	QSM 5.3 Appendix C limits as listed in the tables 28.2b and 28.2c below.	Correct problem, then reprep and reanalyze all failed samples for all surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, or historical results verify interference reanalysis may not be necessary.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
LCS	One per preparation batch of 20 or fewer samples of similar matrix.	A laboratory must use the QSM 5.3 Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified. See table 28.2b and 28.2c below.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified and explained in the case narrative	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
MS/MSD	As specified on the chain-of-custody by Parsons or one pair per 20 or fewer samples of similar matrix.	Recovery QC acceptance criteria same as LCS. See table 28.2b and 28.2c below. RPD of all analytes ≤ 20% (between MS and MSD	Recovery - assume matrix interference if LCS is acceptable. Apply Flag to parent sample. RPD - Examine chromatogram for interferences. Examine sample for possible heterogeneity. Flag parent sample and narrate.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
IS	Every field sample, standard, and QC sample	Retention time within ± 10 seconds from retention time of the midpoint standard in the ICAL; EICP area within - 50% to +100% of ICAL midpoint standard.	Inspect mass spectrometer and GC for malfunctions and correct problem. Reanalysis of samples analyzed while system was malfunctioning is mandatory.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.

Table 28.2b - LCS/MS/MSD Control Limits for SVOCs in water

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
1,2,4,5-Tetrachlorobenzene	35-121
1,2,4-Trichlorobenzene	29-116
1,2-Dichlorobenzene	32-111
1,2-Diphenylhydrazine (Azobenzene)	49-122
1,3-Dichlorobenzene	28-110
1,4-Dichlorobenzene	29-112
1-Methylnaphthalene	41-119
2,3,4,6-Tetrachlorophenol	50-128
2,4,5-Trichlorophenol	53-123
2,4,6-Trichlorophenol	50-125
2,4-Dichlorophenol	47-121
2,4-Dimethylphenol	31-124
2,4-Dinitrophenol	23-143
2,4-Dinitrotoluene	57-128
2,6-Dichlorophenol	50-118
2,6-Dinitrotoluene	57-124
2-Chloronaphthalene	40-116
2-Chlorophenol	38-117
2-Methylnaphthalene	40-121
2-Methylphenol	30-117
2-Nitroaniline	55-127
2-Nitrophenol	47-123
3,3'-Dichlorobenzidine	27-129
3/4-Methylphenol	29-110
3-Nitroaniline	41-128
4,6-Dinitro-2-Methylphenol	44-137
4-Bromophenyl-phenylether	55-124
4-Chloro-3-Methylphenol	52-119
4-Chloroaniline	33-117
4-Chlorophenyl-phenylether	53-121

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
4-Nitroaniline	54-133
4-Nitrophenol	10-126
Acenaphthene	47-122
Acenaphthylene	41-130
Acetophenone	46-118
Anthracene	57-123
Atrazine	44-142
Benzaldehyde	45-132
Benzidine	10-99
Benzo(a)anthracene	58-125
Benzo(a)pyrene	54-128
Benzo(b)fluoranthene	53-131
Benzo(g,h,i)perylene	50-134
Benzo(k)fluoranthene	57-129
Benzoic acid	10-94
Benzyl alcohol	31-112
Biphenyl	49-115
Bis(2-Chloroisopropyl)ether	37-130
Bis(-2-Chloroethoxy)methane	48-120
Bis(2-Chloroethyl)ether	43-118
Bis(2-ethylhexyl)phthalate	55-135
Butyl benzyl phthalate	53-134
Caprolactam	10-41
Carbazole	60-122
Chrysene	59-123
Dibenzo(a,h)anthracene	51-134
Dibenzofuran	53-118
Diethyl phthalate	56-125
Dimethyl phthalate	45-127
Di-n-butyl phthalate	59-127
Di-n-octyl phthalate	51-140

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
Fluoranthene	57-128
Fluorene	52-124
Hexachlorobenzene	53-125
Hexachlorobutadiene	22-124
Hexachlorocyclopentadiene	10-99
Hexachloroethane	21-115
Indeno(1,2,3-cd)pyrene	52-134
Isophorone	42-124
Naphthalene	40-121
Nitrobenzene	45-121
n-Nitrosodimethylamine	23-120
n-Nitrosodi-n-propylamine	49-119
n-Nitrosodiphenylamine	51-123
Pentachlorophenol	35-138
Phenanthrene	59-120
Phenol	34-121
Pyrene	57-126
2,4,6-Tribromophenol (Surrogate)	43-140
2-Fluorobiphenyl (Surrogate)	44-119
2-Fluorophenol (Surrogate)	19-119
Nitrobenzene-d5 (Surrogate)	44-120
p-Terphenyl-d14 (Surrogate)	50-134
Phenol-d6 (Surrogate)	10-107

Table 28.2c - LCS/MS/MSD Control Limits for SVOCs in sediment

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
1,2,4,5-Tetrachlorobenzene	40-117
1,2,4-Trichlorobenzene	34-118
1,2-Dichlorobenzene	33-117
1,2-Diphenylhydrazine (Azobenzene)	41-125

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
1,3-Dichlorobenzene	30-115
1,4-Dichlorobenzene	31-115
1-Methylnaphthalene	40-119
2,3,4,6-Tetrachlorophenol	44-125
2,4,5-Trichlorophenol	41-124
2,4,6-Trichlorophenol	39-126
2,4-Dichlorophenol	40-122
2,4-Dimethylphenol	30-127
2,4-Dinitrophenol	10-148
2,4-Dinitrotoluene	48-126
2,6-Dichlorophenol	41-117
2,6-Dinitrotoluene	46-124
2-Chloronaphthalene	41-114
2-Chlorophenol	34-121
2-Methylnaphthalene	38-122
2-Methylphenol	32-122
2-Nitroaniline	44-127
2-Nitrophenol	36-123
3,3'-Dichlorobenzidine	22-121
3/4-Methylphenol	34-119
3-Nitroaniline	33-119
4,6-Dinitro-2-Methylphenol	29-132
4-Bromophenyl-phenylether	46-124
4-Chloro-3-methylphenol	45-122
4-Chloroaniline	17-106
4-Chlorophenyl phenyl ether	45-121
4-Nitroaniline	27-102
4-Nitrophenol	30-132
Acenaphthene	40-123
Acenaphthylene	32-132
Acetophenone	33-115

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
Anthracene	47-123
Atrazine	47-127
Benzaldehyde	36-200
Benzidine	30-130
Benzo(a)anthracene	49-126
Benzo(a)pyrene	45-125
Benzo(b)fluoranthene	45-132
Benzo(g,h,i)perylene	43-134
Benzo(k)fluoranthene	47-132
Benzoic acid	10-92
Benzyl alcohol	29-122
Biphenyl	40-117
bis (2-Chloroisopropyl) ether	33-131
bis (-2-Chloroethoxy) methane	36-121
bis (2-Chloroethyl)ether	31-120
bis (2-Ethylhexyl)phthalate	51-133
Butyl benzyl phthalate	48-132
Caprolactam	46-117
Carbazole	50-123
Chrysene	50-124
Dibenzo(a,h)anthracene	45-134
Dibenzofuran	44-120
Diethyl phthalate	50-124
Dimethyl phthalate	48-124
Di-n-butyl phthalate	51-128
Di-n-octyl phthalate	45-140
Fluoranthene	50-127
Fluorene	43-125
Hexachlorobenzene	45-122
Hexachlorobutadiene	32-123
Hexachlorocyclopentadiene	10-133

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
Hexachloroethane	28-117
Indeno(1,2,3-cd)pyrene	45-133
Isophorone	30-122
Naphthalene	35-123
Nitrobenzene	34-122
n-Nitrosodimethylamine	23-120
n-Nitrosodi-n-propylamine	36-120
n-Nitrosodiphenylamine	38-127
Pentachlorophenol	25-133
Phenanthrene	50-121
Phenol	34-131
Pyrene	47-127
2,4,6-Tribromophenol (Surrogate)	39-132
2-Fluorobiphenyl (Surrogate)	44-115
2-Fluorophenol (Surrogate)	35-115
Nitrobenzene-d5 (Surrogate)	37-122
p-Terphenyl-d14 (Surrogate)	54-127
Phenol-d6 (Surrogate)	10-145

28.3 METALS BY EPA SW-846 METHOD 6010C

Matrix: Groundwater, Surface water, and Sediment
Analytical Group: Metals
Analytical Method: EPA SW-846 Method 6010C
SOP: MET-200.7

Table 28.3a - Quality Control and Corrective Actions for Analysis of Metals

QC SAMPLE	NUMBER/ FREQUENCY	METHOD/SOP ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	PERSON(S) RESPONSIBLE FOR CA	PROJECT-SPECIFIC MPC
Method Blank	One per preparatory batch of 20 or fewer samples of similar matrix.	The absolute values of all analytes must be < ½ LOQ, <1/10 the amount measured in any sample, or <1/10 the regulatory limit, whichever is greater. Samples < LOD may be reported with failed MB.	Reprep and reanalyze the method blank and all samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified and explained in the case narrative.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
LCS	One per preparation batch of 20 or fewer samples of similar matrix.	A laboratory must use the QSM 5.3 Appendix C Limits for batch control. See Table 28.3b and 28.3c below.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified and explained in the case narrative	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
MS/MSD	As specified on the chain-of-custody by Parsons or one pair per 20 or fewer samples of similar matrix.	Recovery QC acceptance criteria same as LCS. RPD of all analytes ≤ 20% (between MS and MSD	Examine results of LCS. If both the LCS and MS/MSD are unacceptable, re-prepare and analyze the associated samples and QC, otherwise J-Flag parent sample and narrate.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
Post Digestion Spike	One is performed when MS/MSD fails or analyte concentration(s) in all samples < 50x LOD.	The result must agree within ± 20% of expected result.	Run all associate sample in the preparatory batch by method of standard additions or qualify results.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
Serial Dilution	One is performed for each preparation batch with sample concentration(s) > 50x LOQ when MS/MSD fails.	The five-fold dilution result must agree within ± 10% of the original sample result.	Qualify the results.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.

Table 28.3b - LCS/MS/MSD Control Limits for 6010C Metals in Water Matrix

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
Aluminum	86-115
Barium	88-113
Calcium	87-113
Chromium	90-113
Cobalt	89-114
Copper	86-114
Iron	87-115
Magnesium	85-113
Manganese	90-114
Nickel	88-113
Potassium	86-114
Silver	84-115
Sodium	87-115
Vanadium	90-111
Zinc	87-115

Table 28.3c - LCS/MS/MSD Control Limits for 6010C Metals in Solid Matrix

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
Aluminum	74-119
Antimony	79-114
Arsenic	82-111
Barium	83-113
Beryllium	83-113
Cadmium	82-113
Calcium	81-116
Chromium	85-113
Cobalt	85-112
Copper	81-117
Iron	81-118

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
Lead	81-112
Magnesium	78-115
Manganese	84-114
Nickel	83-113
Potassium	81-116
Selenium	78-111
Silver	82-112
Sodium	83-118
Thallium	83-111
Vanadium	82-114
Zinc	82-113

28.4 METALS BY EPA SW-846 METHOD 6020A

Matrix: Groundwater, Surface water, and Sediment
Analytical Group: Metals
Analytical Method: EPA SW-846 Method 6020A
SOP: MET-6020A/200.8

Table 28.4a - Quality Control and Corrective Actions for Analysis of Metals

QC SAMPLE	NUMBER/ FREQUENCY	METHOD/SOP ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	PERSON(S) RESPONSIBLE FOR CA	PROJECT-SPECIFIC MPC
Method Blank	One per preparatory batch of 20 or fewer samples of similar matrix.	The absolute values of all analytes must be < ½ LOQ, <1/10 the amount measured in any sample, or <1/10 the regulatory limit, whichever is greater. Samples < LOD may be reported with failed MB.	Reprep and reanalyze the method blank and all samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified and explained in the case narrative.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
LCS	One per preparation batch of 20 or fewer samples of similar matrix.	A laboratory must use the QSM 5.3 Appendix C Limits for batch control. See Table 28.4b below.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified and explained in the case narrative.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
MS/MSD	As specified on the chain-of-custody by Parsons or one pair per 20 or fewer samples of similar matrix.	Recovery QC acceptance criteria same as LCS. RPD of all analytes ≤ 20% (between MS and MSD	Examine results of LCS. If both the LCS and MS/MSD are unacceptable, re-prepare and analyze the associated samples and QC, otherwise J-Flag parent sample and narrate.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
Post Digestion Spike	One is performed when MS/MSD fails or analyte concentration(s) in all samples < 50x LOD.	The result must agree within ± 20% of expected result.	Run all associate sample in the preparatory batch by method of standard additions or qualify results.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
Serial Dilution	One is performed for each preparation batch with sample concentration(s) > 50x LOQ when MS/MSD fails.	The five-fold dilution result must agree within ± 10% of the original sample result.	Qualify the results.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
IS	Every field sample, standard, and QC sample	IS intensity in the samples within 30-120% of the intensity of the IS in the ICAL blank.	If recoveries are acceptable for QC samples, but not field samples, the field samples may be considered to suffer from a matrix effect. Reanalyze sample at 5-fold dilutions until criteria is met. For failed QC samples, correct problem, and rerun all associated failed field samples.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.

Table 28.4b - LCS/MS/MSD Control Limits for 6020A Metals in Water Matrix

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
Antimony	84-117
Arsenic	84-116
Beryllium	83-121
Cadmium	87-115
Lead	88-115
Selenium	80-120
Thallium	82-116

28.5 MERCURY BY EPA SW-846 METHOD 7470A/7471B

Matrix: Groundwater, Surface water, and Sediment
Analytical Group: Mercury
Analytical Method: EPA SW-846 Method 7470A/7471B
SOP: MET-HG

Table 28.5 - Quality Control and Corrective Actions for Analysis of Mercury

QC SAMPLE	NUMBER/ FREQUENCY	METHOD/SOP ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	PERSON(S) RESPONSIBLE FOR CA	PROJECT SPECIFIC MPC
Method Blank	One per preparation batch of 20 or fewer samples of similar matrix	No analytes detected > 1/2 LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater.	Reprep and reanalyze the method blank and all samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified (B-flag) and explained in the case narrative.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
LCS	One per preparation batch of 20 or fewer samples of similar matrix	82-119%R for waters and 80-124% for solids per the DoD QSM5.3.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified and explained in the case narrative.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
MS/MSD	As specified on the chain-of-custody by Parsons or one pair per 20 or fewer samples of similar matrix.	Recovery QC acceptance criteria same as LCS. RPD of all analytes ≤ 20% (between MS and MSD.	Examine results of LCS. If both the LCS and MS/MSD are unacceptable, re-prepare and analyze the associated samples and QC, otherwise J-Flag parent sample and narrate.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.

28.6 ORTHOPHOSPHATE AS P BY EPA METHODS 365.1 AND SW-846 9056A

Matrix: Groundwater, Surface water, and Sediment
Analytical Group: Orthophosphate as P
Analytical Method: EPA Methods 365.1 and SW-846 9056A
SOP: GEN-365.1 and HS-IC001

Table 28.6 - Quality Control and Corrective Actions for Analysis of Orthophosphate as P

QC SAMPLE	NUMBER/ FREQUENCY	METHOD/SOP ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	PERSON(S) RESPONSIBLE FOR CA	PROJECT SPECIFIC MPC
Method Blank	365.1: One per preparation batch of 10 or fewer samples of similar matrix. One injection covers CCB. 9056A: One per preparation batch of 20 or fewer samples of similar matrix.	No analytes detected >1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit, whichever is greater.	Reprep and reanalyze the method blank and all samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified (B-flag) and explained in the case narrative.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
LCS	One per preparation batch of 20 or fewer samples of similar matrix	90-110%R for waters and solid	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified and explained in the case narrative.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
MS/MSD	As specified on the chain-of-custody by Parsons or one pair per 20 or fewer samples of similar matrix.	365.1: 90-110%R 9056A: 80-120%R RPD of all analytes ≤ 20% (between MS and MSD.	Examine results of LCS. If both the LCS and MS/MSD are unacceptable, re-prepare and analyze the associated samples and QC, otherwise J-Flag parent sample and narrate.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.

28.7 PERCHLORATE BY EPA SW-846 METHOD 6850

Matrix: Groundwater, Surface water, and Sediment
Analytical Group: Perchlorate
Analytical Method: EPA SW-846 Method 6850
SOP: HE-LCMSPER001

Table 28.7a - Quality Control and Corrective Actions for Analysis of Perchlorate

QC SAMPLE	NUMBER/ FREQUENCY	METHOD/SOP ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	PERSON(S) RESPONSIBLE FOR CA	PROJECT-SPECIFIC MPC
Isotope Ratio 35Cl/37Cl	Every sample, batch QC sample, and standard.	Monitor for either the parent ion at masses 99/101 or the daughter ion at masses 83/85 depending on which ions are quantitated. Must fall within 2.3 to 3.8.	If criteria are not met, the sample must be rerun. If the sample was not pretreated, the sample must be re-extracted using cleanup procedures. If, after cleanup, the ratio still fails, use alternative techniques to confirm presence of perchlorate, e.g., a post spike sample or dilution to reduce any interference.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits or DoD QSM Table B-13
IS	Addition of 18O-labeled perchlorate to every sample, batch QC sample, standard, instrument blank, and Method Blank.	Measured 18O IS area within ± 50% of the value from the average of the IS area counts of the ICAL. RRT of the perchlorate ion must be 1.0 ± 2% (0.98 – 1.02).	Rerun the sample at increasing dilutions until the ± 50% acceptance criteria are met. If criteria cannot be met with dilution, the interference is suspected and the sample must be re-prepped using additional pretreatment steps.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits or DoD QSM Table B-13
ICS	One ICS is prepared with every batch of 20 samples and must undergo the same preparation and pretreatment steps as the samples in the batch. It verifies the method performance at the matrix conductivity threshold (MCT). At least one ICS must be analyzed daily. The ICS shall be prepared at the LOQ.	Perchlorate concentration must be within ± 20% of its true value.	Correct problem. Reanalyze all samples and QC samples in the batch. If poor recovery from the cleanup filters is suspected, a different lot of filters must be used to re-extract all samples in the batch. If column degradation is suspected, a new column must be calibrated before the samples can be reanalyzed.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits or DoD QSM Table B-13
Laboratory Reagent Blank (LRB)	Prior to calibration and at the end of the analytical sequence.	No perchlorate detected > ½ LOQ.	Reanalyze Reagent Blank (until no carryover is observed) and all samples processed since the contaminated blank.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits or DoD QSM Table B-13
Method Blank	One per preparatory batch of 20 or fewer samples of similar matrix.	No analytes detected > ½ LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater.	Correct problem. Reprep and reanalyze the method blank and all samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with	Analyst, Laboratory Department	Same as Method/SOP QC Acceptance

QC SAMPLE	NUMBER/ FREQUENCY	METHOD/SOP ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	PERSON(S) RESPONSIBLE FOR CA	PROJECT-SPECIFIC MPC
			the failed MB must be qualified and explained in the case narrative.	Manager, and Data Validator	Limits or DoD QSM Table B-13
LCS	One per preparation batch of 20 or fewer samples of similar matrix.	A laboratory must use the QSM 5.3 Appendix C Limits as follows: Soil = 84-121% Water= 84-119%	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified and explained in the case narrative	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits or DoD QSM Table B-13
MS/MSD	As specified on the chain-of-custody by Parsons or one pair per 20 or fewer samples of similar matrix.	RPD ≤ 15% (between MS and MSD	If RPD indicates obvious extraction/analysis difficulties, sample volume available and reanalyze MS/MSD. Qualify the specific analyte(s) in the parent sample if acceptance criteria are not met and explain in the Case Narrative.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits or DoD QSM Table B-13

28.8 EXPLOSIVES BY EPA SW-846 METHOD 8330B

Matrix: Groundwater, Surface water, and Sediment
Analytical Group: Explosives
Analytical Method: EPA SW-846 Method 8330B
SOP: 1B-8330 and 09-8330 Grinding

Table 28.8a - Quality Control and Corrective Actions for Analysis of Explosives

QC SAMPLE	NUMBER/ FREQUENCY	METHOD/SOP ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	PERSON(S) RESPONSIBLE FOR CA	PROJECT-SPECIFIC MPC
Soil drying procedure	Each sample, LCS, and Method Blank	See SOP 09-8330 Grinding Section 10.1 for drying procedure.	NA	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
Soil sieving procedure	Each sample, LCS, and Method Blank	See SOP 09-8330 Grinding Section 10.1.4 for sieving procedure.	NA	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
Soil Grinding procedure	Each sample, LCS, and Method Blank	See SOP 09-8330 Grinding Section 10.2.1 for grinding procedure. Grab samples only require the acetonitrile-rinsed mortar and	NA	Analyst, Laboratory Department	Same as Method/SOP QC Acceptance Limits.

QC SAMPLE	NUMBER/ FREQUENCY	METHOD/SOP ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	PERSON(S) RESPONSIBLE FOR CA	PROJECT-SPECIFIC MPC
		pestle grinding and passing through 10-mesh sieve.		Manager, and Data Validator	
Soil Subsampling procedure	Each sample, LCS, and Method Blank	See SOP 09-8330 Grinding Section 10.3 for subsampling procedure.	NA	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
Method Blank	One per preparatory batch of 20 or fewer samples of similar matrix.	No analytes detected > ½ LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater.	Correct problem. Reprep and reanalyze the method blank and all samples processed with the contaminated blank. If reanalysis cannot be performed, sample data associated with the failed MB must be qualified and explained in the case narrative.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
LCS	One per preparation batch of 20 or fewer samples of similar matrix.	A laboratory must use the QSM 5.3 Appendix C Limits as seen in Table 28.8b and 28.8c below.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. If reanalysis cannot be performed, sample data associated with the failed LCS must be qualified and explained in the case narrative	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
Surrogate	Each field and QC sample	1,4-Dinitrobenzene used as surrogate. Lab limits of 50-150% for both solid and water matrix.	Correct problem, then re-prep and reanalyze all failed samples for all surrogates in the associated preparatory batch if sufficient sample material is available and within holding time. If obvious chromatographic interference is present, reanalysis may not be necessary, but the failures must be discussed in the Case Narrative. If matrix effect demonstrated for a representative sample set, discuss with project chemist.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
MS/MSD	As specified on the chain-of-custody by Parsons or one pair per 20 or fewer samples of similar matrix.	RPD ≤ 20% (between MS and MSD	If RPD indicates obvious extraction/analysis difficulties, sample volume available and reanalyze MS/MSD. Qualify the specific analyte(s) in the parent sample if acceptance criteria are not met and explain in the Case Narrative.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
Confirmation of positive results (second column)	All results > the DL must be confirmed.	Results between primary and second column RPD ≤40%	Report both columns Apply J-flag if RPD >40% and discuss in the case narrative	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.

Table 28.8b - LCS/MS/MSD Control Limits for Explosives in Solid Matrix

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
1,3,5-Trinitrobenzene	80 – 116
1,3-Dinitrobenzene	73 – 119
2,4,6-Trinitrotoluene	71 – 120
2,4-Dinitrotoluene	75 – 121
2,6-Dinitrotoluene	79 – 117
2-Amino-4,6-dinitrotoluene	71 – 123
2-Nitrotoluene	70 – 124
3,5-Dinitroaniline	86 – 118
3-Nitrotoluene	67 – 129
4-Amino-2,6-dinitrotoluene	64 – 127
4-Nitrotoluene	71 – 124
HMX	74 – 124
Nitrobenzene	67 – 129
Nitroglycerin	73 – 124
Pentaerythritol tetranitrate (PETN)	72 – 128
RDX	67 – 129
Tetryl	68 – 135

Table 28.8c - LCS/MS/MSD Control Limits for Explosives in Water Matrix

COMPOUNDS	LCS/MS/MSD CONTROL LIMITS (%R)
1,3,5-Trinitrobenzene	73 - 125
1,3-Dinitrobenzene	78 – 120
2,4,6-Trinitrotoluene	71 – 123
2,4-Dinitrotoluene	78 – 120
2,6-Dinitrotoluene	77 – 127
2-Amino-4,6-dinitrotoluene	79 – 120
2-Nitrotoluene	70 – 127
3,5-Dinitroaniline	71 – 117
3-Nitrotoluene	73 – 125
4-Amino-2,6-dinitrotoluene	76 – 125
4-Nitrotoluene	71 – 127
HMX	65 – 135
Nitrobenzene	65 – 134
Nitroglycerin	74 – 127
Pentaerythritol tetranitrate (PETN)	73 – 127
RDX	68 – 130
Tetryl	64 - 128

28.9 TOTAL PHOSPHORUS BY EPA METHOD 365.3

Matrix: Sediment
Analytical Group: Total Phosphorus
Analytical Method: EPA Method 365.3
SOP: GEN-365.3

Table 28.9 - Quality Control and Corrective Actions for Analysis of Total Phosphorus

QC SAMPLE	NUMBER/ FREQUENCY	METHOD/SOP ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	PERSON(S) RESPONSIBLE FOR CA	PROJECT SPECIFIC MPC
Method Blank	One per preparation batch of 20 or fewer samples of similar matrix.	No analytes detected > LOQ.	If target exceeds LOQ, reanalyze to determine if instrument was cause. If still noncompliant then re-extract or reanalyze samples containing contaminate, unless samples contain > 20x amount in blank.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
LCS	One per preparation batch of 20 or fewer samples of similar matrix	75-135%R	Correct problem, then re-prep and reanalyze the LCS.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
MS/MSD	As specified on the chain-of-custody by Parsons or one pair per 20 or fewer samples of similar matrix.	75-135%R RPD of all analytes ≤ 20% (between MS and MSD.	Evaluate data to determine if there is a matrix effect or analytical error.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.

28.10 TOTAL AND DISSOLVED PHOSPHORUS BY EPA SW-365.2

Matrix: Groundwater and Surface Water
Analytical Group: Total and Dissolved Phosphorus
Analytical Method: EPA 365.2
SOP: CA-781

Table 28.10 - Quality Control and Corrective Actions for Analysis of Total and Dissolved Phosphorus

QC SAMPLE	NUMBER/ FREQUENCY	METHOD/SOP ACCEPTANCE CRITERIA	CORRECTIVE ACTION (CA)	PERSON(S) RESPONSIBLE FOR CA	PROJECT-SPECIFIC MPC
Method Blank	One per analytical batch of 20 or fewer samples.	No analyte detected >LOQ	(1) Investigate source of contamination (2) Report all sample results <LOQ. (3) Report sample results >10X the blank result and flag results with a "B". (4) Redigest and reanalyze all other samples associated with the failing blank.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
LCS	One per analytical batch of 20 or fewer samples.	%R must be within 80-120	(1) Investigate source of problem. (2) If the LCS recovery is high but the sample results are <LOQ, narrate. Otherwise, reprep a blank and the remaining samples.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
MS	One for every set 10 samples	%R must be within 75-125	(1) Evaluate the samples and associated QC: i.e. If the LCS results are acceptable, narrate. (2) If both the LCS and MS are unacceptable reprep and reanalyze the samples and QC. (3) Notate sample result in raw data if matrix interference suspected.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.
Laboratory Duplicate	One sample duplicate per 10 samples.	RPD <10 for samples >3X the LOQ and < 100 RPD for samples <3X LOQ.	(1) Investigate problem and reanalyze sample in duplicate (2) If RPD still >20, report original result with notation or narration.	Analyst, Laboratory Department Manager, and Data Validator	Same as Method/SOP QC Acceptance Limits.

Worksheet #35: Data Verification Procedures

(EPA UFP-QAPP Guidance Manual, Section 5.2.2)

"Verification" is a completeness check that is performed before the data review process is conducted to determine whether the required information is available for validation. It involves a review of all data inputs to ensure that they are present. This step of the data review process answers whether or not the required data inputs are present. The following table summarizes the methods for data verification.

RECORDS REVIEWED	REQUIREMENT DOCUMENTS	PROCESS DESCRIPTION	RESPONSIBLE PERSON, ORGANIZATION
Field logbook	UFP-QAPP, WP, SOPs	Verify that records are present and complete for each day of field activities. Verify that all planned samples including field QC samples were collected and that sample IDs are documented. Verify that meteorological data were provided for each day of field activities. Verify that changes/exceptions are documented and were reported in accordance with requirements. Verify that any required field measurement was performed and results are documented.	Daily – Parsons Field Team Lead At conclusion of field activities – Parsons Project Manager
Chain-of-custody forms	UFP-QAPP, WP, SOPs	Verify the completeness of chain-of-custody records. Examine entries for consistency with the field logbook. Check that appropriate methods and sample preservation have been recorded. Verify that the required volume of sample has been collected and that sufficient sample volume is available for QC samples (e.g., MS/MSD). Verify that all required signatures and dates are present. Check for transcription errors.	Daily – Parsons sampler Daily prior to samples being sent to the lab – Parsons Project Chemist
Laboratory Deliverable	UFP-QAPP, WP, SOPs	Verify that the laboratory deliverable contains all records specified in the QAPP. Check sample receipt records to ensure sample condition upon receipt was noted, and any missing/broken sample containers were noted and reported according to plan. Compare the data package with the CoCs to verify that results were provided for all collected samples. Review the narrative to ensure all QC exceptions are described. Check for evidence that any required notifications were provided to project personnel as specified in the QAPP. Verify that necessary signatures and dates are present.	Before release – Lab Project Manager, ALS/Katahdin Upon receipt – Parsons Project chemist or data validator
Corrective Action Reports	UFP-QAPP, WP, SOPs	For any non-compliance noted, verify that corrective action was implemented according to plan.	Parsons Project Chemist

Worksheet #36: Data Validation Procedures

(EPA UFP-QAPP Guidance Manual, Section 5.2.2)

"Validation" is performed to identify and qualify data that do not meet the MPCs specified on **Worksheet #12**. Data requiring validation are summarized on **Worksheet #34**. The information in these tables shows what data inputs are required for data validation as well as the processes used to conduct the validation.

36.1 VALIDATION PROCESS

Data validation will be performed in accordance with the DoD "General Data Validation Guidelines" (EDQW 2019) General procedures for chemistry data review and management are described in SOP CHEM-01, Chemistry Data Management (Appendix A). Project specific elements for data validation on this project are summarized in **Tables 36.1** and **36.2** below.

Table 36.1 - Overview of Analytical Data Validation

DATA VALIDATORS: PARSONS

Analytical Group/Method:	All Chemical Analyses
Data deliverable requirements:	Stage 4 data packages and EDDs (NYSDEC EDD)
Analytical specifications:	Per UFP-QAPP, DoD QSM version 5.3 (or current version laboratory is certified under) and Laboratory SOPs
Measurement performance criteria:	Per UFP-QAPP and DoD QSM version 5.3 (or current version laboratory is certified under)
Percent of data packages to be validated:	100%- Stage 2b data validation as required in DoD General Data Validation Guidelines (EDQW 2019).
Percent of raw data reviewed:	As needed[1]
Percent of results to be recalculated:	0%
Validation procedure:	Per UFP-QAPP, DoD General Data Validation Guidelines (EDQW 2019), and USEPA Region 2 SOPs for organic and inorganic data review, current revisions. (Validation preference given to DoD guidance.)
Data validation codes:	See table 36.2 below
Electronic validation program/version:	Excel CSV file and NYSDEC EDD

(1) Review of raw data will be performed as needed in support of any issues discovered during the data validation process

Table 36.2 - Data Validation Codes and Definitions

DATA VALIDATION CODES	DEFINITIONS
U	Analyte was not detected and is reported as less than the Limit of Detection (LOD). The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
UJ	The analyte was not detected and was reported as less than the LOD. However, the associated numerical value is approximate. .
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Note: Labs will report all concentration down to DL and flag any results between DL and LOQ with "J". All non-detected will be reported as <LOD, per DoD QSM.

Electronic data received by the laboratory is reviewed against the hard-copy data report. The automated process will include data flagging for issues related to method blanks, equipment blanks, trip blanks, ambient blanks, LCSs, MS/MSD samples, field duplicates, field triplicates, surrogate recoveries, holding time, and reconciliation of dilutions and re-extractions. All of the elements of QC, their limits, and logic for applying flags are incorporated in the ADR computer application. The software will apply data flags, as well as the reason for each flag. A final flag is applied to the data by the data validator/chemist within the ADR software after reviewing hard copy reports, evaluating all flags applied by the software, and then selecting the most conservative flagging. Final validated ADR formatted text data files which contain all validation flags and reasons will be exported from the ADR software and then electronically imported into a Microsoft Access database. All data summary tables presented in final reports will be prepared using the database. The validated database will be made available to the client.

Worksheet #37: Usability Assessment

(EPA UFP-QAPP Guidance Manual, Section 5.2.3)

This worksheet documents procedures that will be used to perform the data usability assessment. The data usability assessment is performed at the conclusion of data collection activities, using the outputs from data verification and data validation. It is the data interpretation phase, which involves a qualitative and quantitative evaluation of environmental data to determine if the project data are of the right type, quality, and quantity to support the decisions that need to be made. It involves a retrospective evaluation of the systematic planning process, and, like the systematic planning process, involves participation by key members of the project team. The data usability assessment evaluates whether underlying assumptions used during systematic planning are supported, sources of uncertainty have been accounted for and are acceptable, data are representative of the population of interest, and the results can be used as intended, with the acceptable level of confidence.

37.1 USABILITY ASSESSMENT

37.1.1 SUMMARY OF USABILITY ASSESSMENT PROCESSES

The first step of the data usability assessment is to review the sampling design and data collection documentation for consistency and completeness with the project objectives observing any potential discrepancies. Data Validation will be the second step of the usability assessment. See **Worksheet #28** for data quality indicators associated with the analytical measurements to be used on the project. The statistical analysis step will not be performed for this project because there are not enough historical data to perform this step in the data usability assessment; however, the available data for this project will be reviewed for any indication of trends for project compounds of concern. The last step in the assessment process is to determine if the data can be used as intended. All data qualifiers will be evaluated and any possible impact to the overall data quality will be discussed in data validation reports. Any data gap due to the field and/or lab error will be pointed out in the validation report and possible impact to the project will be discussed.

37.1.2 DOCUMENTATION GENERATED

A data validation report will be created for each sample delivery group (SDG), including a summary of all QA/QC results associated with the SDG to provide documentation whether data generated were in control throughout sample analysis. Topics of discussion include all accuracy and precision exceedances as well as the extent of the exceedance and the acceptance criteria for Accuracy/Biased Contamination, Precision of all laboratory and field QA/QC results. The field samples affected by the exceedance and the qualifiers applied to the samples will also be documented. Field duplicate Discussion of, Sensitivity, Representativeness, and Completeness will also be included in the report. Criteria listed in the **Worksheet #12** will be examined to determine if the Measurement Performance Criteria were met. Any lab trending in the QC samples, such as high biased lab control sample for a particular analyte will also be discussed. Data summary tables will be generated in order for data reviewer to review the results in an organized manner. Footnotes will include all flag definitions.

An overall data usability report describing the rationale for the data used and any data limitations will be provided upon request to the NYSDEC. The individual data validation reports will include a discussion of the accuracy, precision, representativeness, completeness and comparability of the data set and deviations from planned procedures and analysis and the impact on the project objectives. Maps will be generated with validated data, and will be presented in the respective annual or letter reports for each site.

37.1.3 PROCEDURES TO ASSESS PROJECT-SPECIFIC OVERALL MEASUREMENT ERROR

The Contractor will determine if quality control data is within specifications through the data validation process (**Worksheet #36**).

37.1.4 PERSONNEL RESPONSIBLE FOR PERFORMING USABILITY ASSESSMENT

The following personnel are responsible for performing usability assessments:

- Contractor Project Manager
- Contractor Project Chemist

37.1.5 IMPACTS OF QUALIFIED DATA AND PLAN DEVIATIONS

The Contractor will use all data not rejected during validation to determine the nature and extent of contamination, and to support the risk assessment. The Contractor will work with the Army and project regulators if there is a concern about the statistical validity of the sample results or to determine if sample locations with rejected data need to be re-sampled.

References

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Intergovernmental Data Quality Task Force (IDQTF), 2012. Uniform Federal Policy for Quality Assurance Project Plans. Optimized UFP-QAPP Worksheets. March 2012. https://www.epa.gov/sites/production/files/documents/ufp_qapp_worksheets.pdf

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Parsons, 2020. Final Work Plan for the OD Grounds Groundwater Sampling. OD Grounds, Seneca Army Depot Activity. April 2020

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Appendices

APPENDIX A – CONTRACTOR SOPS

APPENDIX B – ANALYTICAL SOPS AND CERTIFICATIONS

APPENDIX C – REFERENCE DOCUMENTS

Appendix A

Contractor SOPs

All contractor SOPs have been included in Appendix A of the Work Plan for the OD Grounds Groundwater Sampling to which this UFP-QAPP is attached.

Appendix B

Analytical SOPs and Certifications

Analytical SOPs are provided on the electronic version of this report.

Additional SOPs and laboratory certifications provided which are not found in the Final UFP-QAPP.

Appendix C

Reference Documents

The following historical reports are provided on the electronic (CD) version of this report. This UFP-QAPP Addendum 3 supersedes the previously submitted UFP-QAPP Addendum 2; therefore, it has not been included for reference.

Final UFP-QAPP

UFP-QAPP Addendum 1