



May 2025  
Chambers Creek Wastewater Treatment Plant



# Sediment Sampling and Analysis Plan NPDES Wastewater Discharge Permit No. WA0039624

Prepared for Washington State Department of Ecology  
on behalf of Pierce County

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**Prepared for**  
Washington State Department of Ecology  
on behalf of Pierce County  
2702 S 42nd Street, Suite 109  
Tacoma, Washington 98409

**Prepared by**  
Anchor QEA  
1201 3rd Avenue, Suite 2600  
Seattle, Washington 98101

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## ABBREVIATIONS

%R	percent recovery
ASTM	ASTM International
cm	centimeter
COC	chain of custody
DGPS	differential global positioning system
DMMP	Dredged Material Management Program
DQO	data quality objective
Ecology	Washington State Department of Ecology
EIM	Environmental Information Management
EPA	U.S. Environmental Protection Agency
FL	field lead
HDPE	high-density polyethylene
LCS	laboratory control sample
MDL	method detection limit
mgd	million gallons per day
MLLW	mean lower low water
MS	matrix spike
MSD	matrix spike duplicate
NAD83	North American Datum of 1983
NIST	National Institute of Standards and Technology
NPDES	National Pollutant Discharge Elimination System
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
permit	National Pollutant Discharge Elimination System Waste Discharge Permit No. WA0039624
Plant	Chambers Creek Regional Wastewater Treatment Plant
PM	project manager
PQL	practical quantitation limit
PSEP	Puget Sound Estuary Program
PTFE	polytetrafluoroethylene
QA	quality assurance
QC	quality control
RL	reporting limit
RPD	relative percent difference
SCUM	<i>Sediment Cleanup User's Manual —Guidance for Implementing the Cleanup Provisions of the Sediment Management Standards, Chapter 173-204 WAC</i>

SIZmax	Sediment Impact Zone
SMS	Sediment Management Standard
SOP	standard operating procedure
SQS	Sediment Quality Standards
SRM	standard reference material
SSAP	Sediment Sampling and Analysis Plan
SVOCs	semivolatile organic compounds
WAC	Washington Administrative Code

# 1 Introduction

The Chambers Creek Regional Wastewater Treatment Plant (Plant) National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit (No. WA0039624; permit) was renewed on May 1, 2024. This permit allows for the discharge of effluent from the Plant, which is located at 10311 Chambers Creek Road West, University Place, Washington (Figure 1). After advanced secondary treatment with UV disinfection, the effluent is discharged to Puget Sound via an offshore outfall (Figure 2). The Plant is designated as a Small Quantity Generator and follows relevant federal and state guidelines for the proper disposal of dangerous waste generated (EPA/State ID No: WAD988513347). There are no known chemical spills in the local area that might impact the sediment quality. As stipulated in the permit, the Plant is required to conduct sediment sampling and provide the results to the Washington State Department of Ecology (Ecology). In accordance with Condition S9 of the permit, a Sediment Sampling and Analysis Plan (SSAP) must be submitted to Ecology by January 31, 2025. Following Ecology approval of the SSAP, sediment samples must be collected between August 15 and September 30, 2025, and a data report with the results of the sediment sampling must be submitted to Ecology by January 31, 2026. Sediment sampling is required to characterize or recharacterize sediment quality in the vicinity of the outfall.

This SSAP describes the sediment collection, testing, and quality control (QC) procedures to meet the conditions of the permit. The SSAP has been developed in accordance with current Ecology, Puget Sound Estuary Program (PSEP), *Sediment Cleanup User's Manual* (SCUM), and U.S. Environmental Protection Agency (EPA) protocols for sampling and analysis. The SSAP follows the guidance provided in SCUM Appendix A: Sampling Guidance for NPDES Permits under the Sediment Management Standards (Ecology 2021).

## 1.1 Site Description and History

The Plant began operation in 1984, and the sewer system was constructed between 1981 and 1985. The 1984 Plant was sized to process up to 12 million gallons per day (mgd) of average dry weather flow. The Plant outfall was sized to convey a flow rate of up to 100 mgd. This reflects the projected peak flow for the service area build-out condition. An expansion was implemented from 1992 to 1995, resulting in a rated capacity of 18 mgd (peak month). Another upgrade in 1999 re-rated the permitted capacity to 28.7 mgd (peak month; Brown and Caldwell 2012). Facility upgrades occurred from 2010 to 2018. The Plant discharges treated wastewater via an outfall pipe through a high-rate diffuser. The outfall discharges approximately 760 feet offshore at approximately -110 feet mean lower low water (MLLW). The outfall diffuser section is approximately 112 feet in length, has eight diffusers with 11.9-inch openings on alternating sides, and two vertical maintenance hatches.

Prior to planning and construction of the Plant outfall, limited sediment investigations were conducted in the vicinity. Prior to construction of the Plant outfall in 1984, a baseline study was conducted by Pierce County to investigate physical, chemical, and biological conditions near the proposed outfall. A hydrographic survey conducted in 1974 and 1975 as part of the baseline study demonstrated that the bottom sediments were primarily coarse sand and gravel with some deposits of finer material, which was assumed to come from the adjacent Chambers Creek (Parametrix 1993).

The University of Washington oceanographic model of Puget Sound was used in the baseline study to predict current speed and outfall effluent dispersal. The baseline study demonstrated that the net movement of water from the Chambers Creek area is offshore and to the north toward the Tacoma Narrows (Parametrix 1993). A 2012 dye study of the Plant outfall discharge conducted by the Washington State Department of Health supported the observation of the net water movement north (DOH 2013). Tidal flows near the outfall are relatively strong, reducing the probability of accumulation of sediments in the local area around the outfall. Strong currents combined with relatively deep waters near shore result in rapid dilution of effluents (Parametrix 1993).

A sampling event occurred in the vicinity of the outfall in November 1995 (Parametrix 1996; Study ID CHAMBR95). The 1995 monitoring locations consisted of six stations located along a north-south transect at distances of 30, 155, and 310 feet on each side of the diffuser. The samples were positioned parallel to shore and were located at the Acute Mixing Zone boundary (31 feet from the discharge ports of the diffuser), the Chronic Mixing Zone boundary (310 feet from the discharge ports of the diffuser), and the mid-point between mixing zones. Stations were designated as sediment grab (SG)+30, SG+155, and SG+310 north of the diffuser; and SG-30, SG-155, and SG-310 south of the diffuser (DNR 2014). Samples were collected from the 0- to 2- or 3-centimeter (cm) interval and tested for SMS chemical analytes and grain size. All samples were predominantly coarse material with limited fines ( $\leq 6\%$ ). All detected chemical concentrations were below Sediment Quality Standards (SQS) criteria except for zinc in station SG-30 located south of the outfall at the boundary

of the Acute Mixing Zone. The sample data (excluding grain size) are available in Ecology's Environmental Information Management (EIM) database, although the coordinates available in EIM appear to be incorrect as the coordinates map the locations to the northwest of the outfall, compared to the outfall and diffuser that is shown on the figure based on the as-built drawing (Figure 2).

## **1.2 Document Organization**

The remainder of this SSAP is organized into the following sections:

- Section 2 – Objectives and Sampling Design
- Section 3 – Field Sampling Methods
- Section 4 – Sample Handling and Custody
- Section 5 – Analysis Methods
- Section 6 – Quality Assurance/Quality Control
- Section 7 – Documentation, Recordkeeping, and Reporting Requirements
- Section 8 – Health and Safety
- Section 9 – Project Schedule
- Section 10 – Project Personnel and Responsibilities
- Section 11 – References

## 2 Objectives and Sampling Design

This SSAP presents detailed descriptions of the sampling and analysis procedures to be used to achieve the following objectives:

- Comply with sediment monitoring requirements set forth in Condition S9 of the permit.
- Determine the quality of the surface sediments, as defined by the SMS (Chapter 173-204 Washington Administrative Code [WAC]), in the vicinity of the Outfall 001 diffuser.
- Achieve the data quality objectives (DQOs) using the sampling approach identified in Sections 4 and 5 of the SSAP.

In accordance with the permit requirements, this SSAP follows the guidance provided in the SCUM (Ecology 2021) and current PSEP protocols.

### 2.1 Sampling Design

The sampling design considered the 1995 sampling locations (see Section 1.1) and SCUM sampling design recommendations. The sample design includes eight proposed samples in the vicinity of the outfall and two proposed background samples (Figure 2 and Table 1). The eight proposed outfall sample locations are positioned along two transects oriented north-south to the diffuser and parallel to the shore. Similar to the 1995 sampling design, proposed samples along each transect are located to the north and south of the outfall at the Acute Mixing Zone and Chronic Mixing Zone boundaries (Figure 2), consistent with the prevailing current directions during ebb and flood tides (DOH 2013). The Acute Mixing Zone is defined as a circle with radius of 31 feet from the discharge ports of the diffuser, and the Chronic Mixing Zone defined as a circle with radius of 310 feet from the discharge ports. The sample transects are located offshore at the diffuser at a depth of approximately -110 feet MLLW. The two proposed background sample locations are positioned approximately 1,500 feet to the north and south of the diffuser. The background sample locations are positioned approximately the same distance from shore as the outfall sample locations.

Surface sediment in the 0- to 10-cm interval will be characterized. Analyses will consist of all SMS chemical analytes, including ammonia, sulfides, total volatile solids, metals, semivolatile organic compounds (SVOCs) including polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and conventional analyses of total solids, total organic carbon, and grain size. Results will be compared to the SQS and Sediment Impact Zone (SIZmax) criteria.

Biological testing is not anticipated for this sample collection effort; however, bioassay sample volumes will be collected during sampling in the unlikely event that bioassay testing is determined necessary to evaluate the potential for adverse biological effects based on the sediment chemistry results (e.g., exceedance of SQS chemical criteria). Bioassay testing, if performed, will be conducted in accordance with protocols recommended by PSEP (1995), as modified by the Puget Sound Dredged

Material Management Program. Assessment of the bioassay results will follow the SMS Marine Biological Criteria as presented in the SCUM (Ecology 2021). If needed, bioassays will be conducted by EcoAnalysts Inc. at their laboratory in Port Gamble, Washington and reference sediment samples will be collected by the bioassay analytical lab from Carr Inlet, Washington (PSEP 1995), as described further in Section 6.4.4.

A sediment sample summary, including sample location, station IDs, sample intervals, and chemical testing parameters, is provided in Table 1.

Sediment samples will be delivered immediately to the contracted analytical chemistry laboratory or laboratories. All data will be submitted to Ecology's EIM database and included as part of the Sediment Data Report, as required in the permit. Ecology's EIM Data Analysis Tool (EDAT)<sup>1</sup> tools will be used to confirm that the submitted data were entered accurately, and any discrepancies will be identified and explained.

## 2.2 Sampling Schedule

In accordance with the permit, samples will be collected between August 15 and September 30, 2025. The Sediment Data Report containing the results of the sediment sampling and analysis will be submitted to Ecology no later than January 31, 2026. A sampling schedule is provided in Table 2.

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<sup>1</sup> [EDAT](https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/contamination-cleanup-tools/eim-data-analysis-tool): <https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/contamination-cleanup-tools/eim-data-analysis-tool>

### 3 Field Sampling Methods

This section describes the requirements for sample collection, processing, and handling.

#### 3.1 Horizontal Positioning and Vertical Control

Horizontal positioning will be determined by the onboard differential global positioning system (DGPS) based on target coordinates shown in Table 1. Measured station positions will be reported in Washington State Plane South coordinates (North American Datum of 1983 [NAD83]) to the nearest foot. The DGPS accuracy is typically less than 1 foot but can vary up to 3 feet, depending on the satellite coverage and the number of data points collected.

The vertical elevation of each sediment station will be measured using a lead line and converted to MLLW elevation. Tidal elevations will be determined after sample collection using the National Oceanic and Atmospheric Administration's tide station (ID 9446484) located in Tacoma, Washington.

#### 3.2 Sampling Equipment Decontamination Procedures

Sample containers, instruments, working surfaces, and other items that may come into contact with sediment sample material must meet high standards of cleanliness. All equipment and instruments used that are in direct contact with the sediment collected for analysis must be made of glass, stainless steel, high-density polyethylene (HDPE), or polytetrafluoroethylene (PTFE) and will be cleaned prior to each day's use and between sampling or compositing events. Decontamination of all items will follow PSEP protocols. The decontamination procedure is as follows:

- Scrub until free of visible sediment and rinse with site water.
- Pre-wash rinse with tap water.
- Wash with solution of tap water and Alconox soap (brush).
- Rinse with tap water.
- Rinse three times with distilled water.
- Cover (no contact) all decontaminated items with aluminum foil.

### 3.3 Surface Sediment Sample Collection

This section presents the grab sample collection and processing protocols in Sections 3.3.1 and 3.3.2, respectively.

#### 3.3.1 *Surface Sediment Sample Collection*

Surface sediment samples will be collected using either a hydraulic or gravity-driven Van Veen grab sampler. Samples will be collected in the following manner in accordance with the PSEP protocols (PSEP 1997a):

- The vessel will maneuver to the proposed station.
- The Van Veen sampler will be decontaminated.
- The Van Veen sampler will be deployed at an approximate speed of 0.3 foot per second.
- The winch cable to the grab sampler will be drawn taut and as near to vertical as possible.
- Station location coordinates and depth will be measured and recorded.
- The Van Veen sampler will be closed to collect the sediment sample to a penetration depth of approximately 15 cm (or less depending upon sediment type).
- The sediment sample will be retrieved aboard the vessel and evaluated against the following PSEP acceptability criteria:
  - Grab sampler is not overfilled (i.e., sediment surface is not against the top of the sampler).
  - Sediment surface is relatively flat, indicating minimal disturbance or winnowing.
  - Overlying water is present, indicating minimal leakage.
  - Overlying water has low turbidity, indicating minimal sample disturbance.
  - Penetration depth consistent with PSEP protocols is achieved.

Grab samples not meeting these criteria will be rejected, and the sample collection steps will be repeated until the acceptance criteria are met. Deployments will be repeated within a 10-foot radius of the proposed sample location. If adequate penetration is not achieved after three attempts, Ecology should be contacted. Less penetration will potentially be accepted and noted in the field daily log (Attachment A).

#### 3.3.2 *Sample Processing*

The following protocols will be used to process accepted surface sediment samples:

- **Siphon Water.** Siphon off water overlying the mudline, taking care not to remove sediment.
- **Photograph Grab Sample.** Take digital photographs of each grab sample with a label indicating the project, sample station, and date.
- **Sample Logging.** Record the sample description on the surface sediment field log (Attachment B), including, but not limited to, the following observations, as appropriate:

- Physical soil description in accordance with the Unified Soil Classification System (includes soil type, density/consistency, and color)
- Substantial product and sheens
- Odor (e.g., hydrogen sulfide or petroleum)
- Vegetation
- Human-made debris
- Biological activity (e.g., shells, tubes, bioturbation, or organisms)
- Any other distinguishing characteristics or features
- **Remove Debris.** Materials in the sample more than 2 inches in diameter and debris will not be subsampled into sample containers.
- **Homogenize Grab Sample.** Collect sediment samples from the 0- to 10-cm depth intervals from inside the grab sampler, without touching the sidewalls, using a decontaminated stainless-steel trowel or equivalent. Place the sediment into a single decontaminated stainless-steel bowl and homogenize until uniform color and texture is achieved.
- **Fill Sample Containers.** Using a decontaminated stainless-steel spoon, homogenized sediment will be placed into appropriate pre-labeled sample containers. Containers will be stored in a cooler equipped with ice or another cold source to keep the samples cool prior to final packing for transport to the analytical laboratory. The handling and chain-of-custody (COC) procedures described in Section 4 will be followed. In addition to material collected for the samples, sediment will be collected for potential bioassay sampling. Table 3 lists the sample containers, holding times, and preservation requirements.
- **VOC and Sulfide Collection.** Samples will be collected from the sample device immediately after retrieval and placed in appropriate sample containers prior to homogenization and subsampling for other analyses.

### 3.4 Sample Identification

Table 1 presents a detailed summary of the sediment sampling stations including sample nomenclature. Each sediment sample will be assigned a unique alphanumeric identifier described as follows:

- The first three or four characters identify the sample as location in the vicinity of the outfall or as a background sample: OF1 = Outfall 001 or BRND = background.
- The next two characters identify the sample station: -02 = Station 02.
- The next two characters identify the sampling matrix: -SS = Surface Sediment.
- The next three characters identify the sample depth in centimeters: 0-10 = 0 to 10 cm sampling interval.
- The next six characters identify the date the sample was taken in order of MM, DD, YY: 081625 = a sample taken on August 16, 2025.

For example, sample number OF1-02-SS-0-10-081625 indicates a sediment sample obtained from Station 02 in the vicinity of Outfall 001 sampled from 0 to 10 cm on August 16, 2025.

One field duplicate sample will be collected and include a "10" in front of the parent sample location ID. For example, sample number OF1-102-SS-0-10-081625 indicates a sediment field duplicate sample obtained from OF1-2, sampled on August 16, 2025.

### **3.5 Sample Containers and Labels**

Sample containers and preservatives will be provided by the analytical laboratory. The laboratory will maintain documentation certifying the cleanliness of bottles and the purity of preservatives provided. Specific container requirements are included in Table 3.

Each sample will have an adhesive plastic or waterproof paper label affixed to the container and will be labeled at the time of collection. The following information will be recorded on the container label at the time of collection:

- Project name
- Sampling personnel initials
- Sample identification
- Date and time of sample collection
- Preservative type (if applicable)
- Analysis to be performed

### **3.6 Field Documentation**

Documentation will consist of a daily log and surface sediment field logs (see Attachments A and B). All field notes will be made using an indelible ink pen. Corrections will be made by drawing a single line through the error, writing in the correct information, then dating and initialing the change. The daily logs are intended to provide sufficient data and observations to enable readers to reconstruct events that occurred during the sampling period. At a minimum, the following information will be included in this log:

- Names of field lead (FL) and person(s) collecting and logging the sample
- Health and safety discussions
- Sample station number
- Date and collection time of each sediment sample
- Observations made during sample collection, including weather conditions, complications, vessel traffic, and other details associated with the sampling effort
- Qualitative notation of apparent resistance of sediment column to sampling, including notes on debris
- Any deviations from the approved sampling plan

In addition to maintaining a daily log, surface sediment field logs will be completed for each sample. The surface sediment field logs will include standard entries for station identifier, station coordinates, date and time of sample station, type of samples collected, type of analyses for each sample, and specific information pertaining to the matrix being collected. In addition, the collection form will include information regarding penetration of the sampler and physical characteristics of the sediment such as texture, color, odor, stratification, and sheens.

### **3.7 Field-Generated Waste Disposal**

All sediment remaining after sampling will be washed overboard at the collection site prior to moving to the next sampling station. Any sediment spilled on the deck of the sampling vessel will be washed into the surface waters at the collection site. Sediment remaining following grab sample processing will be returned to the sampling location. However, sediments with visible evidence of contamination (e.g., oily droplets, sheen, paint chips, sandblast grit, other wastes) should not be returned to the water. Instead, they should be retained in a watertight drum on board the vessel for appropriate disposal onshore.

All disposable sampling materials and personal protective equipment used in sample processing, such as disposable coveralls, gloves, and paper towels, will be placed in heavy duty garbage bags or other appropriate containers. Disposable supplies will be placed in a normal refuse container for disposal as solid waste.

## 4 Sample Handling and Custody

This section addresses the sampling program requirements for maintaining custody of the samples throughout the sample collection and shipping process and provides specific procedures for sample storage and shipping.

### 4.1 Sample Custody Procedures

Samples are considered to be in one's custody if they are: 1) in the custodian's possession or view; 2) in a secured location (under lock) with restricted access; or 3) in a container that is secured with an official seal, so the sample cannot be reached without breaking the seal or seals.

COC procedures will be followed for all samples throughout the collection, handling, and analysis process. The principal document used to track possession and transfer of samples is the COC form (Attachment C). Each sample will be represented on a COC form the day it is collected. All data entries will be made using an indelible ink pen. Corrections will be made by drawing a single line through the error, writing in the correct information, then dating and initialing the change. Blank lines or spaces on the COC form will be lined-out and dated and initialed by the individual maintaining custody.

A COC form will accompany each container of samples to the analytical laboratory. Each person who has custody of the samples will sign the COC form and ensure that the samples are not left unattended unless properly secured. Copies of all COC forms will be retained in the project files.

### 4.2 Sample Storage, Transport, Delivery, and Receipt Requirements

Samples will be stored and preserved in accordance with the associated analytical method requirements. Holding time, sample container, and preservation requirements are specified in Table 3. All samples for physical and chemical analysis will be transported to the analytical laboratory. Specific sample packing procedures are as follows:

- Coolant ice will be sealed in separate double plastic bags and placed in the coolers.
- Individual sample containers will be placed in a sealable plastic bag, packed to prevent breakage, and transported in a sealed cooler.
- Glass jars will be separated in the cooler by shock-absorbent material (e.g., bubble wrap) to prevent breakage.
- The coolers will be clearly labeled with sufficient information (i.e., name of project, time and date container was sealed, person sealing the container, and the consultant's office name and address) to enable positive identification.

Upon transfer of sample possession to the analytical laboratory courier, the persons transferring custody of the sample container will sign the COC form. Upon receipt of samples at the laboratory, the receiver will record the condition of the samples on a sample receipt form. COC forms will be used internally in the laboratory to track sample handling and final disposition.

## 5 Analysis Methods

This section summarizes the analytical methods for the required sediment chemistry parameters. All work associated with this project will follow current Ecology, PSEP, and EPA protocols for sampling and analysis (Ecology 2021; PSEP 1986, 1997a, 1997b, 1997c; EPA 1986, 1993). The contents and structure of this SSAP are consistent with the SMS rule (Ecology 2013) and guidance provided in the SCUM (Ecology 2021). Laboratories performing the chemical analyses will be certified by Ecology for the tests performed in conjunction with this project.

Prior to analysis, all samples (both chemical and bioassay) will be maintained according to the appropriate holding times and temperatures for each analysis (Table 3). Sediment samples intended for bioassay testing should be transported to the toxicology laboratory on ice at 4°C (Table 3). The samples should be held in the laboratory in the dark at 4°C with zero headspace and should not be frozen. Table 4 presents the sediment chemistry and conventional parameters to be tested including the analytical methods to be used, and the practical quantitation limits (PQLs). Bioassay samples will be triggered within the 8-week maximum hold-time for bioassay testing. Hold times and conditions will be reported along with the bioassay test results.

### 5.1 Analysis of Sediment Chemistry Parameters

Physical and chemical testing will be conducted at Analytical Resources, LLC, an Ecology-accredited laboratory located in Tukwila, Washington. Analytical Resources, LLC, is also accredited under the National Environmental Laboratories Accreditation Program and Washington State Accreditation Program. All chemical and physical testing will be conducted using SCUM (Ecology 2021) and PSEP protocols and will adhere to SW-846 quality assurance/quality control (QA/QC) procedures and analysis protocols (EPA 1986) where appropriate.

In completing chemical analyses for this project, the contract laboratories are expected to meet the following minimum requirements:

- Adhere to the methods outlined in this SSAP, including methods referenced for each analytical procedure.
- Deliver PDF and electronic data, as specified.
- Meet reporting requirements for deliverables.
- Meet turnaround times for deliverables.
- Implement QA/QC procedures, including DQOs discussed in Section 6 and Table 5, laboratory QC requirements (Table 6), and performance evaluation testing requirements.
- Notify the project QA/QC manager of any QA/QC problems when they are identified to allow for quick resolution.
- Allow laboratory and data audits to be performed, if deemed necessary.

## 5.2 Contingent Bioassay Analysis

If the preliminary chemistry results indicate that concentrations are greater than SQS criteria as provided in Table 4, bioassays will be triggered for those samples, as well as a reference sample (as described in Section 6.4.4) to evaluate potential benthic community toxicity. The following sediment toxicity tests will be performed for all triggered bioassay samples:

- 10-day marine amphipod mortality endpoint
- Marine larval mortality/abnormality endpoint
- 20-day marine juvenile polychaete (*Neanthes arenaceodentata*) growth endpoint

If required, bioassay testing will be performed at EcoAnalysts, Inc., ecotoxicology laboratory<sup>2</sup> in Port Gamble, Washington. EcoAnalysts Inc. is nationally accredited<sup>3</sup> for conducting marine bioassays. Bioassay testing, if performed, will be conducted in accordance with protocols recommended by PSEP (1995), as modified by the Puget Sound Dredged Material Management Program.

Bioassay data will be evaluated as shown in Table 7. The negative control from the tests and results of the reference samples will be used in interpreting toxicity responses in the sediment samples collected. The responses of the organisms exposed to collected sediments will be statistically compared to the responses of the organisms in negative control tests. Bioassay data will be interpreted per SMS and using the marine biological criteria presented in Table 7. Biological criteria exceedance is determined by mortality (M) for the 10-day marine amphipod mortality endpoint, normal survivorship expressed as actual counts (N) for the larval mortality/abnormality endpoint, and mean individual growth rate (MIG) for the 20-day juvenile polychaeta growth endpoint as shown in Table 7.

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<sup>2</sup> <https://www.ecoanalysts.com/>

<sup>3</sup> Applicable accreditations include the National Environmental Laboratory Accreditation Program (NELAP) and State Laboratory Accreditations in Washington (WDOE)

## 6 Quality Assurance/Quality Control

This section describes DQOs and field and laboratory QA/QC requirements. The equipment calibration and maintenance requirements and the assessment of compliance and response actions are also included in this section.

### 6.1 Data Quality Objectives and Criteria

The DQO for this project is to ensure that the data collected are of known and acceptable quality for project objectives described in Section 2 to be achieved. The quality of laboratory data is assessed by precision, accuracy, representativeness, comparability, and completeness (the “PARCC” parameters). Definitions of these parameters and the applicable QC procedures are presented in Sections 6.1.1 through 6.1.7. Applicable quantitative goals for these data quality parameters are listed or referenced in Table 4. Table 5 summarizes the analytical chemistry DQOs and Table 6 summarizes the analytical chemistry laboratory QA/QC analysis.

#### 6.1.1 Precision

Precision is the ability of an analytical method or instrument to reproduce its own measurement. It is a measure of the variability, or random error, in sampling, sample handling, and laboratory analysis. ASTM International (ASTM) recognizes two levels of precision: 1) repeatability—the random error associated with measurements made by a single test operator on identical aliquots of test material in a given laboratory, with the same apparatus, under constant operating conditions; and 2) reproducibility—the random error associated with measurements made by different test operators, in different laboratories, using the same method but different equipment to analyze identical samples of test material (ASTM 2020).

In the laboratory, “within-batch” precision is measured using replicate sample or QC analyses and is expressed as the relative percent difference (RPD) between the measurements. The “batch-to-batch” precision is determined from the variance observed in the analysis of standard solutions or laboratory control samples (LCS) from multiple analytical batches.

Field precision will be evaluated by the collection of blind field duplicates for chemistry samples at a frequency of 1 per event or 1 in 20 samples collected, whichever is more frequent. Field chemistry duplicate precision will be screened against an RPD of 50% for sediment samples. However, no data will be qualified based solely on field homogenization duplicate precision.

Precision measurements can be affected by the nearness of a chemical concentration to the method reporting limit (RL), where the percent error (expressed as RPD) increases. The equation used to express precision is as follows:

**Equation 1**

$$RPD = \frac{(C_1 - C_2) \times 100\%}{(C_1 + C_2)/2}$$

where:

RPD = relative percent difference  
C<sub>1</sub> = larger of the two observed values  
C<sub>2</sub> = smaller of the two observed values

### 6.1.2 Accuracy

Accuracy is a measure of the closeness of an individual measurement (or an average of multiple measurements) to the true or expected value. Accuracy is determined by calculating the mean value of results from ongoing analyses of laboratory-fortified blanks, standard reference materials (SRMs), and standard solutions. In addition, laboratory-fortified (i.e., matrix-spiked) samples are also measured, which indicates the accuracy or bias in the actual sample matrix. Accuracy is expressed as percent recovery (%R) of the measured value, relative to the true or expected value. If a measurement process produces results for which the mean is not the true or expected value, the process is said to be biased. Bias is the systematic error either inherent in a method of analysis (e.g., extraction efficiencies) or caused by an artifact of the measurement system (e.g., contamination). Analytical laboratories use several QC measures to eliminate analytical bias, including systematic analysis of method blanks, LCS, and independent calibration verification standards. Because bias can be positive or negative, and because several types of bias can occur simultaneously, only the net (or total) bias can be evaluated in a measurement.

Laboratory accuracy will be evaluated against quantitative LCS, SRM, matrix spike (MS), and surrogate spike recovery performance criteria provided by the laboratory. Accuracy can be expressed as a percentage of the true or reference value or as a %R in those analyses where reference materials are not available and spiked samples are analyzed. The equation used to express accuracy is as follows:

**Equation 2**

$$\%R = 100\% \times (S - U)/C_{sa}$$

where:

%R	=	percent recovery
S	=	measured concentration in the spiked aliquot
U	=	measured concentration in the unspiked aliquot
C <sub>sa</sub>	=	actual concentration of spike added

Field accuracy will be controlled by adherence to sample collection procedures outlined in Section 3.

### 6.1.3 *Bias*

Bias is the systematic or persistent distortion of a measurement process that causes errors in one direction. Bias assessments for environmental measurements are made using personnel, equipment, and spiking materials or reference materials as independent as possible from those used in the calibration of the measurement system. When possible, bias assessments should be based on analysis of spiked samples, rather than reference materials, so the effect of the matrix on recovery is incorporated into the assessment. A documented spiking protocol and consistency in following that protocol are important to obtaining meaningful data quality estimates.

### 6.1.4 *Representativeness*

Representativeness expresses the degree to which data accurately and precisely represent an environmental condition. The list of analytes has been identified based on previous investigations to provide a targeted assessment of the potential contaminants in reference and outfall area sediments.

### 6.1.5 *Comparability*

Comparability expresses the confidence with which one dataset can be evaluated in relation to another dataset. For this program, comparability of data will be established through the use of standard analytical methodologies, reporting formats, and common traceable calibration and reference materials.

### 6.1.6 *Completeness*

Completeness is a measure of the amount of data that is determined to be valid in proportion to the amount of data collected. Completeness will be calculated as follows:

**Equation 3**

$$C = \frac{(\text{Number of acceptable data points}) \times 100}{(\text{Total number of data points})}$$

The DQO for completeness for all components of this project is 95%. Data that have been qualified as estimated because the QC criteria were not met will be considered valid for the purpose of assessing completeness. Data that have been qualified as rejected will not be considered valid for the purpose of assessing completeness.

### 6.1.7 Sensitivity

Analytical sensitivities will comply with the recommended PQLs provided in the SCUM (Ecology 2021).

The method detection limit (MDL) is defined as the minimum concentration at which a given target analyte can be measured and reported with 99% confidence that the analyte concentration is greater than zero. Laboratory PQLs or RLs are defined as the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. Laboratory RLs will be used to evaluate the method sensitivity and/or applicability prior to the acceptance of a method for this program.

The sample-specific RLs will be reported by the laboratory and will take into account any factors relating to the sample analysis that might decrease or increase the RL (e.g., dilution factor, percent moisture, sample volume, and sparge volume). In the event that the RLs are elevated for a sample due to matrix interferences and subsequent dilution or reduction in the sample aliquot, the data will be evaluated by Anchor QEA and the laboratory to determine if an alternative course of action is required or possible. If this situation cannot be resolved readily (i.e., detection limits less than criteria are achieved), Ecology will be contacted to discuss an acceptable resolution.

## 6.2 Field Quality Assurance and Quality Control

Field activities must be conducted in such a manner that results meet specified quality objectives and are fully defensible. Guidance for QA/QC is derived from the protocols developed for the PSEP (1986, 1997a, 1997b, 1997c), EPA Test Methods (1986, 2008), National Functional Guidelines (EPA 2020a, 2020b), and the cited methods. Field QA procedures will consist of the acceptable practices for collecting and handling samples detailed in Section 4.2. Adherence to these procedures will be complemented by periodic and routine equipment inspection.

Field QA samples are useful in identifying possible problems resulting from sample collection or sample processing in the field. The collection of field QA samples will include field duplicates. Field QA

samples will be collected at a frequency of 1 in 20 samples processed, as specified in Table 6. All field QA samples will be documented in the field daily log and verified by the QA/QC manager or designee.

### **6.2.1 *Field Duplicates***

One field duplicate sample will be collected and analyzed per sampling event, per matrix, and analyzed for the same suite of analyses as the parent sample (Table 6). The field duplicate sample consists of collecting additional sediment from one location, processing that sample consistent with procedures outlined in this SSAP, and then submitting a blind split of that sample to the laboratory.

### **6.2.2 *Additional Sediment Volume for Laboratory Quality Assurance and Quality Control***

Field QA samples will also include the collection of enough sample volume to ensure that the laboratory has sufficient amounts to run the program-required analytical QA/QC (MS/matrix spike duplicate [MSD]) samples for analysis, as specified in Table 6. The samples designated for MS/MSD analyses should be clearly marked on the COC.

## **6.3 Analytical Laboratory Quality Assurance and Quality Control**

Laboratory QC procedures, where applicable, include initial and continuing instrument calibrations, LCS, matrix replicates, MSs, surrogate spikes (for organic analyses), and method blanks. Table 6 lists the frequency of analysis for laboratory QA/QC samples, and Table 5 summarizes the DQOs for precision, accuracy, and completeness.

Results of the QC samples from each sample group will be reviewed by the analyst immediately after a sample group has been analyzed. The QC sample results will then be evaluated to determine if control limits have been exceeded. If control limits are exceeded in the sample group, the QA/QC manager will be contacted immediately, and corrective action (e.g., method modifications, followed by reprocessing the affected samples) will be initiated prior to processing a subsequent group of samples.

### **6.3.1 *Laboratory Instrument Calibration and Frequency***

An initial calibration will be performed on each laboratory instrument to be used at the start of the project, after each major interruption to the analytical instrument, and when any ongoing calibration does not meet method control criteria. A calibration verification will be analyzed following each initial calibration and will meet method criteria prior to analysis of samples. Continuing calibrations will be performed daily prior to any sample analysis to track instrument performance for semivolatile analyses and after every 10 samples analyzed for the inorganic analyses, as applicable. The frequency of continuing calibration will be in accordance with Table 6. If the continuing calibration is out of control, the analysis must come to a halt until the source of the control failure is eliminated or

reduced to meet control specifications. All project samples analyzed while instrument calibration was out of control will be reanalyzed.

### **6.3.2    *Laboratory Replicates***

Analytical replicates provide information on the precision of the analysis and are useful in assessing potential sample heterogeneity and matrix effects. Analytical replicates are subsamples of the original sample that are prepared and analyzed as a separate sample.

### **6.3.3    *Matrix Spikes and Matrix Spike Duplicates***

Analysis of MS samples provides information on the extraction/preparation efficiency of the method on the sample matrix. By performing duplicate MS analyses, information on the precision of the method is also provided.

### **6.3.4    *Method Blanks***

Method blanks are analyzed to assess possible laboratory contamination at all stages of sample preparation and analysis. The method blank for all analyses must contain less than the RL of any single target analyte/compound or be less than 5 times the concentration of the associated samples. If a laboratory method blank exceeds these criteria for any analyte/compound, analyses must stop, the source of contamination must be eliminated or reduced, and the affected samples must be reanalyzed.

### **6.3.5    *Laboratory Control Samples***

LCS are analyzed to assess possible laboratory bias at all stages of sample preparation and analysis. The LCS is a matrix-dependent spiked sample prepared at the time of sample extraction along with the preparation of samples and MSs. The LCS will provide information on the precision of the analytical process and, when analyzed in duplicate, will provide accuracy information, as well.

### **6.3.6    *Laboratory Deliverables***

Data packages will be checked for completeness immediately upon receipt from the laboratory to ensure that requested data and QA/QC information are present. QC sample frequencies will be compared to the criteria in Table 6.

## **6.4    Bioassay Laboratory Quality Control**

If performed, sediment toxicity tests will incorporate standard QA/QC procedures to ensure that the test results are valid. Standard QA/QC procedures include the use of negative controls, positive controls, replicates, and measurements of water quality during testing.

### 6.4.1 *Negative Controls*

The negative control to be used for both sediment toxicity tests will be a clean control, which consists of clean, inert material and the same water used in testing sediment toxicity. A negative control is used in toxicity tests to compare biological endpoint responses in native or natural untreated exposure conditions relative to the sediment under investigation (treatment exposure) and is used routinely to assess the acceptability of the test. To test the biological endpoint response (e.g., growth or mortality) caused exclusively by chemicals on an organism, what would be considered the natural or normal response (e.g., growth or mortality) will be subtracted from the test response. Negative control performance standards for this bioassay program are presented in Table 7, Table 8, and Table 8-2 of the SCUM (Ecology 2021).

### 6.4.2 *Positive Controls*

An appropriate reference toxicant will be run with each batch of test sediments as a positive control to establish the relative sensitivity of the test organisms. The positive control for sediment tests is typically conducted with diluent seawater and without sediment. The LC<sub>50</sub> or the effective EC<sub>50</sub> must be within the 95% confidence interval of responses (calculated using the most recent 12 monthly positive control tests) expected for the toxicant used.<sup>4</sup>

### 6.4.3 *Replicates*

Five replicate chambers for each test sediment and negative control treatments will be run for each bioassay. A water quality replicate will also be run for each treatment.

### 6.4.4 *Bioassay Reference Sediment*

Reference sediment will also be included with each bioassay, tested concurrently with test sediments to provide data that can be used to separate toxicant effects from unrelated effects, such as those of sediment grain size. Reference sediment samples will be collected by the bioassay analytical lab from an area documented to be free from chemical contamination and will represent the range of important natural, physical, and chemical characteristics of the test sediments (i.e., grain size and total organic carbon). For this study, reference sediment samples will be collected from Carr Inlet, Washington (PSEP 1995). All bioassays have performance standards for reference sediments as mentioned previously. Failure to meet these standards may result in the requirement to retest.

### 6.4.5 *Water Quality Monitoring*

Water quality monitoring will be conducted for the amphipod, larval, and juvenile polychaete bioassays and reference toxicant tests. This consists of daily measurements in each test replicate of

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<sup>4</sup> LC<sub>50</sub> is the lethal concentration of toxicant killing 50% of exposed organisms. EC<sub>50</sub> is the concentration of test substance in dilution water that is calculated to affect 50% of a test population during continuous exposure over a specified time period.

salinity, temperature, pH, and dissolved oxygen for the amphipod and larval tests. These measurements will be made every 3 days for the juvenile polychaete bioassay, except for dissolved oxygen, which will be measured daily. Ammonia and sulfides in the overlying water and sediment porewater from a separate beaker will be determined at test initiation and termination for all three tests. Monitoring will be conducted for all test and reference sediments and negative controls (including seawater controls).

#### **6.4.6 Interpretation**

Test interpretation consists of endpoint comparisons of test sediments to the measurements observed in the controls and in reference sediments on an absolute percentage basis, as well as statistical comparison between the test and reference endpoints, where appropriate. Test interpretation will follow the guidelines established through the SMS review process.

#### **6.4.7 Bioassay Retesting**

If there are issues (e.g., positive or negative control failure) with the bioassay QA/QC tests described previously that result in erroneous findings or failure to meet data quality control objectives provided in Table 7, then the bioassay samples will be retested.

### **6.5 Instrument/Equipment Testing, Inspection, and Maintenance Requirements**

This section describes procedures for testing, inspection, and maintenance of field and laboratory equipment.

#### **6.5.1 Field Instruments/Equipment**

Field QC procedures will consist of the following standard instrument operation procedures and using consistent, acceptable practices for collecting measurements. Adherence to these procedures will be complemented by periodic and routine equipment inspection and calibration.

#### **6.5.2 Field Instrument/Equipment Calibration**

The subcontractor responsible for navigation will confirm proper operation of the navigation equipment daily. This verification may consist of internal diagnostics or visiting a location with known coordinates to confirm the coordinates indicated by the navigation system. No other field equipment requires testing or calibration. The winch line and sampling equipment will be inspected daily for fraying, misalignment of jaws, loose connections, and any other applicable mechanical problems. Any problems will be noted in the field daily log and corrected prior to continuing sampling operations.

### 6.5.3 *Laboratory Instruments/Equipment*

In accordance with the QA program, the laboratory shall maintain an inventory of instruments and equipment, and the frequency of maintenance will be based on the manufacturer's recommendations and/or previous experience with the equipment.

The laboratory preventative maintenance program, as detailed in its QA Plan, is organized to maintain proper instrument and equipment performance and to prevent instrument and equipment failure during use. The program considers instrumentation, equipment, and parts that are subject to wear, deterioration, or other changes in operational characteristics; the availability of spare parts; and the frequency at which maintenance is required. Any equipment that has been overloaded, mishandled, gives suspect results, or has been determined to be defective will be taken out of service, tagged with the discrepancy noted, and stored in a designated area until the equipment has been repaired. After repair, the equipment will be tested to ensure that it is in proper operational condition. Anchor QEA will be promptly notified in writing if defective equipment casts doubt on the validity of analytical data. Anchor QEA will also be notified immediately regarding any delays due to instrument malfunctions that could impact holding times.

The analytical laboratory will be responsible for the preparation, documentation, and implementation of the preventative maintenance program. All maintenance records will be checked according to the schedule on an annual basis and recorded by the responsible individual. The laboratory QA/QC manager, or designee, shall be responsible for verifying compliance.

### 6.5.4 *Laboratory Instrument/Equipment Calibration*

Proper calibration of equipment and instrumentation is an integral part of the process that provides quality data. Instrumentation and equipment used to generate data must be calibrated at a frequency that ensures sufficient and consistent accuracy and reproducibility. As part of its QC program, the laboratory performs two types of calibrations. A periodic calibration is performed at prescribed intervals (i.e., balances, drying ovens, refrigerators, and thermometers), and operational calibrations are performed daily, at a specified frequency, or prior to analysis (i.e., initial calibrations) according to method requirements. Calibration procedures and frequency are discussed in the laboratory's QA Plan. Calibrations are discussed in the laboratory standard operating procedures (SOPs) for analyses.

The laboratory QA/QC manager will be responsible for ensuring that laboratory instrumentation is calibrated in accordance with specifications. Implementation of the calibration program shall be the responsibility of the respective laboratory Group Supervisors. Recognized procedures (EPA, ASTM, or manufacturer's instructions) shall be used when available.

Physical standards (i.e., weights or certified thermometers) shall be traceable to nationally recognized standards, such as the National Institute of Standards and Technology (NIST). Chemical reference standards shall be NIST SRMs- or vendor-certified materials traceable to these standards.

The calibration requirements for each method and respective corrective actions shall be accessible, either in the laboratory SOPs or the laboratory's QA Plan, for each instrument or analytical method in use. All calibrations shall be preserved on electronic media.

## **6.6 Inspection/Acceptance Requirements for Supplies and Consumables**

Inspection and acceptance of field supplies, including laboratory- or manufacturer-prepared sampling bottles, will be performed by the FL. All primary chemical standards and standard solutions used in this project, either in the field or laboratory, will be traceable to documented, reliable, commercial sources. Standards will be validated to determine their accuracy by comparison with an independent standard. Any impurities found in the standard will be documented.

## **6.7 Assessments and Response Actions**

This section identifies the responsibilities of key project team members and actions to be taken in the event of an error, problem, or nonconformance to protocols identified in this document.

### **6.7.1 *Field Activities***

The FL will be responsible for correcting equipment malfunctions during the field sampling effort. The project QA/QC manager will be responsible for resolving situations identified by the FL that may result in noncompliance with this SSAP. All corrective measures will be immediately documented in the field daily log.

### **6.7.2 *Laboratory***

The laboratory is required to comply with its SOPs. The laboratory project manager (PM) will be responsible for ensuring that appropriate corrective actions are initiated, as required for conformance with the SSAP. All laboratory personnel will be responsible for reporting problems that may compromise data quality.

## **6.8 Total Organic Carbon**

For marine sediment chemistry data, the reported concentrations for non-polar organic chemicals should be converted to TOC-normalized concentrations to allow direct comparison to the SMS marine chemical benthic criteria.

To TOC-normalize, the dry weight concentration of a chemical is divided by the decimal fraction representing the percent TOC content (e.g., 0.01 means 1 percent) of the sediment sample per the equation:

**Equation 4**

$$\text{ppm OC} = (\text{ppb dry weight}) / (\text{percent TOC dry weight} \times 1,000)$$

where:

ppm = parts per million

OC = organic carbon

ppb = parts per billion

TOC = total organic carbon (decimal fraction)

In cases where TOC values are either very high (>3.5%) or very low (<0.5%), dry-weight concentrations should be reported with the TOC normalized concentrations.

## 7 Documentation, Recordkeeping, and Reporting Requirements

This section describes laboratory and field documentation and recordkeeping, data validation, and data reporting requirements. In accordance with the permit, samples must be collected between August 15 and September 30, 2025. A Sediment Data Report containing the results of the sediment sampling and analysis must be submitted to Ecology no later than January 31, 2026. The Sediment Data Report will include electronic copies of the data in Ecology's EIM format. The final Sediment Data Report will conform to the description in the SSAP and the guidance provided by Ecology (2021).

### 7.1 Documentation and Records

This project will require central project files, including bioassay records, to be maintained at Anchor QEA. Project records will be stored and maintained in a secure manner. Each project team member is responsible for filing all necessary project information or providing it to the person responsible for the filing system. Individual team members may maintain files for individual tasks but must provide such files to the central project files upon completion of each task. Printed copies of documents, when necessary, will be kept on file at Anchor QEA throughout the duration of the project, and all electronic data will be maintained in the database at Anchor QEA. All such records should be maintained for a minimum period of 10 years after the issuance, modification, or renewal of the applicable permit.

#### 7.1.1 *Field Logs*

Field team members will keep a daily record of significant events, observations, and measurements in a field log. All field activities will be recorded in a daily field log maintained by the FL or designee in accordance with the procedures provided in Section 3.6. The field logs will be stored in the project files upon completion of the sampling event.

#### 7.1.2 *Analytical and Chemistry Records*

Analytical data records will be retained by the laboratory and in the Anchor QEA central project files. For all analyses, the data reporting requirements will include those items necessary to complete data validation, including electronic copies of all raw data. The analytical laboratory will be required, where applicable, to report the following:

- **Project Narrative.** This summary, in the form of a cover letter, will discuss problems, if any, encountered during any aspect of analysis. This summary should discuss, but is not limited to, QC, sample delivery, sample storage, and analytical difficulties. Any problems encountered, actual or perceived, and their resolutions will be documented in as much detail as appropriate.

- **COC Records.** Legible copies of the COC forms will be provided as part of the data package. This documentation will include the time of receipt and condition of each sample received by the laboratory. Additional internal tracking of sample custody by the laboratory will also be documented on a sample receipt form. The form must include all sample cooler temperatures measured at the time of sample receipt.
- **Sample Results.** The data package will summarize the results for each sample analyzed. The summary will include the following information when applicable:
  - Field sample identification code and the corresponding laboratory identification code
  - Sample matrix
  - Date of sample extraction
  - Date and time of analysis
  - Weight and/or volume used for analysis
  - Final dilution volumes or concentration factor for the sample
  - Identification of the instrument used for analysis
  - Method MDLs and RLs accounting for sample-specific factors (e.g., dilution or total solid)
  - Analytical results with reporting units identified
  - Data qualifiers and their definitions
- **QA/QC Summaries.** This package will contain the results of the laboratory QA/QC procedures. Each QA/QC sample analysis will be documented with the same information required for the sample results. No recovery or blank corrections will be made by the laboratory. The required summaries are listed as follows (additional information may be requested):
  - **Calibration Data Summary.** This summary will report the concentrations of the initial calibration and daily calibration standards and the date and time of analysis. The response factor, percent relative standard deviation, RPD, and retention time for each analyte will be listed, as appropriate. Results for standards to indicate instrument sensitivity will be documented.
  - **Internal Standard Area Summary.** The stability of internal standard areas will be reported.
  - **Method Blank Analysis.** The method blank analyses associated with each sample and the concentration of all compounds of interest identified in these blanks will be reported.
  - **Surrogate Spike Recovery.** All surrogate spike recovery data for organic compounds will be included. The names and concentrations of all compounds added and percent recoveries will be reported.
  - **MS Recovery.** All MS recovery data will be reported. The names and concentrations of all analytes/compounds added and percent recoveries will be listed. The RPD values for all MSD analyses will be reported.

- **Matrix Duplicate.** The RPD for all matrix duplicate analyses will be reported.
- **Laboratory Control Sample.** All LCS recovery data will be reported. The names and concentrations of all analytes/compounds added and percent recoveries will be listed. The RPD values for all LCS duplicate analyses will be reported.
- **Relative Retention Time.** A report of the relative retention time of each analyte detected in the samples for both primary and confirmational analyses will be reported.
- **Original Data.** Legible copies of the original data generated by the laboratory will include the following:
  - Sample extraction, preparation, identification of extraction or preparation method used, and cleanup logs
  - Instrument specifications and analysis logs for all instruments used on days of calibration and analysis
  - Reconstructed ion chromatograms for all samples, standards, blanks, calibrations, spikes, replicates, and reference materials
  - Enhanced spectra of detected compounds with associated best-match spectra for each sample
  - Printouts of full-scan chromatograms and quantitation reports for each instrument used, including reports for all samples, standards, blanks, calibrations, spikes, replicates, and reference materials
  - Original data quantification reports for each sample
  - Original data for blanks and samples not reported

All instrument data shall be fully restorable at the laboratory from electronic backup.

### 7.1.3 *Data Reduction*

Data reduction is the process by which original data (analytical measurements) are converted or reduced to a specified format or unit to facilitate analysis of the data. Data reduction requires that all aspects of sample preparation that could affect the test result, such as sample volume analyzed or dilutions required, be taken into account in the final result. It is the laboratory analyst's responsibility to reduce the data, which are subjected to further review by the laboratory PM, the Anchor QEA PM, the QA/QC manager, and independent reviewers. Data reduction may be performed manually or electronically. If performed electronically, all software used must be demonstrated to be true and free from error.

## 7.2 **Data Management**

Field data sheets will be checked for completeness and accuracy by the FL prior to delivery to the data manager. All data generated in the field will be documented on a paper copy and provided to the office data manager, who is responsible for the data's entry into the database. All manually

entered data will be checked by a second party. Field documentation will be filed in the main project file after data entry and checking are complete.

Laboratory data will be provided to the data manager in PDF and EQuIS electronic formats. The laboratory data that are provided electronically and loaded into the database will undergo a 10% check against the laboratory data report. Data will be validated or reviewed manually, and qualifiers, if assigned, will be entered manually. The accuracy of all manually entered data will be verified by a second party. Data tables and reports will be exported from EQuIS to Microsoft Excel tables, and data will be exported in the EIM format to provide to Ecology.

### **7.3 Data Validation and Usability**

Once data are received from the laboratory, a number of QC procedures will be followed to provide an accurate evaluation of data quality. Specific procedures will be followed to assess data precision, accuracy, and completeness. Sections 7.3.1 and 7.3.2 describe the procedures that will be used to review project data quality.

#### ***7.3.1 Data Review, Validation, and Verification***

All data will undergo an EPA Stage 2B validation. During the validation process, analytical data will be evaluated for method and laboratory QC compliance, as well as compliance with this document. Their validity and applicability for program purposes will be determined. Based on the findings of the validation process, data validation qualifiers may be assigned. The validated project data, including qualifiers, will be entered into the project database, thus enabling this information to be retained or retrieved, as needed.

#### ***7.3.2 Validation and Verification Methods***

Data validation includes signed entries by the field and laboratory technicians on field data sheets and laboratory data sheets, respectively; review for completeness and accuracy by the FL and laboratory PM; review by the data manager for outliers and omissions; and the use of QC criteria to accept or reject specific data. All data will be entered into the EQuIS database, and a raw data file will be generated. A second data manager or designee will perform 10% verification of the database raw data file and 100% verification of validation qualifiers applied. Any errors in the raw data file will be corrected, and the database will be established.

All laboratory data will be reviewed and verified to determine whether all DQOs have been met and that appropriate corrective actions have been taken, when necessary. The project QA/QC manager or designee will be responsible for the final review of all data generated from analyses of samples.

The first level of review will take place in the laboratory as the data are generated. The laboratory department manager or designee will be responsible for ensuring that the data generated meet

minimum QA/QC requirements and that instruments were operating under acceptable conditions during generation of data.

Data packages will be checked for completeness immediately upon receipt from the laboratory to ensure that data and QA/QC information requested are present. DQOs will be assessed by a reviewer using current National Functional Guidelines data validation requirements (EPA 2020a, 2020b) by considering the following:

- Holding times
- Instrument performance checks
- Initial calibrations
- Continuing calibrations
- Method blanks
- Surrogate recoveries
- Detection limits
- RLs
- LCS
- SRMs
- MS/MSD samples
- Laboratory replicates

Data will be validated in accordance with the project-specific DQOs previously described, analytical method criteria, and the laboratory's internal performance standards based on the SOPs.

## **7.4 Reconciliation with User Requirements**

The QA/QC manager will review data after sampling and analysis to determine if DQOs have been met. If data do not meet the project's specifications, the QA/QC manager will review the errors and determine if the problem is due to calibration or maintenance, sampling techniques, or other factors, and will suggest corrective action. It is expected that any problem would be able to be corrected by retraining, revision of techniques, or replacement of supplies or equipment; if not, the DQOs will be reviewed for feasibility. If specific DQOs are not achievable, the QA/QC manager will recommend appropriate modifications. If matrix interference is suspected to have attributed to the exceedance, adequate laboratory documentation must be presented to demonstrate that instrument performance or laboratory technique did not bias the result. In cases where the DQOs have been exceeded and corrective actions did not resolve the outlier, data will be qualified per EPA National Functional Guidelines (EPA 2020a, 2020b). In these instances, the usability of the data will be determined by the extent of the exceedance. Rejected data will be assigned an "R" qualifier and will not be used for any purposes.

## 7.5 Data Report

A data report will be prepared and submitted to Ecology for review and approval. The data report will document the results of the sediment sampling and analysis program. The data report, at a minimum, will contain the following information:

- A statement of the purpose of the investigation
- A summary of the field sampling, field data, and laboratory analytical procedures (reference will be made to the final SSAP); any field or laboratory deviations, whether intended or unintended; and any failure to meet sampling objectives or DQOs of sufficient magnitude that lead to rejection of results, as necessary
- A general vicinity map showing the location of the site, a sampling station map, and an accompanying table of coordinates for all stations (all coordinates submitted to Ecology for inclusion in the EIM database will be in NAD83, State Plane, Washington North Zone)
- Chemical analysis results data tables summarizing chemical and conventional variables, as well as all pertinent QA/QC data
- An interpretation of the results against the SMS criteria highlighting any exceedances
- Results of bioassay testing if triggered, including QC procedures and a summary data table
- Copies of complete laboratory data packages, including signed COC forms, as appendices or attachments
- Copies of applicable field logs and surface sediment field logs, as appendices or attachments
- Copies of data validation reports and/or findings, as appendices or attachments

## 7.6 Ecology EIM Submittal

Electronic data for the sediment investigation will be submitted to Ecology's EIM System<sup>5</sup> per Ecology's Policy 840. The results will be entered into EIM using the publicly available EDAT Search, Analytical, and Map Tool<sup>6</sup> and labeled with an EIM Study ID using the prefix "CHAMBR" and the two digit sampling year. Final validated data will be submitted, along with the data report, and will comply with the requirements described in the SCUM (Ecology 2021).

Once the sediment data have been entered into EIM, the EDAT analytical tool will be used to retrieve and analyze the data. Any differences between EDAT analyses and data report findings should be explained in the data report. Ecology will use the EDAT chemistry and bioassay analysis tools to interpret all laboratory results.

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<sup>5</sup> Information for online EIM data submittal can be found at <http://www.ecy.wa.gov/eim/submitdata.htm>.

<sup>6</sup> EDAT can be found at: <https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/contamination-cleanup-tools/eim-data-analysis-tool>.

## 8 Health and Safety

A Health and Safety Plan is included in Attachment D.

## 9 Project Schedule

Sampling will be performed between August 15 and September 30, 2025, dependent on final SSAP approval from Ecology. Sediment sampling is anticipated to require 2 days of field work for sample collection and processing. The Sediment Data Report will be submitted to Ecology by January 31, 2026.

## 10 Project Personnel and Responsibilities

This section describes the overall project management strategy for implementing and reporting for this SSAP. A Health and Safety Plan that covers all aspects of worker safety including identified key personnel for the roles below, field staff, and certifications is included in Attachment D.

**Ariel Blanc** will serve as the PM for Anchor QEA. The PM will be responsible for overall project coordination, including production of all project deliverables and administrative coordination, to facilitate timely and successful completion of the project.

**Audrey White** will serve as the Anchor QEA FL. The FL will provide overall direction for the field sampling effort in terms of logistics, personnel assignments, and field operations. The FL will supervise field collection of all samples. The FL will also be responsible for positioning samples accurately; recording sample locations, depths, and identification; verifying conformance to sampling and handling requirements, including field decontamination procedures; physical evaluation and logging of samples; and completing COC forms.

**Lydia Greaves** will serve as the Anchor QEA QA Manager. The QA manager will provide QA oversight for both the field sampling and laboratory programs associated with sediment characterization, verifying that samples are collected and documented appropriately, coordinating with the analytical laboratories, checking data quality, overseeing data validation, and supervising project QA coordination.

**Laurel Menoche** will serve as the Anchor QEA database manager. The database manager will compile field observations and analytical data from laboratories into a database, review the data for completeness and consistency, append the database with qualifiers assigned by the data validator, and verify that the data obtained are in a format suitable for inclusion in the appropriate databases and delivery to Ecology in EIM format.

Sediment chemical and physical testing will be conducted at Analytical Resources, LLC, located in Tukwila, Washington and contingent bioassay testing will be conducted at EcoAnalysts Inc., located in Port Gamble, Washington (see Section 5.2). The laboratory PMs will oversee all laboratory operations associated with the receipt of the environmental samples, chemical/physical analyses, and laboratory report preparation for this project. The laboratory PMs will review all laboratory reports and prepare case narratives describing any anomalies and exceptions that occurred during analysis.

## 11 References

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Water Column, and Tissue in Puget Sound.* Prepared for USEPA Region 10 and the Puget  
Sound Water Quality Authority. Puget Sound Water Quality Authority, Olympia, Washington.
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- PSEP, 1997c. *Puget Sound Estuary Program: Recommended Protocols for Measuring Metals in Puget  
Sound Sediment and Tissue Samples.* Prepared for USEPA Region 10 and the Puget Sound  
Water Quality Authority. Puget Sound Water Quality Authority, Olympia, Washington.

## Tables

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**Table 1**  
**Sampling Design for NPDES Sediment Monitoring**

Location	Station ID	Sample ID	Station Coordinates (Washington State Plane NAD83 South Zone)		Sample Interval (cm)		Chemical Testing Parameters <sup>1</sup>	Bioassay Testing
			Easting (ft)	Northing (ft)	Start Depth	End Depth		
Outfall	Diffuser Start	--	1122206.64	685571.59	--	--	--	--
	Diffuser End	--	1122084.54	685639.58	--	--	--	--
Background	BRND-01	BRND-01-SS-0-10-XXXX25	1121822.35	684112.96	0	10	Conventional, Ammonia, Sulfides, TVS, Metals, SVOCs/PAHs, and PCB Aroclors	Bioassays will be triggered if chemistry results indicate concentrations greater than SQS criteria
	BRND-02	BRND-02-SS-0-10-XXXX25	1122091.33	687152.07	0	10		
Acute Mixing Zone Boundary	OF1-01	OF1-01-SS-0-10-XXXX25	1122183.81	685548.82	0	10		
	OF1-02	OF1-02-SS-0-10-XXXX25	1122133.76	685576.70	0	10		
	OF1-03	OF1-03-SS-0-10-XXXX25	1122186.45	685618.32	0	10		
	OF1-04	OF1-04-SS-0-10-XXXX25	1122135.13	685646.90	0	10		
Chronic Mixing Zone Boundary	OF1-05	OF1-05-SS-0-10-XXXX25	1121937.58	685367.10	0	10		
	OF1-06	OF1-06-SS-0-10-XXXX25	1121774.87	685628.73	0	10		
	OF1-07	OF1-07-SS-0-10-XXXX25	1122327.05	685859.71	0	10		
	OF1-08	OF1-08-SS-0-10-XXXX25	1122003.96	685939.03	0	10		

Notes:

1. Full analyte list from Sediment Cleanup User Manual Appendix A: Table A-1 (Ecology 2021) will be tested.

cm: centimeter

ft: foot

NAD83: North American Datum of 1983

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

SQS: sediment quality standards

SVOC: semivolatile organic compound

TVS: total volatile sulfides

**Table 2**  
**Sampling Schedule for NPDES Sediment Monitoring**

Date	NPDES Permit Activities	
	Activity	Documentation
By January 31, 2025	SSAP submitted to Ecology	SSAP
Between August 15 and September 30, 2025	Surface Sediment Sampling	Field Logs, Surface Grab Logs, Chain of Custody
By January 31, 2026	Data Report submitted to Ecology	Sediment Data Report

Notes:

NPDES: National Pollutant Discharge Elimination System

SSAP: Sediment Sampling and Analysis Plan

**Table 3**  
**Guidelines for Sample Handling and Storage**

Parameter	Sample Size <sup>1</sup>	Container Size <sup>2</sup> and Type	Holding Time	Preservative
Sediment				
Grain Size	100 g	16-oz glass or plastic	None	None
Ammonia	50 g	8-oz glass	7 days	4°C ± 2°C
Total Solids	50 g		14 days	4°C ± 2°C
			6 months	< -18°C
Total Organic Carbon	50 g		14 days	4°C ± 2°C
			6 months	< -18°C
Total Volatile Sulfides	30 g	4-oz glass	7 days	4°C ± 2°C
Sulfides	50 g	2-oz glass (no headspace)	7 days	5 mL 2N ZnAc per 30 g/4± 2°C
Metals <sup>3</sup>	5 g	4-oz glass	6 months; 28 days for mercury	4°C ± 2°C
			2 years; 1 year for mercury	< -18°C
SVOCs, PAHs, PCB Aroclors	350 g	16-oz glass	14 days until extraction	4°C ± 2°C
			1 year until extraction	< -18°C
			40 days after extraction	4°C ± 2°C
Potential Bioassay	6-8 L	Plastic bag with no headspace	56 days	4°C ± 2°C

Notes:

1. Sample size quantities may change dependent on laboratory.
2. All sample containers will have lids with Teflon™ inserts. Sample container quantity may change dependent on laboratory.
3. Samples will be immediately analyzed for mercury or frozen.

g: gram

L: liter

oz: ounce

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

SVOC: semivolatile organic compound, including phthalates, chlorinated organics, and miscellaneous organics included in the Marine Sediment Quality Standards-Chemical Criteria (WAC 173-204-320, Table 1).

ZnAC: zinc acetate

Table 4  
Parameters for Analysis of Chemistry, Methods, and Target Quantitation Limits

Parameter	Analytical Method	SMS Marine Sediment <sup>1</sup>		Marine Sediment AETs <sup>2</sup>		Laboratory PQL
		SQS	SIZmax	SCO	SIZmax	
Conventional Parameters (%)						
Grain Size	PSEP 1986	--	--	--	--	1
Total Solids	PSEP 1986	--	--	--	--	0.04
Total Volatile Solids	PSEP 1986	--	--	--	--	0.01
Total Organic Carbon (TOC)	USEPA 9060Am	--	--	--	--	0.02
Conventional Parameters (mg/kg)						
Ammonia	Plumb (1981)	--	--	--	--	0.4
Total Sulfides	Plumb (1981) /9034/9030B	--	--	--	--	1.0
Metals		(mg/kg dry wt)		(mg/kg dry wt)		(mg/kg dry wt)
Arsenic	USEPA 6020B	57	93	57	93	0.2
Cadmium	USEPA 6020B	5.1	6.7	5.1	6.7	0.1
Chromium	USEPA 6020B	260	270	260	270	0.5
Copper	USEPA 6020B	390	390	390	390	0.5
Lead	USEPA 6020B	450	530	450	530	0.1
Mercury	USEPA 7471B	0.41	0.59	0.41	0.59	0.025
Silver	USEPA 6020B	6.1	6.1	6.1	6.1	0.2
Zinc	USEPA 6020B	410	960	410	960	6.0
SVOCs						
Organic and Chlorinated Organic Chemicals		(µg/kg dry wt)		(µg/kg dry wt)		(µg/kg dry wt)
2,4-Dimethylphenol	USEPA 8270E-SIM	29	29	29	29	20
2-Methylphenol	USEPA 8270E-SIM	63	63	63	63	5.0
4-Methylphenol	USEPA 8270E-SIM	670	670	670	670	5.0
Benzoic Acid	USEPA 8270E-SIM	650	650	650	650	100
Benzyl Alcohol	USEPA 8270E-SIM	57	73	57	73	20
Pentachlorophenol	USEPA 8270E-SIM	360	690	360	690	20
Phenol	USEPA 8270E-SIM	420	1,200	420	1,200	5.0
Organic and Chlorinated Organics		(mg/kg OC)		(µg/kg dry wt)		(µg/kg dry wt)
1,2,4-Trichlorobenzene	USEPA 8270E-SIM	0.81	1.8	31	51	5.0
1,2-Dichlorobenzene	USEPA 8270E-SIM	2.3	2.3	35	50	5.0
1,4-Dichlorobenzene	USEPA 8270E-SIM	3.1	9	110	110	5.0
Dibenzofuran	USEPA 8270E	15	58	540	540	20
Hexachlorobenzene	USEPA 8270E-SIM	0.38	2.3	22	70	0.5
Hexachlorobutadiene	USEPA 8270E-SIM	3.9	6.2	11	120	0.5
N-Nitrosodiphenylamine	USEPA 8270E-SIM	11	11	28	40	5.0
Phthalates		(mg/kg OC)		(µg/kg dry wt)		(µg/kg dry wt)
Bis(2-Ethylhexyl) phthalate	USEPA 8270E	47	78	1,300	1,900	50
Butyl benzyl phthalate	USEPA 8270E-SIM	4.9	64	63	900	5.0
Diethyl phthalate	USEPA 8270E-SIM	61	110	200	> 1,200	20
Dimethyl phthalate	USEPA 8270E-SIM	53	53	71	160	5.0
Di-n-butyl phthalate	USEPA 8270E	220	1,700	1,400	1,400	20
Di-n-octyl phthalate	USEPA 8270E	58	4,500	6,200	6,200	20
PAHs		(mg/kg OC)		(µg/kg dry wt)		(µg/kg dry wt)
Total LPAH <sup>3</sup>	USEPA 8270E	370	780	5,200	5,200	--
2-Methylnaphthalene	USEPA 8270E	38	64	670	670	20
Acenaphthene	USEPA 8270E	16	57	500	500	20
Acenaphthylene	USEPA 8270E	66	66	1,300	1,300	20
Anthracene	USEPA 8270E	220	1,200	960	960	20
Fluorene	USEPA 8270E	23	79	540	540	20
Naphthalene	USEPA 8270E	99	170	2,100	2,100	20
Phenanthrene	USEPA 8270E	100	480	1,500	1,500	20
Total HPAH <sup>4</sup>	USEPA 8270E	960	5,300	12,000	17,000	--
Benzo(a)anthracene	USEPA 8270E	110	270	1,300	1,600	20
Benzo(a)pyrene	USEPA 8270E	99	210	1,600	1,600	20
Benzo(g,h,i)perylene	USEPA 8270E	31	78	670	720	20
Chrysene	USEPA 8270E	110	460	1,400	2,800	20
Dibenzo(a,h)anthracene	USEPA 8270E	12	33	230	230	20
Fluoranthene	USEPA 8270E	160	1,200	1,700	2,500	20
Indeno(1,2,3-cd)pyrene	USEPA 8270E	34	88	600	690	20
Pyrene	USEPA 8270E	1,000	1,400	2,600	3,300	20
Total benzofluoranthenes <sup>5</sup>	USEPA 8270E	230	450	3,200	3,600	40
PCBs		(mg/kg OC)		(µg/kg dry wt)		(µg/kg dry wt)
Total Aroclors	USEPA 8082A	12	65	130	1,000	10

**Table 4**  
**Parameters for Analysis of Chemistry, Methods, and Target Quantitation Limits**

Notes:

Greater than (>) value indicates that the toxic level is unknown, but above the concentration shown.

- 1. Marine values are dry weight normalized for metals and polar organics and normalized to total organic carbon for non-polar organics.
- 2. Dry weight normalized AETs are recommended when total organic carbon is outside the recommended range of 0.5% to 3.5% for organic carbon normalization.
- 3. Total LPAH criterion under the SMS represents the sum of the detected concentrations of the following LPAH compounds: acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene.
- 4. Total HPAH criterion under the SMS represents the sum of the detected concentrations of the following HPAH compounds: benz[a]anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-c,d)pyrene, pyrene, and total benzofluoranthenes.
- 5. The total benzofluoranthenes criterion represents the sum of the concentrations of the b, j, and k isomers of benzofluoranthenes.

µg/kg: microgram per kilogram	PSEP: Puget Sound Estuary Program
AET: apparent effects threshold	SCO: Sediment Cleanup Objective
HPAH: high-molecular-weight polycyclic aromatic hydrocarbon	SIZmax: Sediment Impact Zone Maximum Chemical Criteria
LPAH: low-molecular-weight polycyclic aromatic hydrocarbon	SM: Standard Method
mg/kg: milligram per kilogram	SMS: Sediment Management Standards
mg/kg OC: milligram per kilogram organic carbon normalized	SQS: Sediment Quality Standard
ng/kg: nanogram per kilogram	SVOC: semivolatile organic compound
PAH: polycyclic aromatic hydrocarbon	TOC: total organic carbon
PCB: polychlorinated biphenyl	USEPA: U.S. Environmental Protection Agency
PQL: practical quantitation limit	wt: weight

**Table 5**  
**Data Quality Objectives**

Parameter	Precision	Accuracy <sup>1</sup>	Completeness
Total Organic Carbon	± 20% RPD	65-135% R	95%
Total Solids	± 20% RPD	NA	95%
Total Volatile Solids	± 20% RPD	65-135% R	95%
Grain Size	± 20% RPD	NA	95%
Ammonia	± 20% RPD	65-135% R	95%
Sulfide	± 20% RPD	65-135% R	95%
Metals	± 30% RPD	75-125% R	95%
PCBs	± 35% RPD	50-150% R	95%
SVOCs/PAHs	± 35% RPD	50-150% R	95%

Notes:

1. LCS and MS/MSD % Recovery. All other accuracy recovery limits will be based on laboratory-defined control limits.

NA: not applicable

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

R: Recovery

RPD: relative percent difference

SVOC: semivolatile organic compound

**Table 6**  
**Field and Laboratory Quality Assurance/Quality Control Analysis Summary**

Analysis Type	Field Duplicate	Initial Calibration	Ongoing Calibration	Standard Reference Material <sup>2</sup>	Replicates <sup>3</sup>	Matrix Spikes	LCS/Blank Spike	Matrix Spike Duplicates <sup>3</sup>	Method Blanks	Surrogate Spikes
Grain Size	1 per 20 samples	Daily or each batch <sup>1</sup>	NA	NA	1 per 20 samples	NA	NA	NA	NA	NA
Total Solids	1 per 20 samples	Daily or each batch <sup>1</sup>	NA	NA	1 per 20 samples	NA	NA	NA	NA	NA
Total Organic Carbon	1 per 20 samples	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 10 samples	1 per 10 samples	1 per 10 samples	NA	Each batch	NA
Ammonia	1 per 20 samples	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	NA	Each batch	NA
Sulfide	1 per 20 samples	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	NA	Each batch	NA
Metals	1 per 20 samples	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	Each batch	NA
SVOCs/PAHs/PCBs	1 per 20 samples	As needed <sup>4</sup>	Every 12 hours	1 per 20 samples	NA	1 per 20 samples	1 per 20 samples	1 per 20 samples	Each batch	Every sample

Notes:

1. Calibration and certification of drying ovens and weighing scales are conducted bi-annually.
2. When a Standard Reference Material is not available, a laboratory control sample will suffice.
3. A matrix spike duplicate can be performed in lieu of a laboratory replicate and vice versa.
4. Initial calibrations are considered valid until the ongoing continuing calibration no longer meets method specifications.

NA: not applicable

LCS: laboratory control sample

PCB: polychlorinated biphenyl

SVOC: semivolatile organic compound

**Table 7**  
**Bioassay Analysis Performance Standards**

Biological Test Endpoint	Performance Standard		SCO/SQS <sup>a</sup>	CSL <sup>a</sup>
	Control	Reference		
Amphipod				
10-day mortality	M <sub>C</sub> ≤ 10%	M <sub>R</sub> ≤ 25%	M <sub>T</sub> > 25% Absolute and M <sub>T</sub> vs. M <sub>R</sub> SD (p < 0.05)	M <sub>T</sub> – M <sub>R</sub> ≥ 30% and M <sub>T</sub> vs. M <sub>R</sub> SD (p < 0.05)
Larval				
Bivalve or echinoderm abnormality/mortality	N <sub>C</sub> / I ≥ 0.70	N <sub>R</sub> / N <sub>C</sub> ≥ 0.65	N <sub>T</sub> / N <sub>R</sub> < 0.85 and N <sub>T</sub> vs. N <sub>R</sub> SD (p < 0.10)	N <sub>T</sub> / N <sub>R</sub> < 0.70 and N <sub>T</sub> vs. N <sub>R</sub> SD (p < 0.10)
Juvenile Polychaete				
<i>Neanthes</i> 20-day growth	M <sub>C</sub> ≤ 10% and MIG <sub>C</sub> ≥ 0.38 mg/individual/day ash-free dry weight (or case-by-case)	MIG <sub>R</sub> / MIG <sub>C</sub> ≥ 0.80	MIG <sub>T</sub> / MIG <sub>R</sub> < 0.70 and MIG <sub>T</sub> vs. MIG <sub>R</sub> SD (p < 0.05)	MIG <sub>T</sub> / MIG <sub>R</sub> < 0.50 and MIG <sub>T</sub> vs. MIG <sub>R</sub> SD (p < 0.05)

Notes:

a. Marine biological criteria (SCO & CSL and performance standards) for each biological test. Adverse effects are defined when any of the biological tests show the results in the table.

A: Abundance; C: Control; R: Reference; T: Test; F: Final; M: Mortality; N: Normal Survivorship expressed as actual counts; I: Initial count;

MIG: Mean Individual Growth Rate expressed in mg/ind/day Ash Free Dry Weight; ML: Mean Light output; BLD: Blank Corrected Light Decrease;

SD: Significantly Different

CSL: cleanup screening level

SCO: sediment cleanup objective

SQS: Sediment Quality Standard

**Table 8**  
**Marine and Estuarine Sediment Toxicity Test Conditions**

Biological Test Endpoint		Performance Standard		Control Samples			Control Limits			Water Quality Monitoring	
		Control	Ref.	- Control	+ Control	Ref.	Temp. °C	Salinity (ppt)	DO% Saturation	Temp., Salinity DO, pH	Sulfides, Ammonia
Amphipod											
10-day mortality	<i>Rhepoxynius abronius</i>	M <sub>C</sub> ≤ 10%	M <sub>R</sub> ≤ 25%	Clean sediment	Ref. toxicant in seawater	Yes	15 +/- 1	28 +/- 1	N/A	Daily	Start/end
	<i>Ampelisca abdita</i>						20 +/- 1	28 +/- 1			
	<i>Eohaustorius estuarius</i>						15 +/- 1	Ambient			
Larval											
Bivalve or echinoderm abnormality / mortality	Oyster <sup>a</sup>	N <sub>C</sub> / I ≥ 0.70	N <sub>R</sub> / N <sub>C</sub> ≥ 0.65	Clean seawater	Ref. toxicant in seawater	Yes	20 +/-1	28 +/-1		Daily	Start/end
	Mussel <sup>b</sup>						16 +/-1				
	Sand dollar <sup>c</sup>						15 +/-1				
	Sea urchin <sup>d</sup>						15 +/-1				
Juvenile Polychaete											
<i>Neanthes</i> 20-day growth		M <sub>C</sub> ≤ 10% and MIG <sub>C</sub> ≥ 0.38 mg/ind/day AFDW	MIG <sub>R</sub> / MIG <sub>C</sub> ≥ 0.80	Clean sediment	Ref. toxicant in seawater	Yes	20 +/-1	28 +/- 2	N/A	Every third day	Start/end (optional)

Notes:

- a. Pacific oyster (*Crassostrea gigas*)
- b. Blue mussel (*Mytilus galloprovincialis*)
- c. Sand dollar (*Dendraster excentricus*)
- d. Sea urchin (*Strongylocentrotus purpuratus*, purple sea urchin; or *S. droebachiensis*, green sea urchin)

AFDW: Ash Free Dry Weight; C: Control; F: Final; I: Initial count; M: Mortality; mg/ind/day: milligrams per individual per day; MIG: Mean Individual Growth rate;  
N: Normal survivorship expressed as actual counts in mg/ind/day; R or Ref.: Reference; DO: Dissolved Oxygen

Revised December 2021

## Figures

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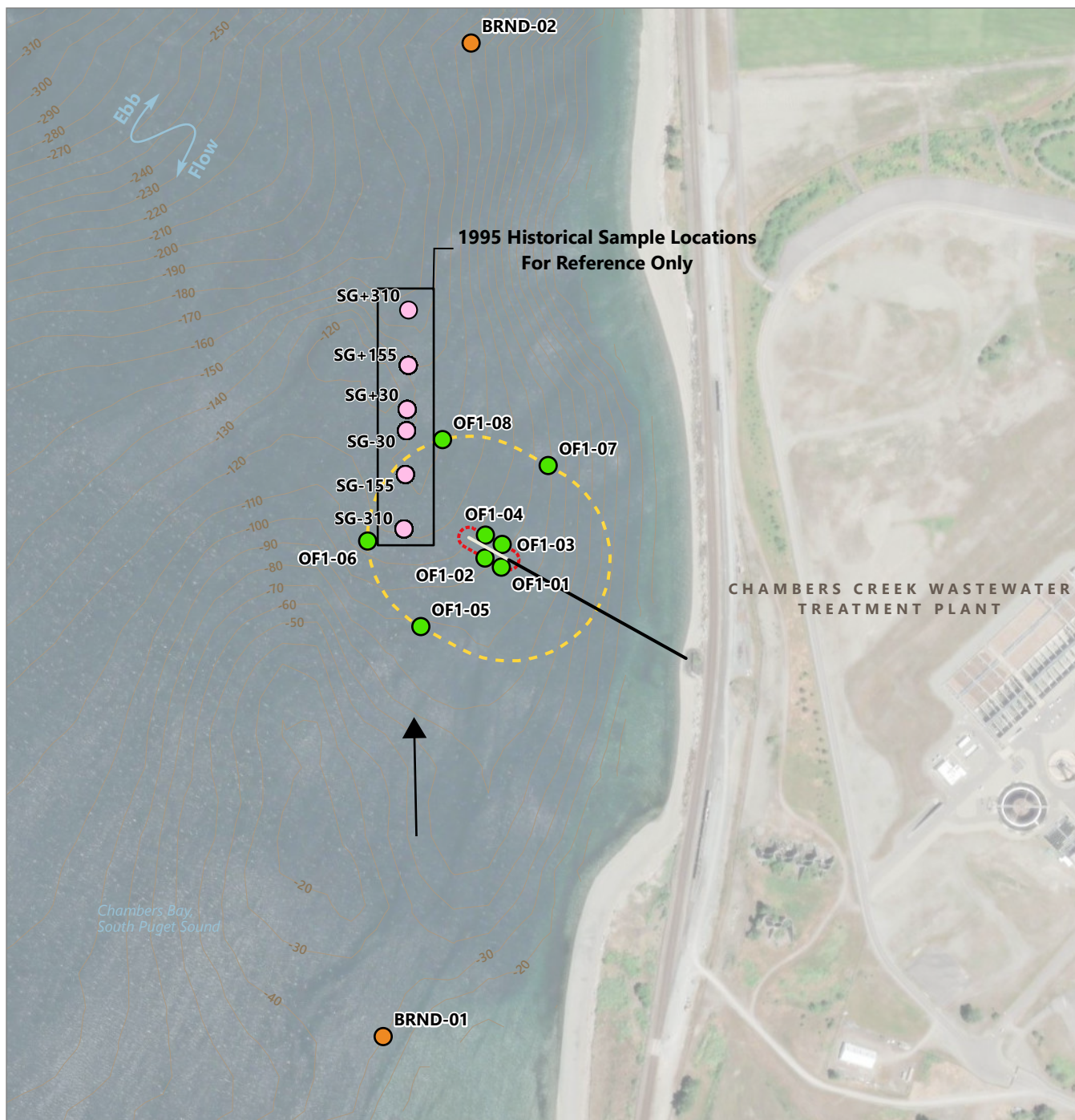


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Filepath: \\GSTFile01\\GIS\\Jobs\\Pierce\_County\_0767\\ChambersCreek\_WWTP\\Maps\\JARPA\_SSAP\\AQ\_JARPA\_SSAP.aprx | AQ\_SSAP\_Fig1\_VicinityMap



**Figure 1**  
**Vicinity Map**

Sediment Sampling and Analysis Plan  
Pierce County Chambers Creek Wastewater Treatment Plant

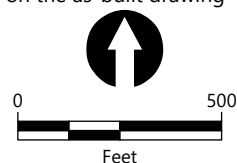


#### LEGEND:

- 1995 Historical Sample Location<sup>1</sup>
- Proposed Sediment Sample Location
- Proposed Background Sample Location
- Diffuser Section
- Outfall 001 Pipe
- - - Acute Mixing Zone
- - - Chronic Mixing Zone
- Contour (MLLW; 10' Interval)<sup>2</sup>
- Estimated Predominant Flow Direction

#### NOTES:

1. Historical sample coordinates appear to be incorrect.
2. Bathymetry source: NOAA Survey H12050
3. Outfall and diffuser were mapped based on the as-built drawing from December 1982.



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Filepath: \\gstfile01\gis\Jobs\Pierce\_County\_0767\ChambersCreek\_WWTP\Maps\JARPA\_SSAP\AQ\_JARPA\_SSAP.aprx | AQ\_SSAP\_Fig2\_SamplingPlan



**Figure 2**  
**Sampling Plan**

Sediment Sampling and Analysis Plan  
Pierce County Chambers Creek Wastewater Treatment Plant

# Attachment A

## Daily Log

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## Daily Log



Anchor QEA, Inc  
1201 3rd Avenue, Suite 2600  
Seattle, WA 98101  
Phone 206.287.9130 Fax 206.287.9131

**PROJECT NAME:** NPDES Sediment Sampling

DATE: \_\_\_\_\_

**SITE ADDRESS:**

**PERSONNEL:**

<b>WEATHER:</b>	<b>WIND FROM:</b>	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
		SUNNY	CLOUDY	RAIN	?	<b>TEMPERATURE:</b>		° F	.	° C		
[Circle appropriate units]												

[illegible]

Signature: \_\_\_\_\_

## Attachment B

### Surface Grab Log

---

## Surface Sediment Field Log

Job:	Station:	
Job No:	Date:	
Field Staff:	Sample Method:	
Contractor:	Proposed Coordinates: Lat.	
Horizontal Datum:	Long.	
<u>Water Height</u>	<u>Tide Measurements</u>	<u>Sample Acceptability Criteria:</u>
DTM Depth Sounder: _____	Time: _____	1) Overlying water is present
DTM Lead Line: _____	Height: _____	2) Water has low turbidity
		3) Sampler is not overfilled
		4) Surface is flat
		5) Desired penetration depth
_____ Mudline Elevation (lower low water-large tides): calculated after sampling		
Notes: _____		
_____		
_____		

[illegible]

**Sample Description:** surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

**Sample Containers:**

### Analyses:

## Attachment C

### Chain of Custody

---

[illegible]

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---

Relinquished By:	Company: <u>Anchor QEA, Inc</u>
Signature/Printed Name	Date/Time

Received By:	Company: _____
Signature/Printed Name	Date/Time

Relinquished By:	Company: _____
Signature/Printed Name	Date/Time

Received By: _____	Company: _____
Signature/Printed Name _____	Date/Time _____

## Attachment D

### Health and Safety Plan

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May 2025  
Chambers Creek Wastewater Treatment Plant Sediment Monitoring



## Health and Safety Plan

Prepared for Washington State Department of Ecology  
on behalf of Pierce County



May 2025

Chambers Creek Wastewater Treatment Plant Sediment Monitoring

# Health and Safety Plan

**Prepared for**

Washington State Department of Ecology  
on behalf of Pierce County  
2702 S 42nd Street, Suite 109  
Tacoma, Washington 98409

**Prepared by**

Anchor QEA  
1201 3rd Avenue, Suite 2600  
Seattle, Washington 98101

## Certification Page

The below individuals are certifying that they have reviewed the contents of this Health and Safety Plan and that it is complete and accurate to the best of their knowledge. Should any of the below individual roles change, this Health and Safety Plan should be modified.



---

Ariel Blanc  
Project Manager  
Anchor QEA



---

Audrey White  
Field Lead  
Anchor QEA

Date: December 30, 2024

Date: May 13, 2025

The information in this Health and Safety Plan has been designed for the Scope of Work presently contemplated by Anchor QEA. Therefore, this document may not be appropriate if the work is not performed by or using the methods presently contemplated by Anchor QEA. In addition, as the work is performed, conditions different from those anticipated may be encountered and this document may have to be modified. Therefore, Anchor QEA only intends this Health and Safety Plan to address currently anticipated activities and conditions and makes no representations or warranties as to the adequacy of the Health and Safety Plan for all conditions encountered.

# Health and Safety Plan Acknowledgement Form

Project Number: 240767-01.01

Project Name: Chambers Creek Wastewater Treatment Plant Sediment Monitoring

My signature below certifies that I have read and understand the policies and procedures specified in this Health and Safety Plan (HASP). For non-Anchor QEA employees, this HASP is to be used for informational purposes only to ensure their own HASP meets or exceeds these requirements. Non-affiliated personnel may be required to sign a separate Liability Waiver.

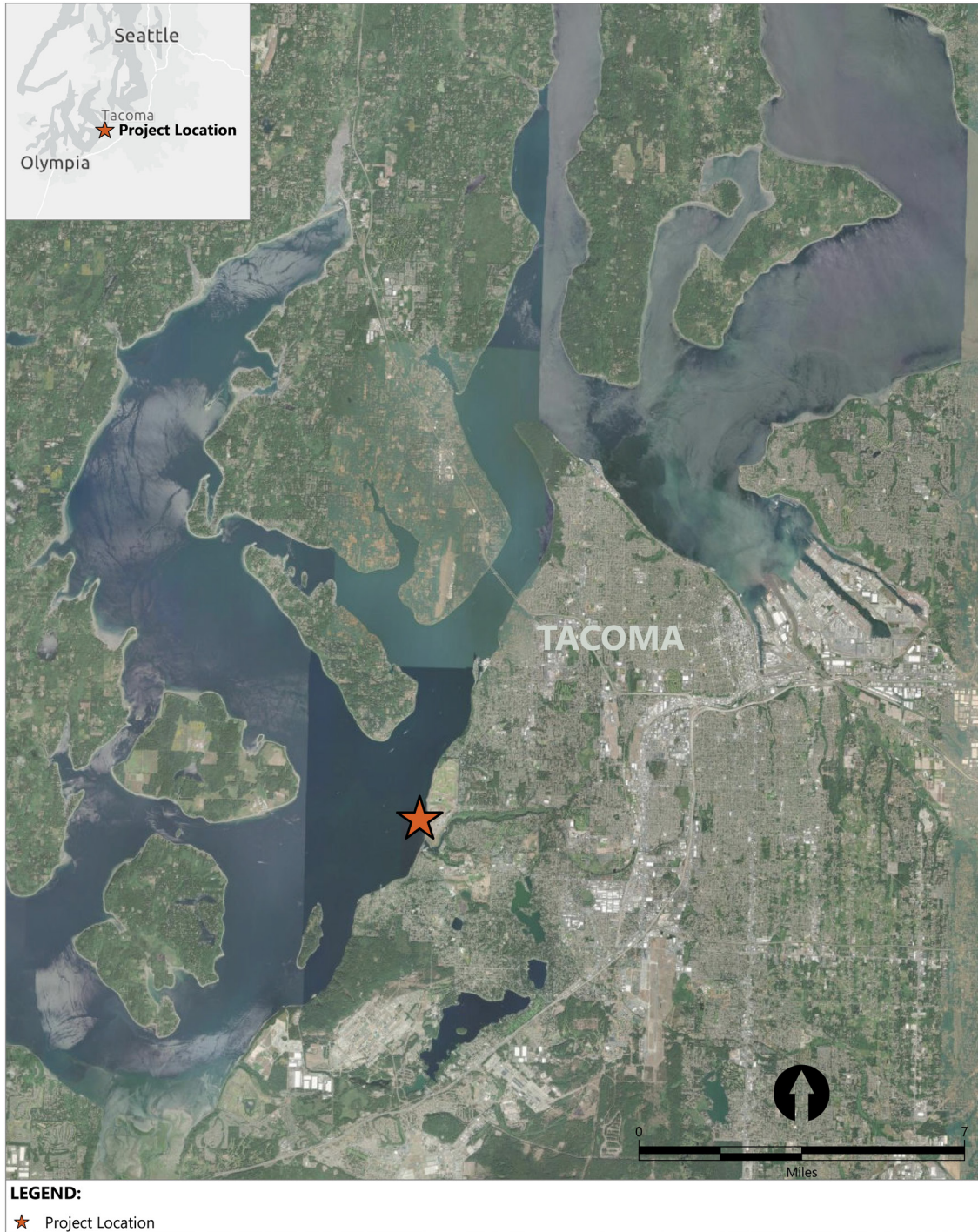
Date	Name (print)	Signature	Company

Date	Name (print)	Signature	Company

# Site Emergency Procedures

## Site Map

**Figure A**  
**General Site Location Overview**



# Emergency Contact Information

**Table A**  
**Site Emergency Form and Emergency Phone Numbers\***

Category	Information	
Possible Chemicals of Concern	See Table 6-1	
Minimum Level of Protection	Modified Level D	
Site(s) Location Address	10311 Chambers Creek Road W, University Place, WA, 98467	
Emergency Phone Numbers		
Ambulance	911	
Fire	911	
Police	911	
Poison Control	(800) 222-1222	
Client Contact	Laurie Pierce	Office: (253) 798-3019
Project Manager (PM)	Ariel Blanc	Office: (360) 715-2713 Mobile: (360) 708-5051
Field Lead (FL)	Audrey White	Office: (206) 971-2668 Mobile : (650) 931-7405
Corporate Health and Safety Manager (CHSM)	Matt Gruber	Office: (828) 771-0327 Mobile: (828) 490-6877
Director of Health and Safety (DOHS)	Tim Shaner	Office: (251) 375-5282 Mobile: (251) 281-3386
State Emergency Response System	(800) 562-6108 or (253) 512-7000	
EPA Emergency Response Team, <sup>1</sup> Region 10	(206) 553-1200	

Notes:

\* In the event of any emergency, contact the PM and FL.

1. For local resources, please visit: <http://www.epa.gov/emergency-response/emergency-response-my-community>. The National Response Center hotline is (800) 424-8802.

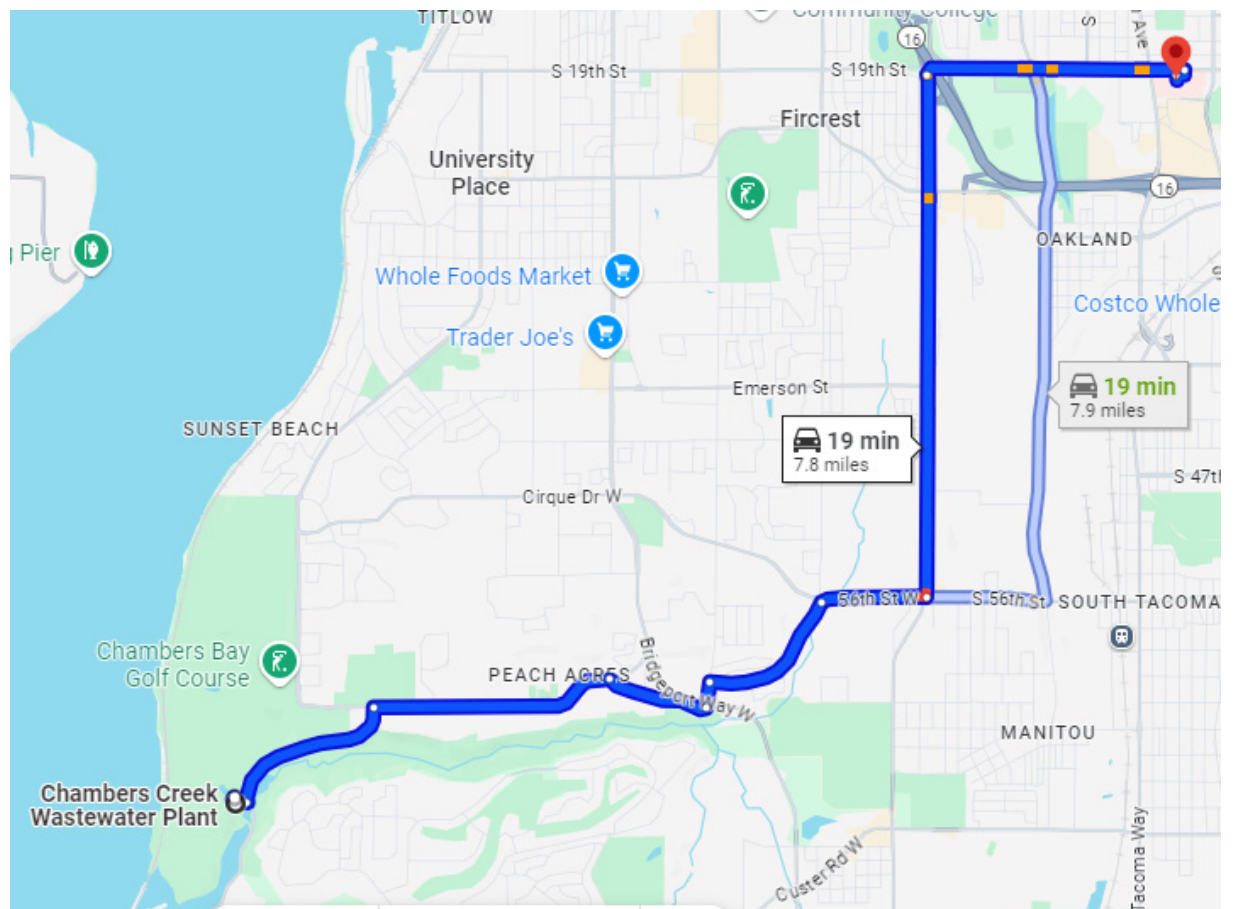
**Table B**  
**Hospital Information**

Category	Information
Hospital Name	MultiCare Allenmore Hospital Emergency Department
Address	1901 S Union Avenue
City, State	Tacoma, WA 98405
Phone	(253) 459-6400
Emergency Phone	911

## Hospital Route Map and Driving Directions

1. From Chambers Creek Wastewater Treatment Plant take Chambers Creek Road W to exit the Plant. Continue on Chambers Creek Road W for 2.0 miles.
2. Follow Chambers Creek Road W and Alameda Drive W 1.3 miles to Cirque Drive W.
3. At the traffic circle, take the first exit onto Cirque Drive W and follow for 0.5 mile.
4. Turn left onto Orchard Street W and follow for 2.5 miles.
5. Turn right onto S 19th Street and follow for 1.2 miles.
6. Arrive at the Multicare Allenmore Hospital Emergency Department.

**Figure B**  
**Hospital Route Map**



## Care Management—WorkCare Incident Intervention

Anchor QEA maintains access to WorkCare Incident Intervention, a 24/7 telehealth triage program for the management of work-related injuries, illnesses, and physical discomfort. WorkCare nurses and physicians are available by calling **(888) 449-7787** and are ready to intervene immediately whenever a workplace injury or illness happens.

Every Anchor QEA employee is encouraged to use this service, but most likely the manager, a coworker, or the injured worker themselves will call WorkCare with details about the type of incident, the probable cause, and the scope of the situation. With that information, WorkCare will evaluate the incident, explain the appropriate course of action, and consult with the employee's treating physician on a quality treatment plan that meets the needs of the employee and Anchor QEA.

## Key Safety Personnel

The following people share responsibility for health and safety at the site. See Section 4 of this Health and Safety Plan (HASP) for a description of each person's role and responsibilities.

Client Contact: Laurie Pierce	Office: (253) 798-3019
Project Manager (PM): Ariel Blanc	Office: (360) 715-2713 Mobile: (360) 708-5051
Field Lead (FL): Audrey White	Office: (206) 971-2668
Corporate Health and Safety Manager (CHSM): Matt Gruber	Office: (828) 771-0327 Mobile: (828) 490-6877
Director of Health and Safety (DOHS): Tim Shaner	Office: (251) 375-5282 Mobile: (251) 281-3386

## Personal Incident Response Procedures

The first person to recognize an emergency must take immediate action using the following steps and the flowchart in Figure C:

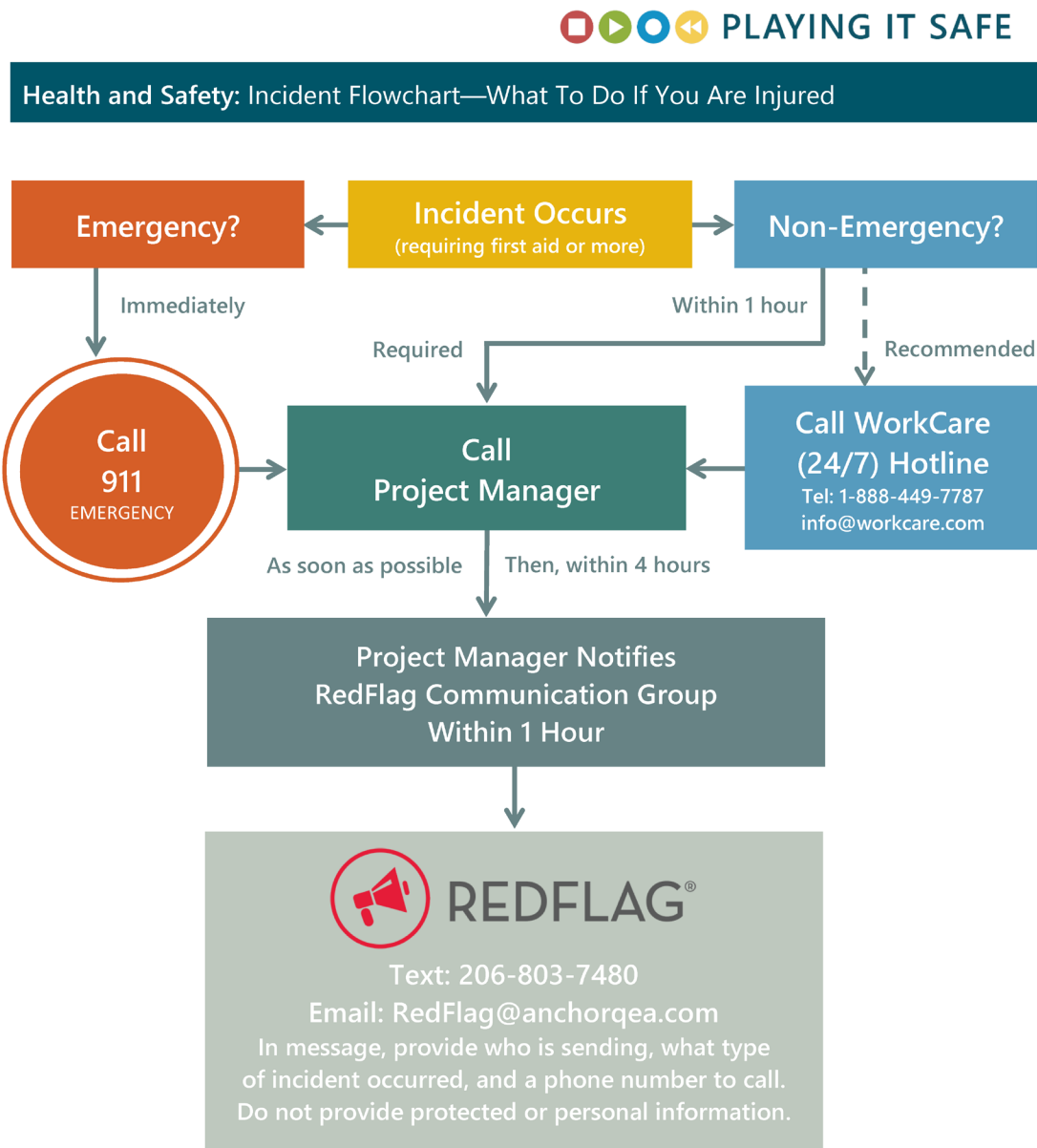
1. Survey the situation to verify it is safe for you and the victim. **Do not endanger your own life.**
  - Never enter an area to rescue someone who has been overcome unless you are properly equipped and trained.
  - Make sure all protocols are followed.
  - Review Safety Data Sheets (SDSs) to evaluate response actions for chemical exposures.
2. Immediately call 911 or the appropriate emergency number listed in Table A, or have someone else to do it.
  - Report the physical injury, incident location, and any chemical exposure, fire, or release.

3. Have someone retrieve the nearest first aid kit containing the necessary items and, if needed, an Automated External Defibrillator (AED).
  - Use an AED only if you are properly trained and are currently certified.
4. Decontaminate the victim without delaying lifesaving procedures (see Section 8).
5. Administer first aid and cardiopulmonary resuscitation (CPR), if you are properly trained, until emergency responders arrive.<sup>1</sup>
6. Notify the Field Lead (FL) and Project Manager (PM); the PM will notify the client contact. The PM will also contact the Corporate Health and Safety Manager (CHSM), who will facilitate the incident investigation. All client requirements pertinent to personal incident reporting will also be adhered to.
7. If evacuation is required, the FL must conduct a head count to verify that all Anchor QEA personnel are accounted for.
8. Complete the appropriate incident investigation reports.

---

<sup>1</sup> Personnel qualified and currently certified in basic first aid or CPR are protected under Good Samaritan policies as long as they perform only the basic tasks that they were taught. Do not provide first aid or perform CPR unless you have been properly trained.

**Figure C**  
**Incident Flowchart**



Revised: 12/27/2023

*Responsibility is taken, not given. Take responsibility for safety.*



## Non-Personal Incident Response Procedures

All incidents—including, but not limited to, fire, explosion, property damage, or environmental releases—must be responded to according to the site-specific HASP. In general, this means securing the site of the incident and turning control over to the emergency responders, or securing the site and summoning appropriate remedial personnel or equipment. Anchor QEA will immediately notify the client of any major incident, fire, equipment or property damage, or environmental incident in a preliminary report, followed by a full report within 72 hours.

### *Spills and Releases of Hazardous Materials*

When required, notify the National Response Center [(800) 424-8802] and state and local agencies. Give the following information to the National Response Center:

- Name and telephone number
- Name and address of incident location
- Time and type of incident
- Name and quantity of materials involved, if known
- Extent of injuries
- Possible hazards to human health or the environment outside the facility

If hazardous waste is released or produced through control of the incident, verify the following:

- Waste has been collected and contained.
- Containers of waste have been removed or isolated from the immediate site of the emergency.
- Recovered waste, contaminated soil or surface water, and any other material that results from the incident or its control has been treated or stored.
- No waste incompatible with the released material is treated or stored in the facility until the cleanup is complete.

Before operations resume, make sure all emergency equipment that was used has been decontaminated, recharged, and is fit for its intended use.

## Recording Playing It Safe Events

All events that could have reasonably led to an injury, environmental release, or other incident must be immediately reported to the FL and PM so the conditions that led to the event can be readily corrected to prevent future occurrences. Any events where there are opportunities for others to learn should be recorded as a Playing It Safe event.

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## APPENDICES

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Appendix B	Job Safety Analysis Documents
Appendix C	Safety Data Sheets
Appendix D	Certifications
Appendix E	Heat and Cold Exposure Program

## ABBREVIATIONS

AED	Automated External Defibrillator
ANSI	American National Standards Institute
APR	Air-Purifying Respirator
ASTM	ASTM International
CAS	Chemical Abstracts Service (number)
CDC	Centers for Disease Control and Prevention
CFR	<i>Code of Federal Regulations</i>
CHSM	Corporate Health and Safety Manager
COC	chemical of concern
CPR	cardiopulmonary resuscitation
dBA	A-weighted decibel
dB	decibel
DOHS	Director of Health and Safety
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
eV	electron volts
FL	Field Lead
GFCI	ground-fault circuit interrupter
HASP	Health and Safety Plan
HAZMAT	Hazardous Materials
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	high-efficiency particulate air
JSA	Job Safety Analysis
LEL	lower-explosive limit
LO/TO	lockout/tagout
mg/m <sup>3</sup>	milligram per cubic meter
MHR	maximum heart rate
MLLW	mean lower low water
NA	not applicable
NIOSH	National Institute for Occupational Safety and Health
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NRR	Noise Reduction Rating
OSHA	Occupational Safety and Health Administration
OV	organic vapor
PAH	polycyclic aromatic hydrocarbon

PE	Professional Engineer
PEL	Permissible Exposure Limit
PFD	personal flotation device
PM	Project Manager
PPE	personal protective equipment
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
SDS	Safety Data Sheet
TLV	Threshold Limit Value
TSD	treatment, storage, and disposal
TWA	time-weighted average
USCG	U.S. Coast Guard
UV	ultraviolet
UXO	unexploded ordnance
WBGT	wet bulb globe temperature
WWTP	Wastewater Treatment Plant
XO	exploded ordnance

# 1 Introduction

This Health and Safety Plan (HASP) was prepared on behalf of Pierce County and presents health and safety requirements and procedures that will be followed by Anchor QEA personnel and, at a minimum, by Anchor QEA subcontractors during work activities at Chambers Creek Wastewater Treatment Plant (the site). This HASP was developed in accordance with Title 29 of the *Code of Federal Regulations* (CFR), Part 1910.120(b), and is to be used in conjunction with Anchor QEA's Corporate Health and Safety Program. See Section 1.2 for information on how to modify this HASP in response to changing conditions in the field or new project tasks.

This HASP identifies potential physical, chemical, and biological hazards associated with field activities; establishes safe working conditions and protective measures to control those hazards; defines emergency procedures; and describes the responsibilities of site personnel as well as their training and medical monitoring requirements.

Issuance of this approved HASP documents that a hazard assessment was performed for the work site and specific site activities, and the adequacy of the personal protective equipment (PPE) selected was evaluated as required by 29 CFR 1910.132(d)—Personal Protective Equipment, General Requirements (General Industry); 29 CFR 1910.134—Respiratory Protection; 29 CFR 1926.28—Personal Protective Equipment (Construction Industry); and 29 CFR 1926.55—Gases, Vapors, Fumes, Dusts and Mist, and is duly noted by the signature(s) and date appearing on the certification page of this document.

## 1.1 Health and Safety Plan Requirements and Contingency Plan

The provisions of this HASP are mandatory for all Anchor QEA personnel assigned to the project and must be followed when working at the site. Personnel assigned to work at the project site will be required to read this HASP and must sign the Health and Safety Plan Acknowledgement Form to confirm that they understand and agree to abide by the provisions of this HASP. A copy of this HASP must be maintained on site and available for employees and visitors to review at any time.

Subcontractors are ultimately responsible for the health and safety of their employees and shall have their own HASP that covers their specific activities related to this project. Any subcontractor HASPs must include, at a minimum, the requirements set forth in this HASP. Subcontractors may mandate health and safety protection measures for their employees beyond the minimum requirements specified in this HASP.

All visitors to the work site must also abide by the requirements of this HASP and must attend a pre-work briefing where the contents of this HASP will be presented and discussed. Visitors may also be required to sign the Liability Waiver.

## **1.2 Health and Safety Plan Modifications**

This HASP will be amended, if necessary, to address changing field conditions or additional work tasks not already described in this document. Modifications will be proposed by the Field Lead (FL) using the Modification to Health and Safety Plan form included in Appendix A. Modifications will be reviewed by a Corporate Health and Safety Manager (CHSM) or the Director of Health and Safety (DOHS) and approved by the Project Manager (PM). Significant operational changes that could affect the health and safety of personnel, the community, or the environment will not be made without the prior approval of the PM and a CHSM.

## 2 Site Description and Background Information

### 2.1 Site Description

National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit Number WA0039624 (permit) issued by the Washington State Department of Ecology (Ecology) requires sediment sampling compliance monitoring in the vicinity of the Chambers Creek Wastewater Treatment Plant (WWTP) Outfall 001 diffuser. WWTP is located at 10311 Chambers Creek Road W, University Place, Washington, 98467. Outfall 001 and diffuser is located on site in University Place, Washington, and is situated along Puget Sound, approximately 5 miles south of Tacoma and 20 miles north of Olympia. The WWTP discharges treated wastewater via an outfall pipe through a high-rate diffuser. The outfall discharges approximately 760 feet offshore at approximately -110 feet mean lower low water (MLLW). The outfall diffuser section is approximately 112 feet in length, has eight diffusers with 11.9-inch openings on alternating sides, and has two vertical maintenance hatches.

Sampling locations and chemical testing methods have been selected in accordance with the monitoring requirements of the permit and guidance provided in the *Sediment Cleanup User's Manual (SCUM)*, Appendix A: Sampling Guidance for NPDES Permits under the Sediment Management Standards<sup>2</sup> and current Puget Sound Estuary Program protocols. A total of 10 sample locations are proposed to meet sediment sampling compliance monitoring requirements. Eight samples are located in the vicinity of the diffuser. Two samples are background samples located to the north and south of the diffuser. Surface sediment will be sampled at the 0- to 10-cm interval. Sediment chemical and physical data from this investigation will be presented to Ecology for acceptance and confirmation of permit compliance.

---

<sup>2</sup> Washington State Department of Ecology, 2021. *Sediment Cleanup User's Manual (SCUM)*, Appendix A: Sampling Guidance for NPDES Permits under the Sediment Management Standards. Publication No. 12-09-057. December 2021.

## 3 Scope of Work

### 3.1 Project Scope of Work

This HASP addresses health and safety issues associated with the following field tasks:

- Collect 10 surface sediment grab samples at the 0- to 10-cm interval, located in the vicinity of the Outfall 001 diffuser, and following the Sediment Sampling and Analysis Plan.
  - The outfall discharges approximately 760 feet offshore at approximately -110 feet MLLW.
  - Eight samples are located in the vicinity of the diffuser.
  - Two samples are background samples located offshore, 1,500 feet to the north and south of the diffuser.

In accordance with the permit, samples must be collected between August 15 and September 30, 2025.

## 4 Authority and Responsibilities of Key Personnel

This section describes the authority and responsibilities of the key Anchor QEA project personnel. Their names and contact information are listed in the Site Emergency Procedures section at the beginning of this HASP. If key site personnel change during the project, a new contact list will be posted immediately at the site. The site's medical, fire, and police emergency phone number is **911**.

### 4.1 Project Manager

The PM provides overall direction for the project and is responsible for ensuring that the project meets the client's objectives in a safe and timely manner. The PM is responsible for providing qualified staff for the project and adequate resources and budget so the Health and Safety staff can carry out their responsibilities during the field work. In addition, the PM is in regular contact with the FL and CHSM to verify that appropriate health and safety procedures are followed during the performance of each project task.

The PM has authority to direct response operations; the PM assumes total control over project activities but may assign responsibility for aspects of the project to others. In addition, the PM has the following responsibilities:

- Oversee the preparation and organization of background review of the project, the Scope of Work, and the field team.
- Verify that the team obtains permission for site access and coordinates activities with appropriate officials.
- Brief the FL and field personnel on specific assignments.
- Together with the FL, see that health and safety requirements are met.
- Consult with a CHSM regarding unsafe conditions, incidents, or changes in site conditions or the Scope of Work.

### 4.2 Field Lead

The FL reports to the PM, also has authority to direct response operations, and assumes control over on-site activities. The FL directs field activities, coordinates the technical and health and safety components of the field program, and is responsible in general for implementing, enforcing, and administering this site-specific HASP and Corporate Health and Safety Program requirements. The FL will be the primary point of contact for all field personnel and visitors. FLs on contaminated sites must have completed a minimum of an additional 8-hour HAZWOPER Supervisor course as approved by Health and Safety. The FL must be present on site when work is being performed.

The FL and any other member of the field team have **STOP WORK AUTHORITY**—the authority to stop or suspend work in the event of an emergency, if conditions arise that pose an unacceptable health and safety risk to the field team or environment, or if conditions arise that warrant

modifications to this HASP. It is critical that both the FL and PM communicate regularly to proactively identify and address any safety-related concerns that may arise.

The FL can designate an alternate to act in their absence; however, the FL alternate must meet any FL requirements to include training. The FL's responsibilities related to this HASP include, but are not necessarily limited to, the following:

- Provide (via implementation of this HASP) emergency procedures, evacuation routes, and telephone numbers for the local hospital, poison control center, fire department, and police department.
- Conduct and document daily safety meetings.
- Execute the Scope of Work and schedule.
- Conduct periodic field health and safety inspections to verify compliance with this HASP.
- Oversee implementation of safety procedures.
- Implement site personnel protection levels.
- Enforce site control measures designed to limit access to authorized personnel only.
- Periodically inspect protective clothing and equipment for adequacy and safety compliance.
- Verify that protective clothing and equipment are properly stored and maintained.
- Perform or oversee air monitoring (if required) in accordance with this HASP.
- Maintain and oversee operation of monitoring equipment and interpretation of data from the monitoring equipment.
- Monitor site personnel for signs of stress, including heat stress, overexertion, cold exposure, and fatigue.
- Require participants to use the "buddy" system when performing tasks.
- Maintain communication with a CHSM regarding on-site activities.
- If applicable, verify that decontamination and disposal procedures are followed.
- Maintain the availability of required safety equipment.
- Notify, when necessary, local public emergency officials (**all personnel on site may conduct this task as needed**).
- Notify emergency response personnel in the event of an emergency and coordinate emergency medical care.
- Communicate incidents promptly to the PM.
- Follow up on incident reports to the PM.
- Advise appropriate health services and medical personnel of potential exposures.

The FL records in the field logbook health and safety-related details of the project. At a minimum, each day's entries must include the following information:

- Project name or location
- Names of all on-site personnel

- Level of PPE worn and any other specifics regarding PPE
- Weather conditions
- Type of field work being performed

The field team will have a health and safety meeting led by the FL prior to any field work each day. The FL will fill out the health and safety forms during the meeting to discuss any hazards, weather, and other applicable details listed above. All members will sign the health and safety form. A hard copy and virtual scan of the forms will be filed with all other sampling logs and included in the field report.

The FL will have completed the required Occupational Safety and Health Administration (OSHA) 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training and annual updates, the 8-hour Supervisor training, medical monitoring clearance, and current first aid and cardiopulmonary resuscitation (CPR) training. Other certifications or training may be stipulated based on client or site requirements.

### **4.3 Corporate Health and Safety Manager**

A CHSM (or designee) is responsible for managing on-site health and safety activities and for supporting the PM and FL on health and safety-related issues. A CHSM or designee has the following responsibilities:

- Provide technical input into the design and implementation of this HASP.
- Advise on the potential for occupational exposure to project hazards, along with appropriate methods and/or controls to eliminate site hazards.
- Verify that a hazard assessment has been performed and that the adequacy of the PPE selected was evaluated as required by 29 CFR 1910.132(d), 29 CFR 1910.134, 29 CFR 1926.25, and 29 CFR 1926.55, and is duly noted by the signatures and date appearing on the Certification Page of this document.
- Consult with the FL on matters relating to suspending site activities in the event of an emergency.
- Verify that all on-site Anchor QEA and subcontractor personnel have read and signed the Health and Safety Plan Acknowledgement Form.
- Verify that corrective actions resulting from deficiencies identified by audit and observations are implemented and effective.

A CHSM or designee will have completed the required OSHA 40-hour HAZWOPER training and annual updates as well as the 8-hour Supervisor training (or a minimum of 5 years of supervisory experience).

## 4.4 Project Field Team

In addition to the key personnel noted previously, the project field team members also have specific responsibilities related to this HASP. All field team members, including subcontractors, must be familiar with and comply with this HASP. Before beginning work on the site, all project field team members must attend a meeting led by the FL concerning safety issues and a review of the project work tasks.

Field team members must immediately report to the FL any potentially unsafe or hazardous conditions, and all members of the field team have **STOP WORK AUTHORITY**—the authority to stop or suspend work if conditions arise that pose an unacceptable health and safety risk to the field team or environment, or if conditions arise that warrant modifications to this HASP. It is critical that all field team members proactively communicate with the FL to identify potential unsafe conditions.

Field team members report to the FL for on-site activities and also have the following responsibilities:

- Review, maintain a working knowledge of, and comply with this HASP.
- Attend and participate in daily safety meetings.
- Safely complete on-site tasks required to fulfill the Scope of Work.
- Notify the FL of existing or potential safety issues at the site.
- Report all incidents to the FL.
- Demonstrate safety- and health-conscious conduct.

In accordance with OSHA standards at 29 CFR 1910.120(e)(3)(i),<sup>3</sup> newly assigned HAZWOPER 40-hour trained field team members must have at least 3 days of field work supervised by an experienced FL (with HAZWOPER Supervisor training). The PM is responsible for identifying such “short service” personnel and verifying that their supervised field experience occurs (or has occurred) and is documented in the project field notes and on the Daily Safety Briefing form (Appendix A).

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<sup>3</sup> “General site workers (such as equipment operators, general laborers and supervisory personnel) engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained experienced supervisor.”

## 5 Project-Specific Requirements

This section provides activity-specific levels of protection and air monitoring requirements to be used on this site based on the Scope of Work and the chemicals of concern (COCs).

### 5.1 Activity-Specific Level-of-Protection Requirements

See Section 10 for general PPE requirements. Level D is the minimum level of PPE acceptable for most sites. An upgrade to Modified Level D occurs when there is a possibility that contaminated media can come in contact with the skin or work uniform. An upgrade to Level C occurs when there is a potential for exposure to airborne COCs (i.e., if the results of air monitoring reveal that action levels have been exceeded). Hearing protection must be worn when there are high noise levels. Site personnel must maintain proficiency in the use and care of PPE that is to be worn.

Table 5-1 describes the specific means of protection needed for each identified work activity.

**Table 5-1**  
**Project Job Tasks and Required Personal Protective Equipment**

Job Tasks	PPE Requirements
<p><b>EXAMPLES:</b></p> <ul style="list-style-type: none"> <li>Loading and unloading sample coolers, boat equipment, general non-sampling activities onboard a marine vessel</li> <li>Operation of sampling vessel and equipment from inside boat house</li> </ul>	<input checked="" type="checkbox"/> Standard work uniform/coveralls
	<input checked="" type="checkbox"/> Work boots with safety toe conforming to ASTM F2412-05/ASTM F2413-05
	<input type="checkbox"/> High-visibility traffic safety vest
	<input type="checkbox"/> Chemical-resistant clothing <u>check appropriate garments:</u> <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> One-piece coverall  <input type="checkbox"/> Disposable chemical coveralls  <input type="checkbox"/> Bib-style overalls and jacket with hood </div> <div> <input type="checkbox"/> Hooded one- or two-piece chemical splash suit  <input type="checkbox"/> Chemical-resistant hood and apron </div> </div> <p><b>Fabric Type:</b> Tyvek  NOTE: Thick rain pants and coveralls may be substituted for coated Tyvek if sediments are not obviously contaminated with PAHs or related petroleum products. Rain slickers cannot be effectively decontaminated of tar/petroleum contamination.</p>
	<input type="checkbox"/> Disposable inner gloves (latex or equivalent "surgical")
	<input type="checkbox"/> Disposable chemical-resistant outer gloves <b>Material Type:</b> Nitrile
	<input type="checkbox"/> Chemical-resistant boots with safety toe conforming to ASTM F2412-05/ASTM F2413-05 or disposable boot covers for safety toe/work boots <b>Material Type:</b> Rubber or leather
	<input type="checkbox"/> Puncture-resistant shanks in safety shoes conforming to ASTM F2412-05/ASTM F2413-05
	<input type="checkbox"/> Metatarsal guards conforming to ASTM F2412-05/ASTM F2413-05
	<input type="checkbox"/> Sleeves to be duct-taped over gloves and pants to be duct-taped over boots
	<input type="checkbox"/> Splash-proof safety goggles
	<input type="checkbox"/> Safety glasses
	<input type="checkbox"/> Hard hat
	<input type="checkbox"/> Hard hat with face shield
	<input type="checkbox"/> Hearing protectors ( <b>REQUIRED</b> if site noise levels are greater than 85 decibels [dB] based on an 8-hour TWA). <b>Type:</b>
	<input type="checkbox"/> Two-way radio communication (intrinsically safe, if explosive atmosphere is a potential)
	<input type="checkbox"/> Long cotton underwear

Job Tasks		PPE Requirements
	<input checked="" type="checkbox"/>	High-visibility, USCG-approved PFD (if working on any water vessel or without fall protection within 10 feet of water)
	<input type="checkbox"/>	USCG-approved float coat and bib-overalls (e.g., full two-piece "Mustang" survival suit or similar) or one-piece survival suit if combined air and water temperature is below 90°F
	<input type="checkbox"/>	Half-face APR (OSHA/NIOSH-approved)
	<input type="checkbox"/>	Full-face APR (OSHA/NIOSH-approved)
	<input type="checkbox"/>	<b>Type of Cartridges to be Used:</b> <input type="checkbox"/> OV or <input type="checkbox"/> OV/HEPA (if samples are dry)
<b>EXAMPLES:</b> <ul style="list-style-type: none"> <li>Sediment sampling, general boating activities, decontamination activities</li> <li>Sampling and characterizing sediments</li> <li>Sample glassware handling</li> <li>Operation of sampling equipment but with no anticipated direct contact with sediments or decontamination chemicals</li> </ul>	<input checked="" type="checkbox"/>	Standard work uniform/coveralls
	<input checked="" type="checkbox"/>	Work boots with safety toe conforming to ASTM F2412-05/ASTM F2413-05
	<input type="checkbox"/>	High-visibility traffic safety vest
	<input type="checkbox"/>	Chemical-resistant clothing <u>check appropriate garments:</u> <input type="checkbox"/> One-piece coverall <input type="checkbox"/> Disposable chemical coveralls <input type="checkbox"/> Bib-style overalls and jacket with hood <input type="checkbox"/> Hooded one- or two-piece chemical splash suit <input type="checkbox"/> Chemical-resistant hood and apron <b>Fabric Type:</b> Tyvek NOTE: Thick rain pants and coveralls may be substituted for coated Tyvek if sediments are not obviously contaminated with PAHs or related petroleum products. Rain slickers cannot be effectively decontaminated of tar/petroleum contamination.
	<input type="checkbox"/>	Disposable inner gloves (latex or equivalent "surgical")
	<input checked="" type="checkbox"/>	Disposable chemical-resistant outer gloves <b>Material Type:</b> Nitrile
	<input type="checkbox"/>	Chemical-resistant boots with safety toe conforming to ASTM F2412-05/ASTM F2413-05 or disposable boot covers for safety toe/work boots <b>Material Type:</b> Rubber or leather
	<input type="checkbox"/>	Puncture-resistant shanks in safety shoes conforming to ASTM F2412-05/ASTM F2413-05
	<input type="checkbox"/>	Metatarsal guards conforming to ASTM F2412-05/ASTM F2413-05
	<input type="checkbox"/>	Sleeves to be duct-taped over gloves and pants to be duct-taped over boots
	<input type="checkbox"/>	Splash-proof safety goggles

Job Tasks		PPE Requirements
<ul style="list-style-type: none"> <li>Decontamination activities</li> <li>Sample glassware handling</li> </ul>	<input checked="" type="checkbox"/>	Safety glasses
	<input checked="" type="checkbox"/>	Hard hat
	<input type="checkbox"/>	Hard hat with face shield
	<input type="checkbox"/>	Hearing protectors ( <b>REQUIRED</b> if site noise levels are greater than 85 decibels [dB] based on an 8-hour TWA). <b>Type:</b>
	<input type="checkbox"/>	Two-way radio communication (intrinsically safe, if explosive atmosphere is a potential)
	<input type="checkbox"/>	Long cotton underwear
	<input checked="" type="checkbox"/>	High-visibility, USCG-approved PFD (if working on any water vessel or without fall protection within 10 feet of water)
	<input type="checkbox"/>	USCG-approved float coat and bib-overalls (e.g., full two-piece "Mustang" survival suit or similar) or one-piece survival suit if combined air and water temperature is below 90°F
	<input type="checkbox"/>	Half-face APR (OSHA/NIOSH-approved)
	<input type="checkbox"/>	Full-face APR (OSHA/NIOSH-approved)
	<input type="checkbox"/>	<b>Type of Cartridges to be Used:</b> <input type="checkbox"/> OV or <input type="checkbox"/> OV/HEPA (if samples are dry)

## 6 Risk Analysis and Control

The following sections discuss the potential health and safety hazards associated with the field tasks described in the Scope of Work. These hazards can be addressed through mechanical and physical control measures, the use of PPE, monitoring, training, decontamination, emergency response, and safety procedures.

Significant changes in the Scope of Work covered by this HASP must be reported to the PM and CHSM, and the HASP must be modified, if necessary (see Section 1.2). Any task not specified in the Scope of Work and this HASP must be evaluated using the Job Safety Analysis (JSA) process before conducting the work.

### 6.1 Job Safety Analysis

Anchor QEA work tasks have been evaluated for their hazards, and JSA documents have been developed that detail the chemical, physical, and biological hazards associated with these tasks along with the control measures (e.g., engineering controls, administrative controls, and/or PPE) that will be used to conduct them safely.

The PM and FL are responsible for identifying work tasks and project site conditions that are beyond the previously developed JSA documents and for informing a CHSM about them. A CHSM, in turn, will provide any support needed by the PM and the FL, who will be primarily responsible for developing project-specific JSAs to address those tasks and conditions.

Project personnel will be informed about the contents of the JSA documents during the site orientation meeting and during daily safety meetings when conducting work where the specific JSAs are applicable.

JSA documents applicable to this project are provided in Appendix B and include the following field tasks:

- General Field Activities
- Sediment Sampling
- General Boating Activities
- Decontamination Activities
- Motor Vehicle Operation
- Sample and Laboratory Glassware Handling

#### 6.1.1 *Augmented Job Safety Analysis Process*

If significant work tasks are identified during the course of the project that were not previously addressed in the JSA documentation (provided in Appendix B), then the PM and FL shall develop a task-specific JSA document with input from a CHSM, as needed, before conducting the work. This

HASP will be modified to include the new task-specific JSA document (see Section 1.2 for HASP modification procedures). Project personnel shall be trained on the contents of the new task-specific JSA before it can be implemented.

## **6.2 Exposure Routes**

Possible routes of exposure to the chemicals that may be encountered on this project include dermal contact of dust or liquid. Exposure can be minimized by following safe work practices and by wearing the appropriate PPE. See Section 10 for information about PPE requirements.

### **6.2.1 *Dermal Contact***

Dermal (skin) contact with potentially contaminated soil, sediment, or groundwater during field activities is possible. Direct contact will be minimized by using appropriate PPE and decontamination procedures.

## **6.3 Chemicals of Concern Profile**

Table 6-1 provides a summary profile of project COCs. This profile is based on site history and site characterization information, when available. For more detailed and specific information, always refer to the Safety Data Sheet (SDS) or equivalent information for the COC (see Appendix C).

**Table 6-1**  
**Chemicals of Concern Profile**

Chemical Name and Chemical Abstracts Service (CAS) Number (#)	Exposure Routes	Symptoms	Target Organs	Occupational Exposure Limit	LEL (%)	Ionization Potential (eV)
<b>Metals</b>						
Arsenic, 7440-38-2	inhalation, skin absorption, skin and/or eye contact, ingestion	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin, [potential occupational carcinogen]	Liver, kidneys, skin, lungs, lymphatic system	OSHA PEL TWA 0.010 mg/m <sup>3</sup>	NA	NA
Cadmium, 7440-43-9	inhalation, ingestion	pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]	respiratory system, kidneys, prostate, blood	OSHA PEL TWA 0.005 mg/m <sup>3</sup>	NA	NA
Chromium, 7440-47-3	inhalation, ingestion, skin and/or eye contact	irritation eyes, skin; lung fibrosis (histologic)	Eyes, skin, respiratory system	OSHA PEL TWA 1 mg/m <sup>3</sup>	NA	NA
Copper, 7440-50-8	inhalation, ingestion, skin and/or eye contact	irritation eyes, nose, pharynx; nasal septum perforation; metallic taste; dermatitis; In Animals: lung, liver, kidney damage; anemia	Eyes, skin, respiratory system, liver, kidneys (increased risk with Wilson's disease)	OSHA PEL TWA 1 mg/m <sup>3</sup>	NA	NA

<b>Chemical Name and Chemical Abstracts Service (CAS) Number (#)</b>	<b>Exposure Routes</b>	<b>Symptoms</b>	<b>Target Organs</b>	<b>Occupational Exposure Limit</b>	<b>LEL (%)</b>	<b>Ionization Potential (eV)</b>
Lead, 7439-92-1	inhalation, ingestion, skin and/or eye contact	lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension	Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue	OSHA PEL TWA 0.050 mg/m <sup>3</sup>	NA	NA
Mercury, 7439-97-6	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria	Eyes, skin, respiratory system, central nervous system, kidneys	OSHA PEL TWA 0.1 mg/m <sup>3</sup>	NA	NA
Silver, 7440-22-4	inhalation, ingestion, skin and/or eye contact	Blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance	Nasal septum, skin, eyes	OSHA PEL TWA 0.01 mg/m <sup>3</sup>	NA	NA

Chemical Name and Chemical Abstracts Service (CAS) Number (#)	Exposure Routes	Symptoms	Target Organs	Occupational Exposure Limit	LEL (%)	Ionization Potential (eV)
<b>PAHs</b>						
Naphthalene, 91-20-3	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage	Eyes, skin, blood, liver, kidneys, central nervous system	OSHA PEL TWA 10 ppm (50 mg/m <sup>3</sup> )	0.9%	8.12 eV
<b>Chlorinated Hydrocarbons</b>						
1,4-dichlorobenzene, 106-46-7	inhalation, skin absorption, ingestion, skin and/or eye contact	Eye irritation, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; In Animals: liver, kidney injury; [potential occupational carcinogen]	Liver, respiratory system, eyes, kidneys, skin	OSHA PEL TWA 75 ppm (450 mg/m <sup>3</sup> )	2.5%	8.98 eV
1,2-dichlorobenzene, 95-50-1	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation eyes, nose; liver, kidney damage; skin blisters	Eyes, skin, respiratory system, liver, kidneys	OSHA PEL C 50 ppm (300 mg/m <sup>3</sup> )	2.2%	9.06 eV
1,2,4-trichlorobenzene, 120-82-1	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation eyes, skin, mucous membrane; In Animals: liver, kidney damage; possible teratogenic effects	Eyes, skin, respiratory system, liver, reproductive system	None	(302°F): 2.5%	NA
Hexachlorobenzene, 118-74-1						

Chemical Name and Chemical Abstracts Service (CAS) Number (#)	Exposure Routes	Symptoms	Target Organs	Occupational Exposure Limit	LEL (%)	Ionization Potential (eV)
<b>Phthalates</b>						
Dimethyl phthalate, 131-11-3	inhalation, ingestion, skin and/or eye contact	irritation eyes, upper respiratory system; stomach pain	Eyes, respiratory system, gastrointestinal tract	OSHA PEL TWA 5 mg/m <sup>3</sup>	(358°F): 0.9%	9.64 eV
Diethyl phthalate, 84-66-2	inhalation, ingestion, skin and/or eye contact	irritation eyes, skin, nose, throat; headache, dizziness, nausea; lacrimation (discharge of tears); possible polyneuropathy, vestibular dysfunction; pain, numb, lassitude (weakness, exhaustion), spasms in arms and legs; In Animals: reproductive effects	Eyes, skin, respiratory system, central nervous system, peripheral nervous system, reproductive system	None	(368°F): 0.7%	NA
Di-n-butyl phthalate, 84-74-2	inhalation, ingestion, skin and/or eye contact	irritation eyes, upper respiratory system, stomach	Eyes, respiratory system, gastrointestinal tract	OSHA PEL TWA 5 mg/m <sup>3</sup>	(456°F): 0.5%	NA
Bis(2-ethylhexyl) phthalate, 117-81-7	inhalation, ingestion, skin and/or eye contact	irritation eyes, mucous membrane; In Animals: liver damage; teratogenic effects; [potential occupational carcinogen]	Eyes, respiratory system, central nervous system, liver, reproductive system, gastrointestinal tract	OSHA PEL TWA 5 mg/m <sup>3</sup>	(474°F): 0.3%	NA
<b>Phenols</b>						
Phenol, 108-95-2	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation eyes, nose, throat; anorexia, weight loss; lassitude (weakness, exhaustion), muscle ache, pain; dark urine; cyanosis; liver, kidney damage; skin burns; dermatitis; ochronosis; tremor, convulsions, twitching	Eyes, skin, respiratory system, liver, kidneys	OSHA PEL TWA 5 ppm (19 mg/m <sup>3</sup> )	1.8%	8.50 eV

Chemical Name and Chemical Abstracts Service (CAS) Number (#)	Exposure Routes	Symptoms	Target Organs	Occupational Exposure Limit	LEL (%)	Ionization Potential (eV)
2-methylphenol, 95-48-7	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation eyes, skin, mucous membrane; central nervous system effects: confusion, depression, respiratory failure; dyspnea (breathing difficulty), irregular rapid respiration, weak pulse; eye, skin burns; dermatitis; lung, liver, kidney, pancreas damage	Eyes, skin, respiratory system, central nervous system, liver, kidneys, pancreas, cardiovascular system	OSHA PEL TWA 5 ppm (22 mg/m <sup>3</sup> )	(300°F): 1.4%	8.93 eV
4-methylphenol, 106-44-5	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation eyes, skin, mucous membrane; central nervous system effects: confusion, depression, respiratory failure; dyspnea (breathing difficulty), irregular rapid respiration, weak pulse; eye, skin burns; dermatitis; lung, liver, kidney, pancreas damage	Eyes, skin, respiratory system, central nervous system, liver, kidneys, pancreas, cardiovascular system	OSHA PEL TWA 5 ppm (22 mg/m <sup>3</sup> )	(300°F): 1.1%	8.97 eV
Pentachlorophenol, 87-86-5	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation eyes, nose, throat; sneezing, cough; lassitude (weakness, exhaustion), anorexia, weight loss; sweating; headache, dizziness; nausea, vomiting; dyspnea (breathing difficulty), chest pain; high fever; dermatitis	Eyes, skin, respiratory system, cardiovascular system, liver, kidneys, central nervous system	OSHA PEL TWA 0.5 mg/m <sup>3</sup>	NA	NA
<b>Miscellaneous Extractable Organics</b>						
Hexachlorobutadiene, 87-68-3	inhalation, skin absorption, ingestion, skin and/or eye contact	In Animals: irritation eyes, skin, respiratory system; kidney damage; [potential occupational carcinogen]	Eyes, skin, respiratory system, kidneys	None	NA	NA

## 7 Site Control and Communications

The primary purposes of site controls are to establish the hazardous area perimeter, reduce the migration of contaminants into clean areas, and prevent unauthorized access or exposure to hazardous materials by site personnel and the public. Site control is especially important in emergencies.

### 7.1 General Site Control Safety Procedures

All Anchor QEA site personnel and subcontractors must comply with the following standard safe work practices, which must be discussed in the safety briefing before initiating work on the site:

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited on site except in designated areas.
- Hands and faces must be washed upon leaving the work area and before eating, drinking, chewing gum or tobacco, and smoking.
- A buddy system will be used. Radio, mobile phone, or hand signals will be established to maintain communication.
- During site operations, all workers will be a safety backup to their partner.
- Buddies will maintain visual contact on site when performing potentially hazardous duties.
- No one will be admitted to the site without the proper safety equipment, training, and (if required) medical monitoring certification.
- Proper decontamination procedures must be followed before leaving a contaminated work area.

Any staff member who does not comply with the safety policy established in this HASP may be subject to corrective action, potentially including but not limited to being reprimanded or immediately dismissed.

### 7.2 Work Area Access Control

When work is performed in public areas, precautions must be taken to protect site personnel and the public. Access to the work area will be controlled using a combination of the following:

- Fences and/or barricades
- Traffic control devices and/or use of flaggers
- Caution tape

Other methods can also be used to keep the site secure and provide a visual barrier to prevent unauthorized personnel from entering the site and active work areas.

## 7.3 Site-Specific Work Zone Requirements

This section provides guidelines for maintaining safe conditions when working from a boat.

### 7.3.1 *Sediment Sampling Work Zones*

For sediment sample collection aboard marine sampling vessels, the vessel captain, onshore coring operator, and FL will delineate the vessel's work zones and inform the field team of the arrangement. Having work zones helps limit the migration of sample material out of the zones and restricts access to active work areas.

Two work zones will be observed aboard the vessel. One will encompass the area of the vessel where the samplers will be deployed and recovered. Only the sampling team may enter this zone unless assistance is required by other personnel. The second work zone will be a sample processing area on the vessel, where the contractor team will deliver and sample the sediment grabs. Anchor QEA personnel will log and process the sediment samples on the boat.

The collection and processing areas both on the vessel will have an area to stage clean equipment, don PPE, take rest breaks, and perform any other site activities that do not involve potentially contaminated materials.

#### 7.3.1.1 Vessel Decontamination Area

A station will be set up for decontaminating sample processing equipment and personal gear such as boots or PPE. The station will be equipped with buckets, brushes, soapy water, rinse water, and wipes necessary to perform decontamination operations. Plastic bags will be provided to collect expendable and disposable materials. Decontamination fluids will be stored in sealable containers and will be properly disposed of.

#### 7.3.1.2 Access Control

Maintaining security and controlling access to the sampling vessel is the responsibility of the captain and FL. Additional security measures may be put into effect by the client. Access to the vessel will only be granted to necessary project personnel. Any security or access control problems will be reported to the client or appropriate authorities.

#### 7.3.1.3 Safety Equipment

In addition to PPE that will be worn by shipboard personnel, basic emergency and first aid equipment will also be provided. Equipment will include the following:

- U.S. Coast Guard (USCG)-approved personal flotation devices (PFDs)
- First aid kit adequate for the number of personnel
- Emergency eyewash

Anchor QEA and/or subconsultants will provide this equipment, which must be available at the location(s) where field activities are being performed. Equipment will be checked daily to verify its readiness for use.

## 7.4 Field Communications

Communication between all Anchor QEA employees and subcontractors at the work site can be verbal or non-verbal, although verbal communication can be affected by background noise or the use of various PPE. All project personnel must be initially briefed on the communication methods before starting work, and communication methods should be reviewed in daily safety meetings. Communication equipment must be checked daily to verify proper operation. Table 7-1 lists the types of communication methods and equipment to use, depending on site conditions.

**Table 7-1**  
**Field Communication Methods**

Type of Communication	Communication Device	Signal
Emergency notification	On-site telephone or mobile telephone	Initiate phone call using applicable emergency numbers
Emergency notification among site personnel	Two-way radio	Initiate radio communication with Code Red message
Hailing site personnel for non-emergency	Compressed air horn	One long blast, one short blast
Hailing site personnel for emergency evacuation	Compressed air horn	Three long, continuous blasts
Hailing site personnel for distress, need help	Visual	Arms waved in circle over head
Hailing site personnel for emergency evacuation	Visual	Arms waved in crisscross over head
Break, lunch, end of day	Visual	Two hands together, break apart

## 8 Decontamination Procedures and Practices

### 8.1 Minimizing Contamination

Take the following measures to prevent or minimize exposure to potentially contaminated materials:

#### **Personnel**

- Do not walk through spilled materials.
- Do not handle, touch, or smell sample media directly.
- Make sure PPE is not cut or torn before using it.
- Protect and cover any skin injuries.
- Stay upwind of airborne dust and vapors.
- Do not eat, drink, chew tobacco, or smoke in the work zones.

#### **Sampling Equipment and Vehicles/Vessels**

- Avoid getting sampled media on the outside of sample containers.
- Bag sample containers before filling with sampled media, if necessary.
- Place clean equipment on a plastic sheet to avoid direct contact with contaminated media.
- Keep contaminated equipment and tools separate from clean equipment and tools.
- Fill sample containers over a tub to contain spillage.
- Clean up spilled material immediately to avoid tracking it around the vehicle or vessel.

### 8.2 Decontaminating Equipment

All vehicles, vessels, and equipment that have entered a potentially contaminated area will be visually inspected and, if necessary, decontaminated before leaving the area. If the vehicle's contamination level is low, decontamination may be limited to rinsing its tires and wheel wells with an appropriate detergent and water. If a vehicle is significantly contaminated, steam cleaning or pressure washing may be required. Tools are to be cleaned in the same manner. Rinsate from all decontamination activities will be collected for proper disposal. Decontamination of equipment and tools will take place within the processing area. Appropriate PPE should be donned before beginning decontamination activities.

The following supplies will be available to use in decontaminating equipment:

- Wash and rinse buckets
- Tap water and phosphate-free detergent
- Distilled or deionized water
- Scrub brushes
- Paper towels and plastic garbage bags
- Deck pump with pressurized freshwater hose (aboard the vessel)
- Pressure washer/steam cleaner, if appropriate
- Appropriate PPE for the type of contaminant

### 8.3 Sampling and Processing Equipment Decontamination

To prevent sample cross-contamination, sampling and processing equipment that comes into contact with soil, sediment, or water samples will undergo the following decontamination procedures when work in the processing area is completed and before the equipment is used again:

1. Rinse with potable water and wash with scrub brush.
2. Wash with phosphate-free detergent (i.e., Alconox®).
3. Visually inspect the sampler and, if necessary, repeat the scrub and rinse step. If scrubbing and rinsing with Alconox® or similar substance is not enough to remove visually observable tar-related contamination, scrub and rinse the equipment with hexane (or a similar type of solution) until all visible signs of contamination are gone.
4. Before using sampling equipment again, rinse the exterior of the equipment with potable water three times. Rinse homogenizing equipment once with potable water and three times with distilled water before and between sample processing.
5. Wear PPE that is appropriate for the contaminant.

### 8.4 Handling of Investigation-Derived Waste

All sediment remaining after sampling will be washed overboard at the collection site prior to moving to the next sampling station. Any sediment spilled on the deck of the sampling vessel will be washed into the surface waters at the collection site. Sediment remaining following grab sample processing will be returned to the sampling location. However, sediments with visible evidence of contamination (e.g., oily droplets, sheen, paint chips, sandblast grit, other wastes) should not be returned to the water. Instead, they should be retained in a watertight drum on board the vessel for appropriate containment, and an aliquot sent for chemical analysis to inform proper disposal.

Sampling equipment will be decontaminated on site after each use using an environmentally friendly detergent such as Alconox®. Fluids used to decontaminate sampling equipment, and disposable sample collection wastes (e.g., gloves, paper towels, or foil) will be placed in heavy-duty garbage bags or other appropriate containers. Disposable supplies will be placed in a normal refuse container for disposal as solid waste.

#### 8.4.1 Disposable Personal Protective Equipment

Disposable PPE, which may include nitrile gloves, must be disposed of according to the requirements of the client and state and federal agencies.

### 8.5 Sanitizing Personal Protective Equipment

Exhalation, body oils, and perspiration will soil the insides of masks and clothing. Before reusing reusable protective clothing, and other personal articles, they must be decontaminated and also sanitized. If practical, machine wash reusable protective clothing after a thorough decontamination;

otherwise, clean by hand. Following proper sanitization, bag or tag equipment to show that it has been sanitized and is ready for use.

## **8.6 Emergency Personnel Decontamination**

Personnel who experience medical problems or injuries may also require decontamination. However, if the decontamination may aggravate or cause more serious health effects, or if prompt lifesaving, first aid, and medical treatment are required, decontamination procedures will be omitted. Either way, a member of the site management team will accompany contaminated personnel to the medical facility to advise on matters involving decontamination. Consideration should still be given to the potential for contaminating other areas such as vehicles and treatment facilities. PPE appropriate for the contaminant should be worn.

## **8.7 Containment of Decontamination Fluids**

Spill control measures will be used, as necessary, to contain contaminated runoff that may enter into clean areas. Use plastic sheeting or hay bales, or install a spill control system to prevent spills and contain contaminated water.

## 9 Health and Safety Training and Informational Programs

This section describes the health and safety training and informational programs with which Anchor QEA project site personnel must comply. All certifications required in this section are provided in Appendix D and will be kept on internal file.

### 9.1 Initial Project Site Orientation

Everyone working at an Anchor QEA project site must participate in an initial health and safety orientation presented by the PM or FL that, at a minimum, will cover the following topics:

- A review of the contents of this HASP, including the Scope of Work and associated site hazards and control methods and procedures.
- Provisions of this HASP are mandatory for all Anchor QEA personnel assigned to the project.
- Anchor QEA subcontractors are also expected to follow the provisions of this HASP unless they have their own HASP that covers their specific activities related to this project and includes the minimum requirements of this HASP.
- All visitors to the work site will also be required to abide by the requirements of this HASP.
- Personnel assigned to perform work at the project site, working under the provisions of this HASP, will be required to read the HASP and must sign the Health and Safety Plan Acknowledgement Form to confirm that they understand and agree to abide by the provisions of this HASP. Personnel not directly affiliated with the project (i.e., visitors) may also be required to sign the Liability Waiver.

### 9.2 Daily Safety Meetings

Daily safety “tailgate” meetings make accident prevention a top priority for everyone working at a site and reinforce awareness of important accident-prevention techniques. The following daily safety meeting procedures and practices are required:

- Daily safety meetings will be held each morning before conducting site activities.
- The Daily Safety Briefing form in Appendix A will be used to document each meeting.
- Copies of the completed Daily Safety Briefing forms will be maintained on site during the course of the project.

### 9.3 End-of-Day Wellness Checks

Similar to the daily safety meetings, field staff will gather at the end of the day to verify group health and wellness and discuss any near misses that occurred that day. These wellness checks will be recorded on that day’s Daily Safety Briefing form.

## 9.4 Hazardous Waste Operations Training

Personnel working on project sites where they may be potentially exposed to hazardous wastes or other hazardous substances must be trained in accordance with the requirements of the 29 CFR 1910.120 (HAZWOPER) regulation, as follows:

- Field personnel must complete a minimum of 40 hours of hazardous waste activity instruction.
- Field personnel must complete a minimum of 3 days of supervised field instruction.
- Field personnel assigned to the site must also have received 8 hours of refresher training annually. If the time lapse since their previous training has exceeded 1 year, they may not work on the site until training is current.
- On-site managers and supervisors directly responsible for workers engaged in hazardous waste operations must have an additional 8 hours of supervisory training.
- Field personnel must be current in first aid and CPR training offered by the American Red Cross or similar organization.
- Other training may be required depending on the task to be performed (e.g., confined space entry, excavation or trenching, underground storage tank removal, fall protection, and hazard communication).

## 9.5 Hazard Communication Program

The purpose of hazard communication (Employee Right-to-Know) is to verify that the hazards of all chemicals located at the field project site are communicated to all Anchor QEA personnel and subcontractors in accordance with 29 CFR 1910.1200. See the Anchor QEA Hazard Communication Program document for additional information. These chemicals may be brought on site to support site investigation/remediation activities or site maintenance (e.g., fuel for lawn mowers), and/or may be containerized investigation-derived waste following field activities.

Every container of hazardous materials must be labeled by the manufacturer, who must also provide the SDS upon initial order of the product and upon request thereafter. The actual format may differ from company to company (e.g., National Fire Protection Association, Hazardous Material Information System, or other), but the labels must contain similar types of information, and manufacturer labels should be kept, if possible. The label may use words or symbols to communicate the following information:

- Introduction
- Hazard(s) identification
- Composition or information about ingredients
- First aid measures
- Fire-fighting measures
- Accidental release response measures

- Handling and storage
- Exposure controls or personal protection
- Physical and chemical properties
- Stability and reactivity properties
- Toxicological properties
- Ecological properties
- Disposal considerations
- Transport considerations
- Regulatory information
- Other information, including at a minimum, label preparation or last revision date

SDSs for all chemicals brought onto the site or anticipated to be used on site are provided in Appendix C of this HASP. These SDSs shall be readily available for reference by site personnel and emergency response personnel.

Hazardous materials received without proper labels shall be set aside and may not be distributed for use until properly labeled.

If a hazardous chemical is transferred into a portable container (e.g., an approved safety can), even if for immediate use only, the contents of the portable container (e.g., acetone or gasoline) must be identified.

## 10 General PPE Requirements

The minimum level of PPE (usually Level D or C) should be selected according to the hazards that may be encountered during site activities in accordance with established U.S. Environmental Protection Agency (EPA) levels of protection. Only PPE that meets American National Standards Institute (ANSI) standards shall be worn. Site workers must be proficient in the use and care of PPE. Damaged or defective PPE must be replaced and may not be used. Anchor QEA will provide all necessary PPE for its employees, as described in this HASP.

Refer to Section 5 for site-specific job task and level-of-protection requirements.

### 10.1 Minimum Requirements: Level D Protection

Level D PPE provides the minimum level of protection on project sites and includes the following equipment:

- Standard work uniform or coveralls
- Work boots with safety toe conforming to ASTM International (ASTM) F2412-05/ASTM F2413-05
- Approved safety glasses or goggles that meet ANSI Z87.1—2010 requirements for eye protection
- Hard hat that meets ANSI Z89.1—1986 requirements for head protection
- High-visibility traffic safety vest
- Hearing protection when there are high noise levels

Level D protection will be used only under the following conditions:

- The atmosphere contains no known hazards.
- Work functions preclude splashes, immersions, or the potential for unexpected inhalation of, or contact with, hazardous concentrations of chemicals.
- Atmospheric concentrations of contaminants are less than the Permissible Exposure Limit (PEL) and/or Threshold Limit Value (TLV).

#### 10.1.1 Modified Level D Protection Requirements

Level D protection should be upgraded to Modified Level D when there is a possibility that contaminated media can contact the skin or work uniform, or if unique, site-specific hazards exist. Modified Level D protection includes additional protective equipment such as USCG-approved PFDs, face shields or goggles, chemical-resistant clothing, and disposable gloves of various materials depending on the type of chemicals involved.

## **10.2 Evaluation of PPE**

If modifications need to be made to the PPE that has been initially selected, the individuals who determine a change is needed shall vet the change with the FL, PM, and Health and Safety. Any changes shall be documented in a Modification to Health and Safety Plan form. See Section 1.2 for HASP modification procedures.

## 11 Work Safe Procedures and Practices

In addition to the task-specific JSAs listed in Section 6.1 and presented in Appendix B, this section lists the health and safety procedures and practices applicable to this project. For additional information, consult with the PM.

### 11.1 Physical Hazards and Controls

#### 11.1.1 General Site Activities

Observe the following general procedures and practices to prevent physical hazards:

- Legible and understandable precautionary labels shall be affixed prominently to containers of potentially contaminated soil, sediment, water, and clothing.
- No food or beverages shall be present or consumed in areas that have the potential to contain COCs and/or contaminated materials or equipment.
- No tobacco products or cosmetics shall be present or used in areas that have the potential to contain COCs and/or contaminated materials or equipment.
- No horseplay shall occur on the site.
- When lifting, personnel should first assess the load to make sure that it is not too heavy to lift. If it is too heavy, get help or use a lifting tool or equipment. When lifting, keep the load as close as possible to the body, bend at the knees, and lift with the legs and not the back.
- When using a knife or other sharp tool, cut away from the body and use appropriate cut-resistant gloves. Use a safety box cutter to open boxes.
- An emergency eyewash unit shall be located immediately adjacent to employees who handle hazardous or corrosive materials, including decontamination fluids. All operations with the potential for eye injury or splash must have approved eyewash units locally available that are capable of delivering at least 0.4 gallon per minute for at least 15 minutes.
- Personnel working within 10 feet of bodies of water shall wear USCG-approved PFDs.
- Certain project sites may have newly finished work (e.g., concrete, paving, framing, habitat reconstruction, or sediment caps) that may be damaged by unnecessary contact, or that could cause dangerous conditions for personnel (e.g., slipping, sinking, or tripping). Personnel working in or around these areas shall communicate with the PM, FL, and client contact as needed to prevent damaging new work or entering dangerous conditions.
- Generally, all on-site activities will be conducted during daylight hours. If work after dusk is planned or becomes necessary due to an emergency, adequate lighting must be provided.
- Hazardous work, such as handling hazardous materials and heavy loads and operating equipment, should not be conducted during severe storms.

- All temporary electrical power must have a ground-fault circuit interrupter (GFCI) as part of its circuit if the circuit is not part of permanent wiring. Temporary GFCIs shall be placed on the plug end of cords and plugged directly into the outlet. All equipment must be suitable and approved for the class of hazard present.
- Generators must be used in dry, well-ventilated areas. Hearing protection must be used in accordance with Section 11.1.14.
- Gasoline and diesel equipment must be shut down and allowed to cool before refueling.

### *11.1.2 Slips, Trips, and Falls*

Observe the following procedures and practices to prevent slips, trips, and falls:

- Inspect each work area for potential slip, trip, and fall hazards before each work task.
- Communicate any identified slip, trip, and fall hazards to all personnel. Identified hazards shall be corrected or labeled with warning signs or barricades so they can be avoided.
- All personnel must be aware of their surroundings and maintain constant communication with each other at all times.

### *11.1.3 Ergonomic Considerations*

Workers performing certain field tasks may need to remain in fixed positions (e.g., observing subcontractor work) or repeat the same motions over a period of time (e.g., sediment sample processing). It is important that workers self-monitor for ergonomic fatigue (e.g., soreness, tightness, stiffness, or pain in muscles) and adjust work tasks, body positions, or work areas to minimize ergonomic stressors.

Observe the following suggestions for minimizing ergonomic stress:

- Limit fixed positions. Periodically vary standing and sitting positions, take frequent short walks, and modify observation locations when possible.
- Minimize extreme postures. Conduct work tasks using comfortable postures (particularly if the tasks are repetitive), and use tools or structures to minimize the need to hold or work with materials or access the work area.
- Limit contact stress. Be aware of soft tissue resting on hard surfaces, and limit these occurrences (e.g., use comfortable footwear, and use tools to hold materials).
- Contact the Field Services Group in advance for prolonged field efforts that involve a field trailer. This group can set up field staff with a monitor, mouse, and keyboard so they are not working solely on laptops.
- Take breaks from work tasks, particularly repetitive ones.
- Consider performing stretching exercises before and during work activities if those tasks are anticipated to be long or strenuous.

#### *11.1.4 Exploded/Unexploded Ordnance*

Observe the following procedures and practices if there is a potential for encountering exploded ordnance (XO) or unexploded ordnance (UXO):

- Workers shall operate only in authorized areas to minimize the potential for encountering XO or UXO.
- Before starting work in a previously undisturbed or new area of work, a team member who has received awareness training shall perform a XO/UXO screening of the area, as necessary.
- If a worker observes any unidentified object that may potentially be XO or UXO, the worker must not disturb the object, and should immediately leave the area and report their finding to the FL and PM. The FL shall instruct workers when the area is secured and report the finding to Health and Safety.

#### *11.1.5 Corrosive Material Handling Procedures*

Corrosive materials include acids and bases, which are extremely corrosive and have a variety of uses. Acids include hydrochloric, nitric, and sulfuric acids. Bases include sodium hydroxide.

Observe the following procedures when working with corrosive materials:

- Wear gloves rated for the corrosive material and eye-splash protection while using acid dispensed from a small dropper bottle during water sampling.
- Wear a full-face Air-Purifying Respirator (APR) equipped with combination cartridges (organic vapor/acid gas) as well as Tyvek coveralls and nitrile gloves for large volume applications.
- Have an eyewash bottle and/or portable eyewash station on site.
- Do not add anything into a virgin chemical drum, including unused product.
- Avoid mixing strong acids and bases. Consult a CHSM for task-specific evaluation. If mixing is absolutely necessary, do it slowly. Avoid vapors or fumes that are generated.
- When diluting acids and bases, add the acid or base to water in small quantities and mix cautiously.

#### *11.1.6 Electric Safety*

Observe the following procedures and practices to prevent electric shock:

- General
  - Only appropriately trained and certified electricians will perform tasks related to electrical equipment. A good rule of thumb is to defer any task that would not normally and reasonably be completed by the average public consumer.
  - Each circuit encountered will be considered live until proven otherwise.
  - Only proper tools will be used to test circuits.
  - No wire will be touched until the circuit is determined to be de-energized.

- Extension Cords
  - All extension cords used on any project will be three-pronged.
  - All extension cords will be in good working order.
  - Each extension cord ground will be tested for continuity on at least a quarterly basis and marked to indicate when the inspection occurred.
  - Each extension cord will be visually inspected before each use.
  - If any extension cord is found in disrepair or fails the continuity test, it will be taken out of service.
  - Any extension cord that does not have the grounding pin will be taken out of service and not used.
  - Extension cords will not be used in place of fixed wiring.
  - Extension cords will not be run through holes in walls, ceilings, or floors.
  - Extension cords will not be attached to the surface of any building.
  - No extension cord will be of the “flat wire” type. Every extension cord will have each individual wire insulated and further protected by an outside cover.
  - Extension cords will be located out of traffic areas or, if this is unavoidable, use barricades and tape the cords down to protect workers from tripping over them.
  - Extension cords or powered equipment will not be staged in wet areas, to the degree possible. Elevate cords, connections, and equipment out of puddles.
- Power Tools/Plug and Cord Sets
  - Any cord that is cut in a way that exposes insulation will be removed from service.
  - All tools and plug and cord sets will be tested for continuity.
  - If grounding pins are missing, the plug and cord will be removed from service.
  - Any tool or plug and cord set failing the continuity test will be removed from service.
  - All power tools will have three-pronged plugs unless double insulated.
- Ground-Fault Circuit Interrupters
  - Each 120-volt electrical wall receptacle providing power to the job site will be protected by a portable GFCI.
  - Each GFCI will be tested quarterly and marked to indicate when the inspection occurred.
  - Each 120-volt, single-phase, 15- and 20-ampere receptacle outlet, including those on generators, will have an approved GFCI.
  - GFCIs will be located in line as close to the plug as possible (opposite end from the piece of equipment).
- Specific
  - If unsure if a task requires specific electrical training, err on the side of caution and contact the PM and FL before proceeding.
  - If subsurface work is to be performed, follow the guidelines in Section 11.1.11 and conduct utility locating before beginning work and in accordance with local ordinances.

- If lock out/tag out (LO/TO) procedures are required (i.e., de-energizing machinery or equipment so work may be performed), the equipment owner must provide LO/TO procedures and training. By default, the equipment owner should perform any LO/TO. If it becomes necessary for Anchor QEA personnel to perform LO/TO tasks, contact the PM and FL who will coordinate with a CHSM before doing so.
- Maintain appropriate distance from overhead utilities.
- If unexpected electrical equipment is encountered (i.e., buried wire), assume it is live, stop work, and contact the PM and FL immediately.
- If working in enclosed or restricted areas where electrical hazards may be present, contact a licensed electrician or other suitably trained party to provide barriers, shields, or insulating materials to prevent electric shock.
- If working in areas where electrical hazards are present, verify that conductive clothing and jewelry is replaced with non-conductive clothing, or removed.

### *11.1.7 General Falls*

Observe the following general falls and ladder usage procedures and practices:

- Assess work areas for fall hazards. A fall protection system that meets OSHA and ANSI Z359.1 standards must be used if work is conducted 4 feet or more above the surface.
- Use ANSI Type 1A rated ladders.
- Do not carry any object or load that could cause a loss of balance or a fall.

### *11.1.8 Heavy Equipment Operations*

Observe the following heavy equipment operations procedures and practices:

- Wear leather gloves while attaching support members to protect against pinching injuries.
- While working from elevated levels greater than 6 feet, verify that all employees have fall protection that meets OSHA and ANSI Z359.1 standards, the equipment has an annual inspection by a Competent Person, and the employees have received annual training.
- Do not stand under loads that are being raised or lowered with cranes or aerial lifts.
- The subcontractor or Anchor QEA equipment operator must conduct pre-operational inspections of all equipment. In addition, daily inspections will be conducted on the equipment before site activities.
- Maintain the appropriate distance from overhead utilities.
- Always stay out of the swing radius of all heavy equipment. Always use a spotter during movement of equipment. The spotter and others, as appropriate, shall maintain constant communication with the operator.
- All operators must have adequate training and be qualified to operate the particular heavy equipment unit.

- Conduct a site evaluation to determine proper positioning for the unit. Make sure the surface is level. Cordon off holes, drop-offs, bumps, or weak ground surfaces.
- When using a crane, do not use hands when the load is being lifted or lowered. Use non-conductive tag line to help direct and position the load.
- Never climb a raised platform or stand on the mid-rail or top-rail.
- Tools should always be hung or put into a belt whenever possible.

### *11.1.9 Hand and Power Tools*

Observe the following procedures and practices when working with hand and power tools:

- Keep hand tools sharp, clean, oiled, dressed, and not abused.
- Worn tools are dangerous. For example, the “teeth” in a pipe wrench can slip if worn smooth, an adjustable wrench will slip if the jaws are sprung, and hammerheads can fly off loose handles.
- Tools subject to impact (e.g., chisels, star drills, and caulking irons) tend to “mushroom.” Keep them dressed to avoid flying spalls, and use tool holders.
- Do not force tools beyond their capacity.
- Flying objects can result from operating almost any power tool, so always warn people in the vicinity and use proper eye protection.
- Each power tool should be examined before use for damaged parts, loose fittings, and frayed or cut electric cords. Tag and return defective tools for repairs. Verify that there is adequate lighting, inspect tools for proper lubrication, and relocate tools or material that could “vibrate into trouble.”
- Compressed air must be shut off or the electric cord unplugged before making tool adjustments. Air must be “bled down” before replacement or disconnection.
- Proper guards or shields must be installed on all power tools before issue. Do not use improper tools or tools without guards in place.
- Replace all guards before startup. Remove cranks, keys, or wrenches used in service work.

### *11.1.10 Motor Vehicle Operation*

All drivers are required to have a valid driver’s license, and all vehicles must have appropriate state vehicle registration and inspection stickers. **Anchor QEA prohibits the use of hand-held wireless devices while driving any vehicle for business use at any time, for personal use during business hours, and as defined by law.** Additionally, site-specific motor vehicle requirements must be followed, if any.

When driving to, from, and within the job site, be aware of potential hazards including:

- Vehicle accidents
- Distractions

- Fatigue
- Weather and road conditions

To mitigate these hazards, observe the following procedures and practices regarding motor vehicle operation:

- Before leaving, inspect fuel and fluid levels and air pressure in tires, and adjust mirrors and seat positions appropriately.
- Wear a seat belt at all times and make sure that clothing will not interfere with driving.
- Plan your travel route and check maps for directions or discuss with colleagues.
- Clean windows and mirrors as needed throughout the trip.
- Wear sunglasses as needed.
- Fill up when the fuel level is low (not near empty).
- Follow a vehicle maintenance schedule to reduce the possibility of a breakdown while driving.
- Stop driving the vehicle, regardless of the speed (e.g., even 5 miles per hour) or location (e.g., a private road), when the potential of being distracted by conversation exists.
- Using hand-held communication devices (e.g., mobile phones) while operating any motor vehicle is prohibited.
- Get adequate rest before driving.
- Periodically change your seat position, stretch, open the window, or turn on the radio to stay alert.
- Pull over and rest if you are experiencing drowsiness.
- Check road and weather conditions before driving.
- Be prepared to adjust your driving plans if conditions change.
- Travel in daylight hours, if possible.
- Give yourself plenty of time to allow for slowdowns due to construction, accidents, or other unforeseen circumstances.
- Use lights at night and lights and wipers during inclement weather.

### *11.1.11 Vehicular Traffic*

Observe the following procedures and practices regarding vehicular traffic:

- Wear a high-visibility traffic safety vest when vehicle hazards exist.
- Use cones, flags, barricades, and caution tape to define the work area.
- Use a vehicle to block the work area (if conditions allow).
- Engage a police detail for high-traffic situations.
- Always use a spotter in tight or congested areas for material deliveries.
- As necessary, develop traffic control plans and train personnel as flaggers in accordance with the U.S. Department of Transportation *Manual of Uniform Traffic Control Devices* and/or local requirements.

### *11.1.12 Boating Operations*

Observe the following precautions when conducting boating trailer and launch activities:

- Follow the trailer and boat manufacturers' instructions for securing the boat to the trailer.
- Follow the trailer manufacturer's instructions for securing the trailer to the towing vehicle.
- Prohibit site personnel from moving into trailer/vehicle pinch points without advising the vehicle operator.
- Use experienced operators when backing trailers on boat ramps.
- Wear proper work gloves when the possibility of pinching or other injury may be caused by moving or handling large or heavy objects.
- Maintain all equipment in a safe condition.
- Launch boats one at a time to avoid collisions.
- Use a spotter for vehicles backing boats to the launch area.
- Understand and review hand signals.
- Wear boots with non-slip soles when launching boats.
- Wear USCG-approved PFDs when working within 10 feet of the water.
- Keep ropes and lines coiled and stowed to eliminate trip hazards.
- Maintain three-point contact on dock/pier or boat ladders.
- Verify that drain plugs are in place.

Observe the following precautions when conducting boating operations:

- Maintain a current boater's license(s) as required.
- Wear USCG-approved PFDs for work activities within 10 feet of the water.
- Obtain and review information regarding dams that may be present in work areas, particularly with regard to "no boating" zones and safety buoys, cables, and warning signage.
- Maintain boat anchorage devices commensurate with anticipated currents, distance to shore, and water depths.
- Provide a floating ring buoy in the immediate boat launch/landing areas with at least 60 feet (18.3 meters) of line for a vessel less than 65 feet (19.8 meters) in length, or 90 feet (27.4 meters) of line for a vessel 65 feet (19.8 meters) or greater in length (see <https://www.law.cornell.edu/cfr/text/46/117.70> for more information).
- Step into the center of the boat.
- Keep your weight low when moving on the boat.
- Move slowly and deliberately.
- Steer directly across other boat wakes at a 90-degree angle to avoid capsizing.
- Steer the boat facing forward.
- Watch for floating objects in the water.

- Right-of-way is yielded to vessels on your boat's right, or starboard, and vessels with limited ability to maneuver such as any wind-propelled vessel.

Observe the following precautions when working on a boat:

- Observe proper lifting techniques.
- Obey lifting limits (see Section 11.1.15).
- Use mechanical lifting equipment (i.e., pulleys or winches) to move large or awkward loads.
- Wear USCG-approved PFDs for work activities within 10 feet of the water.

The safety-related items listed in Table 11-1 shall be available when conducting boating operations.

**Table 11-1**  
**Safety Equipment Specific to In-Water Work**

<b>Additional Safety Equipment for Sampling Vessel per U.S. Coast Guard Requirements:</b>
<ul style="list-style-type: none"> <li>• Proper vessel registration, numbering, and documentation (registered with state, certificate of vessel registration number displayed, and carrying a valid certificate of number)</li> <li>• USCG-approved PFDs (or life jackets) for every person on the sampling vessel (Type I, II, III, or V are required). High-visibility required by Anchor QEA.</li> <li>• Appropriate, non-expired, visual distress devices for day and night use from the following: <ul style="list-style-type: none"> <li>– Three hand-held red flares (day and night), or</li> <li>– One hand-held red flare and two parachute flares (day and night), or</li> <li>– One hand-held orange smoke signal, two floating orange smoke signals (day), and one electric distress light (night only)</li> </ul> </li> <li>• Alternate means of propulsion (oars or paddles)</li> <li>• Dewatering device (pump or bailer)</li> <li>• Properly maintained and inspected USCG-approved fire extinguishers (no fixed system = (2) B-1 or (1) B-2 type extinguishers; fixed system = (1) B-1 type extinguisher)</li> <li>• Proper ventilation of gasoline-powered vessels</li> <li>• Sound-producing device (whistle, bell, or horn)</li> <li>• VHF 2-way radio</li> <li>• Proper navigational light display</li> <li>• Throwable life ring with attached line (any vessel larger than 16 feet is required to carry one Type IV [throwable] PFD)</li> </ul>

Additional Safety Equipment for Sampling Vessel per U.S. Coast Guard Requirements:	
Additional USCG-Recommended Equipment Includes:	
<ul style="list-style-type: none"> <li>• Extra visual distress signals</li> <li>• Primary and spare anchor</li> <li>• Heaving line</li> <li>• Fenders</li> <li>• First aid kit</li> <li>• Flashlight</li> <li>• Mirror</li> <li>• Searchlight</li> <li>• Sunburn lotion</li> <li>• Tool kit</li> <li>• Spare fuel</li> </ul>	<ul style="list-style-type: none"> <li>• Boat hook</li> <li>• Spare propeller</li> <li>• Mooring line</li> <li>• Food and water</li> <li>• Binoculars</li> <li>• Spare batteries</li> <li>• Sunglasses</li> <li>• Marine hardware</li> <li>• Extra clothing</li> <li>• Spare parts</li> <li>• Pertinent navigational chart(s) and compass</li> </ul>

### 11.1.13 Working Over or Near Water

#### 11.1.13.1 Personal Flotation Devices

PFDs are not required where employees are continuously protected from the hazard of drowning by railings, nets, safety belts, or other applicable provisions.

Type I, II, III or V USCG-approved, high-visibility PFD shall be provided and properly worn by all personnel in the following circumstances:

- On or within 10 feet of water
- On floating pipelines, pontoons, rafts, or stages
- On structures extending over or next to the water, except where guard rails or safety nets are provided for employees
- Working alone at night where there are drowning hazards, regardless of other safeguards provided
- In skiffs, small boats, or launches, unless in an enclosed cabin or cockpit
- Whenever there is a drowning hazard

Observe the following precautions when using PFDs:

- Before and after each use, the buoyant work vests or life preservers shall be inspected for defects that would alter their strength or buoyancy. Defective devices or devices with less than 13 pounds buoyancy shall be removed from service.
- All PFDs shall be equipped with reflective tape as specified in 46 CFR 25.25-15.
- Thirty-inch USCG-approved ring buoys with at least 150 feet of 600-pound capacity line shall be provided and readily available for emergency rescue operations. The distance between ring buoys shall not exceed 200 feet.

- PFD lights conforming to 46 CFR 161.012 shall be required whenever there is a potential need for life rings to be used after dark. Onshore installations, at least one life ring, and every third one thereafter, shall have a PFD light attached. PFD lights on life rings are required only in locations where adequate general lighting (e.g., floodlights or light stanchions) is not provided.

#### **11.1.13.2 Cold Water Work**

When the combined air and water temperature is below 90°F, field personnel working on or near water shall wear either a float coat and bib-overalls (e.g., a full two-piece “Mustang” survival suit or similar) or a one-piece survival suit. Suits or float coats shall be USCG approved. If extremely cold or severe weather conditions are forecast, work activities should be postponed. Work activities will be continually reviewed and adjustments made if wearing a survival suit during work activities potentially poses a hazard due to warm air temperatures, or limited mobility or agility. In addition, proximity of water work to shore and scope/duration/timing of work activities will be considered when stipulating the above requirement. Overall, if water craft will be used during work, or work will be conducted near water, it is imperative that site-specific conditions are considered and evaluated so that proper safeguards and procedures are in place before beginning work.

In addition to considering the use of apparel appropriate for anticipated air, weather, and water conditions, field teams shall identify any procedures necessary for cold-water “man-overboard” scenarios. These procedures should be identified in the site-specific HASP, described in the JSA used for boating activities and, if prudent, practiced before work.

#### **11.1.14 Noise**

Excessive noise is hazardous not only because of its potential to damage hearing, but also because of its potential to disrupt communications and instructions. The following procedures and practices shall be followed to prevent noise-related hazards:

- All employees will have access to hearing protection with a Noise Reduction Rating of not less than 30 decibels.
- Hearing protection must be worn in any environment where site personnel must raise their voices to be heard while standing at a distance of 3 feet or less. However, the preferred method is a calibrated sound level meter for determining the sound level.
- Hearing protection must be worn by any personnel observing or operating concrete cutting or sawing equipment, pile driving, or other loud noise-generating activities.

Hearing protection is required for site personnel operating or working near noisy equipment or operations, where the noise level is greater than 85 A-weighted decibels (dBA) (time-weighted average

[TWA]), as well as personnel working around heavy equipment. The FL will determine the need and appropriate testing procedures, (i.e., sound level meter and/or dosimeter) for noise measurement.

When needed, a calibrated sound level meter will be used to measure noise levels at selected locations in the work area and on the site perimeter. When used, noise monitoring equipment must be calibrated before and after each shift.

If continuous noise levels are found to exceed 85 dBA at any location within the work area, warning signs will be posted. Site personnel and visitors will be notified that hearing protection is required. Appropriate hearing protection (i.e., ear plugs or ear muffs) will be worn whenever personnel or visitors are working in that location. A supply of ear plugs will be maintained on site.

Action levels in Table 11-2 will trigger the use of appropriate hearing protection (plugs or muffs). Hearing protection must be able to attenuate noise below 90 dBA (8-hour TWA). Each hearing protection device has a Noise Reduction Rating (NRR) assigned by EPA. The calculation for a hearing protection device's effectiveness is as follows:

#### Equation 1

$$\text{Noise reading } dBA - (NRR - 7dB) < 90dBA$$

where:

dB = decibel

dBA = A-weighted decibel

NRR = Noise Reduction Rating

**Table 11-2**  
**Noise Exposure Action Levels**

Instrument	Measurement	Action
Type I or Type II Sound Level Meter or Dosimeter	>80 dBA to 85 dBA	Hearing protection recommended. Limit work duration to 8-hour shifts.
	>85 dBA to 90 dBA	Hearing protection required. Limit work duration to 8-hour shifts.
	>90 dBA to 115 dBA	Hearing protection required. Investigate use of engineering controls. Limit work duration to 8-hour shifts.
	>115 dBA	Stop work. Consult a CHSM.

### *11.1.15 Lifting and Material Handling*

Observe the following procedures and practices for lifting and material handling:

- Use leather gloves when handling metal, wire rope, sharp debris, or transporting materials (e.g., wood, piping, or drums).
- The size, shape, and weight of the object to be lifted must first be considered. No individual employee is permitted to lift any object that weighs more than 60 pounds. Multiple employees or mechanical lifting devices are required for objects heavier than the 60-pound limit.
- Plan a lift before doing it. Bend at the knees and lift with the legs; maintain the natural curves of the back; do not use back muscles.
- Check the planned route for clearance.
- Use the buddy system when lifting heavy or awkward objects.
- Do not twist your body while lifting.
- Know the capacity of any handling device (e.g., crane, forklift, chain fall, or come-along) that you intend to use.
- Use tag lines to control loads.
- Verify that your body, material, tools, and equipment are safe from such unexpected movement as falling, slipping, rolling, tripping, bowing, or any other uncontrolled motion.
- Trucks (i.e., flat beds) hauling equipment or materials must not be moved once rigging has been released.
- Chock all material and equipment (such as pipe, drums, tanks, reels, trailers, and wagons) as necessary to prevent rolling.
- Tie down all light, large-surface-area material that might be moved by the wind.
- When working at heights, secure tools, equipment, and wrenches against falling.
- Do not store materials or tools on ducts, lighting fixtures, beam flanges, hung ceilings, or similar elevated locations.
- Fuel-powered tools used inside buildings or enclosures shall be vented and checked for excessive noise.

### *11.1.16 Fire Control*

Observe the following fire control procedures and practices:

- Smoke only in designated areas.
- Keep flammable liquids in closed containers.
- Keep the work site clean; avoid accumulating combustible debris such as paper.
- Obtain and follow property owner hot work safety procedures when welding or performing other activities requiring an open flame.
- Isolate flammable and combustible materials from ignition sources.

- Verify fire safety integrity of equipment installations according to National Electrical Code specifications.

### *11.1.17 Static Electricity and Transfer of Flammable Liquids*

Observe the following procedures and practices regarding static electricity when transferring flammable liquids:

- Electrically bond and ground pumps, transfer vessels, tanks, drums, bailers, and probes when moving flammable liquids.
- Electrically bond and ground vacuum trucks and the tanks they are emptying.
- Do not splash fill containers with flammable liquids.
- Pour flammable liquids slowly and carefully.
- Two fire extinguishers (2A20:BC) must be available, charged, inspected, and readily accessible.

### *11.1.18 Cleaning Equipment*

Observe the following procedures and practices when cleaning equipment:

- Wear appropriate PPE to avoid skin and eye contact with isopropyl alcohol, Alconox®, or other cleaning materials.
- Stand upwind to minimize any potential inhalation exposure.
- Dispose of spent cleaning solutions and rinses accordingly.

## **11.2 Environmental Hazards and Controls**

### *11.2.1 Fatigue Management*

Because Anchor QEA personnel may be working during both daytime and nighttime hours several days per week, depending on the activity, it is important that all personnel are aware of the hazards related to fatigue. Fatigue can be defined as an increasing difficulty in performing physical or mental activities. Signs of fatigue may include tiredness, changes in behavior, loss of energy, and reduced ability to concentrate. Fatigued site personnel may have a reduced ability to recognize or avoid risks on the work site, which may lead to an increase in the number and severity of injuries and other incidents. Fatigue can occur at any time when working and may cause safety concerns due to decreased manual dexterity, reaction time, and alertness.

Fatigue results from insufficient rest and sleep between activities. Contributing factors to fatigue may include the following:

- The time of day that work takes place
- The length of time spent at work and in work-related duties
- The type and duration of a work task and the environment (e.g., weather conditions and ambient noise) in which it is performed

- The quantity and quality of rest obtained before, during, and after a work period
- Non-work activities
- Individual factors such as sleeping disorders, medications, or emotional state

Personnel suffering from fatigue may exhibit both physical and mental effects, such as the following:

- Slower movements
- Poor coordination
- Slower response time to interaction
- Bloodshot eyes
- Slumped or weary appearance
- Nodding off
- Distractedness or poor concentration
- Inability to complete tasks
- Fixed gaze
- Appearing depressed, irritable, frustrated, or disinterested

Employees are strongly encouraged to get sufficient pre-work rest, maintain sufficient nutritional intake during work (i.e., eat and drink at regular intervals), and communicate with team members and leaders if their level of fatigue elevates.

Use the following procedures to help detect and address fatigue-related issues:

- Periodically observe and query coworkers for signs or symptoms of fatigue.
- Site personnel that express concern over their level of fatigue, or that are observed to be fatigued such that elevated worker risk is evident, will be relieved or have their work tasks adjusted so that they may rest sufficiently.
- Work schedules will consider fatigue factors and optimize continuous periods available for uninterrupted sleep. The employee is responsible for reporting to work properly rested and fit for duty. In case of an emergency or operational difficulties (e.g., limited access due to water levels or boat repairs), work hours may require adjustment.
- Maintain a routine exercise program and regular sleep schedule as much as possible over the course of the work.
- Avoid heavy meals or caffeine and minimize or eliminate the consumption of alcohol and nicotine before sleeping.

### *11.2.2 Heat Stress*

Heat-related illnesses can happen if workplace activities in a hot environment overwhelm the body's ability to cool itself. Observe the following general procedures and practices regarding heat stress:

- Increase the number of rest breaks and/or rotate site personnel in shorter work shifts.

- Watch for signs and symptoms of heat stress and fatigue (see Section 11.2.2.1).
- During hot months, plan work for early morning or evening.
- Use ice vests when necessary.
- Rest in cool, dry areas.
- Verify that employees have access to potable drinking water and shade.
- During conditions exceeding 95°F, verify that the following additional procedures are adhered to:
  - Establish effective communication by voice, observation, or electronic means.
  - Observe employees for alertness and signs or symptoms of heat illness.
  - Designate one or more employees on each work site as authorized to call for Emergency Medical Services.
  - Remind employees to drink water throughout the shift.
  - Conduct pre-shift meetings before beginning work to review the high heat procedures, encourage drinking water, and remind employees of their right to take a cool-down rest when necessary.

#### 11.2.2.1 Signs, Symptoms, and Treatment

The FL will be trained in heat stress prevention, including the following, before supervising employees:

- Procedures to prevent heat illness.
- Procedures to follow when an employee exhibits symptoms consistent with possible heat illness, including emergency response procedures.

In addition, employees should be regularly trained on heat exposure, as outlined in the Heat and Cold Exposure Program (Appendix E). The information provided below addresses these training requirements.

Adverse climatic conditions are important considerations in planning and conducting site operations. High ambient temperature can result in health effects ranging from transient heat fatigue, physical discomfort, reduced efficiency, personal illness, and increased accident probability to serious illness or death. Heat stress is of particular concern when chemical protective garments are worn because they prevent evaporative body cooling. Wearing PPE places employees at considerable risk of developing heat stress.

Heat stress is caused by a number of interacting factors, including environmental conditions, clothing, workload, and the individual characteristics of the worker. Because heat stress is probably one of the most common (and potentially serious) illnesses, regular monitoring and other preventive precautions are vital.

**Heat Rash.** Heat rash can be caused by continuous exposure to hot and humid air and skin abrasion from sweat-soaked clothing, rubber boots, or impermeable waders. The condition is characterized by

a localized red skin rash and reduced sweating. Heat rash reduces the ability to tolerate heat. To treat, keep skin hygienically clean and allow it to dry thoroughly after using chemical protective clothing. Take measures to prevent heat rash by changing clothes often to maximize use of dry garments, or taking frequent breaks to allow doffing of equipment and drying of skin.

**Heat Cramps.** Heat cramps are caused by profuse perspiration with inadequate electrolytic fluid replacement. This often robs the larger muscle groups (stomach and quadriceps) of blood, which can cause painful muscle spasms and pain in the extremities and abdomen. To treat, move the employee to a cool place and give sips of water or an electrolytic drink. Watch for signs of heat exhaustion or heat stroke.

**Heat Exhaustion.** Heat exhaustion is a mild form of shock caused by increased stress on various organs to meet increased demand to cool the body. Onset is gradual and symptoms should subside within 1 hour. Symptoms include a weak pulse; shallow breathing; pale, cool, moist skin; profuse sweating; dizziness; and fatigue. To treat, move the employee to a cool place and remove as much clothing as possible. Give sips of water or electrolytic solution and fan the person continuously to remove heat by convection. Do not allow the affected person to become chilled. Treat for shock if necessary.

**Heat Stroke.** Heat stroke is the most severe form of heat stress; the body must be cooled immediately to prevent severe injury and/or death. ***This is a medical emergency!*** Symptoms include red, hot, dry skin; a body temperature of 105°F or higher; no perspiration; nausea; dizziness and confusion; and a strong, rapid pulse. Because heat stroke is a true medical emergency, the individual should be transported to a medical facility immediately. Call for Emergency Medical Services. Before transport, remove as much clothing as possible and wrap the individual in a sheet soaked with water. Fan the individual vigorously while transporting to help reduce body temperature. If available, apply cold packs under the arms, around the neck, or any other place where they can cool large surface blood vessels. If transportation to a medical facility is delayed, reduce body temperature by immersing the individual in a cool-water bath (however, be careful not to over-chill the individual once body temperature is reduced below 102°F). If this is not possible, keep the individual wrapped in a sheet and continuously douse with water and fan.

#### 11.2.2.2 Prevention

The implementation of preventive measures is the most effective way to limit the effects of heat-related illnesses. During periods of high heat, adequate liquids must be provided to replace lost body fluids. Replacement fluids can be a commercial mix such as Gatorade or fresh water. The replacement fluid should be kept cool, 50°F to 60°F, and it should be placed close to the work area. Employees must be encouraged to drink more than the amount required to satisfy thirst.

Cooling devices such as vortex tubes or cooling vests can be worn beneath impermeable clothing. If cooling devices are worn, only physiological monitoring will be used to determine work activity.

All site personnel are to rest when any symptoms of heat stress are noticed. Rest breaks are to be taken in a cool, shaded rest area. Employees shall remove chemical protective garments during rest periods and will not be assigned other tasks.

All employees shall be informed of the importance of adequate rest and proper diet, including the harmful effects of excessive alcohol and caffeine consumption.

### 11.2.2.3 Monitoring

Heat stress monitoring should be performed when employees are working in environments exceeding 90°F ambient air temperature. If employees are wearing impermeable clothing, this monitoring should begin at 77°F. There are two general types of monitoring that the Health and Safety representative can designate to be used: wet bulb globe temperature (WBGT), and physiological. The Heat Stress Monitoring Record form (see Appendix A) will be used to record the results of heat stress monitoring.

Note that some states such as Washington and California have specific regulatory standards for protection of employees from heat stress-related injuries.

**Wet Bulb Globe Temperature (WBGT).** The WBGT index is the simplest and most suitable technique to measure the environmental factors that most nearly correlate with core body temperature and other physiological responses to heat. When WBGT exceeds 25°C (77°F), the work regimen in Table 11-3 should be followed.

**Table 11-3**  
**Permissible Heat Exposure Threshold Limit Values**

Work/Rest Regimen	Workload		
	Light	Moderate	Heavy
Continuous work	86°F (30.0°C)	80°F (26.7°C)	77°F (25.0°C)
75% work and 25% rest each hour	87°F (30.6°C)	82°F (28.0°C)	78°F (25.9°C)
50% work and 50% rest each hour	89°F (31.4°C)	85°F (29.4°C)	82°F (27.9°C)
25% work and 75% rest each hour	90°F (32.2°C)	88°F (31.1°C)	86°F (30.0°C)
These TLVs assume that nearly all acclimated, fully-clothed site personnel with adequate water and salt intake should be able to function effectively under the given working conditions without exceeding a deep body temperature of 100.4°F (38°C).			

(From OSHA Technical Manual, Section III: Chapter 4 - Heat Stress)

The TLVs denoted in Table 11-3 apply to physically fit and acclimatized individuals wearing light, summer clothing. If heavier clothing that impedes sweat or has a higher insulation value is required, the permissible heat exposure TLVs should be adjusted based on the WBGT Correction Factors in Table 11-4.

**Table 11-4**  
**Wet Bulb Globe Temperature Correction Factors**

Clothing Type	WBGT Correction
Summer lightweight working clothing	0°F (0°C)
Cotton coveralls	-3.6°F (-2°C)
Winter work clothing	-7.2°F (-4°C)
Water barrier, permeable	-10.8°F (-6°C)
Fully encapsulating	-14.4°F (-10°C)

**Physiological.** Physiological monitoring can be used in lieu of, or in addition to, WBGT. This monitoring can be self-performed once the Health and Safety representative demonstrates appropriate techniques to affected employees. Because individuals vary in their susceptibility to heat, this type of monitoring has its advantages. The following two parameters are to be monitored at the beginning of each rest period:

- **Heart Rate:** The maximum heart rate (MHR) is the amount of work (beats) per minute a healthy person's heart can be expected to safely deliver. Each individual will count their radial (wrist) pulse for 1 minute as early as possible during each rest period. If the heart rate of any individual exceeds 75% of their calculated MHR ( $MHR = 200 - \text{age}$ ) at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same. An individual is not permitted to return to work until their sustained heart rate is below 75% of their calculated MHR.
- **Temperature:** Each individual will measure their temperature with a thermometer for 1 minute as early as possible in the first rest period. If the temperature exceeds 99.6°F at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same. An individual is not permitted to return to work if their temperature exceeds 100.4°F.

#### 11.2.2.4 Training

Employees potentially exposed to heat stress conditions will be instructed on the contents of this procedure. This training can be conducted during daily safety tailgate meetings.

### 11.2.3 Cold Stress

Employees should be regularly trained on cold exposure, as outlined in the Heat and Cold Exposure Program (Appendix E). Observe the following procedures and practices regarding cold stress:

- Take breaks in heated shelters when working in extremely cold temperatures.
- Upon entering the shelter, remove the outer layer of clothing and loosen other layers to promote evaporation of perspiration.
- Drink warm liquids to reduce the susceptibility to cold stress.
- Be aware of cold stress symptoms, including shivering, numbness in the extremities, and sluggishness.
- Provide adequate insulating dry clothing to maintain warmth if work is performed in air temperature below 40°F. Wind chill cooling rates and the cooling power of air are critical factors. The higher the wind speed and the lower the temperature in the work area, the greater the insulation value of the protective clothing required.
- If the air temperature is 32°F or less, hands should be protected.
- If only light work is involved and if the clothing on the worker may become wet on the job site, the outer layer of the clothing in use should be impermeable to water. With more severe work under such conditions, the outer layer should be water repellent, and the outer wear should be changed as it becomes wetted. The outer garments should include provisions for easy ventilation in order to prevent wetting of the inner layer by sweat.
- If available clothing does not give adequate protection to prevent cold injury, work should be modified or suspended until adequate clothing is made available, or until weather conditions improve.
- Implement a buddy system in which site personnel are responsible for observing fellow workers for early signs and symptoms of cold stress.

#### 11.2.3.1 Signs, Symptoms, and Treatment

Cold stress can range from frostbite to hypothermia. The signs and symptoms of cold stress are listed below. The appropriate guidelines should be followed if any personnel exhibit these symptoms:

**Frostbite.** Frostbite is characterized by pain in the extremities and loss of manual dexterity.

"Frostnip," or reddening of the tissue, is accompanied by a tingling or loss of sensation in the extremities and continuous shivering.

**Hypothermia.** Hypothermia is characterized by pain in the extremities and loss of manual dexterity, with severe, uncontrollable shivering, and an inability to maintain the level of activity. Symptoms include excessive fatigue, drowsiness, irritability, or euphoria. Severe hypothermia includes clouded consciousness, low blood pressure, pupil dilation, cessation of shivering, unconsciousness, and possible death.

Move the individual to a warm, dry place. If the individual's clothing is wet, remove it and replace it with dry clothing. Keep the individual warm. Re-warming of the individual should be gradual to avoid stroke symptoms. Dehydration, or the loss of body fluids, may result in a cold injury due to a significant change in blood flow to the extremities. If the individual is conscious and alert, warm sweet liquids should be provided. Coffee and other caffeinated liquids should be avoided because of diuretic and circulatory effects. Extremities affected by frostbite should be gradually warmed up and returned to normal temperature. Moist compresses should be applied; begin with lukewarm compresses and slowly increase the temperature as changes in skin temperature are detected. Call for Emergency Medical Services. Keep the individual warm and calm and move them to a medical facility as soon as possible.

### *11.2.4 Sunlight and Ultraviolet Exposure*

Observe the following procedures and practices regarding ultraviolet (UV) exposure:

- Protect against extended exposure to sunlight with shade, long clothing, sunscreen, and high-SPF, broad-spectrum sunscreen applied frequently.
- Plan work to avoid unnecessary UV exposure (see Section 11.2.4.2).
- During peak daylight months, plan work for early morning or evening.
- Many factors affect the hazards associated with UV exposure, including the following:
  - **Time of day:** UV rays are strongest between 10:00 a.m. and 4:00 p.m.
  - **Season of the year:** UV rays are stronger during spring and summer months. This is less of a factor near the equator.
  - **Distance from the equator (latitude):** UV exposure goes down as you get farther from the equator.
  - **Altitude:** More UV rays reach the ground at higher elevations.
  - **Cloud cover:** The effect of clouds can vary. Sometimes cloud cover blocks some UV from the sun and lowers UV exposure, while some types of clouds can reflect UV and increase UV exposure. What is important to know is that UV rays can get through, even on a cloudy day. Consider monitoring the UV index for your work area:  
<https://www.epa.gov/sunsafety/uv-index-1>.
  - **Reflection off surfaces:** UV rays can bounce off surfaces like water, sand, snow, pavement, or grass, leading to an increase in UV exposure.
- Evaluate site-specific factors affecting UV exposure and address work practices as appropriate.

#### **11.2.4.1 Signs, Symptoms, and Treatment**

The best way to treat sunburn is to prevent it by using the guidelines listed in the preceding bullets and in Section 11.2.4.2. Signs of sunburn include the following:

- Pinkness or redness
- Skin that feels warm or hot to the touch

- Pain, tenderness, or itching
- Swelling
- Small, fluid-filled blisters, which may break
- Headache, fever, chills, and fatigue if the sunburn is severe

If signs of sunburn are noticed, avoid further exposure and immediately implement treatment. If the sunburn is blistering *and* covers 15% or more of the body, seek medical attention.

#### **11.2.4.2 Prevention**

UV exposure hazards and their impacts on each work site should be evaluated to determine the best practices for risk mitigation. The most effective way to prevent skin damage from UV exposure is to protect bare skin from the exposure. This can be accomplished with shade, clothing (e.g., pants, long sleeves, or hats), sunscreen, and sunglasses. Plan work to either create shade or take advantage of natural shade, and avoid peak UV times during the day when possible.

#### **11.2.5 Inclement Weather**

Observe the following procedures and practices regarding inclement weather:

- Evaluate the work site for hazards that may be amplified during inclement weather, such as traction issues, ingress and egress, slope stability, or wind-driven hazards (e.g., dust, debris, or falling trees).
- Stop outdoor work during electrical storms (lightning strikes), hailstorms, high winds, and other extreme weather conditions such as extreme heat or cold.
- Stop outdoor work when lightning is within 10 miles and remain stopped until 30 minutes following the last strike within 10 miles. Note that if you hear thunder, you can be struck by lightning.
- Take cover indoors or in a vehicle that will provide adequate protection. In some cases, this may require exiting the work site, such as during windstorms in areas with overhead hazards (e.g., trees or power lines).
- Listen to local forecasts for warnings about specific weather hazards such as tornadoes, hurricanes, and flash floods.
- Verify that on-site equipment and resources are adequately protected from inclement weather.
- If working in an unfamiliar geographic location, consult with local resources for unique weather hazards.

#### **11.2.6 Insects and Spiders**

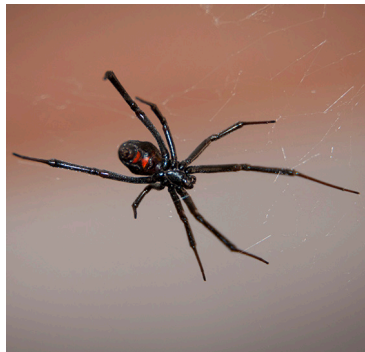

Observe the following general procedures and practices regarding insects/spiders:

- Tuck pants into socks.
- Wear long sleeves.

- Use insect repellent.
- Avoid contact by always looking ahead to where you will be walking, standing, sitting, leaning, grabbing, lifting, or reaching.
- Check for signs of insect/spider bites, such as redness, swelling, and flu-like symptoms.

The most dangerous spiders to humans in North America are black widows and brown spiders (also known as brown recluse or fiddleback spiders). A guide to identifying these spiders is presented in Table 11-5.

**Table 11-5**  
**North American Hazardous Spider Identification Guide**

Hazardous Spider Identification Guide	
<p><b>Black Widow Spider<sup>1</sup></b></p> <ul style="list-style-type: none"> <li>• Habitat: Wood piles, rubble piles, under stones, in hollow stumps, rodent burrows, privies, sheds, and garages.</li> <li>• Appearance: Females are shiny black with red hourglass marking on underside of abdomen. Males rarely seen.</li> <li>• Size: About 1/2 inch long.</li> <li>• Bite symptoms: Pain for first 8 to 12 hours. Local swelling, severe cramping and abdominal rigidity, nausea, sweating, tremors, labored breathing, increased blood pressure, fever may continue for several days.</li> <li>• Treatment: Clean bite with soap and water. Apply ice. Elevate and immobilize extremity. Seek medical attention immediately.</li> </ul>	
<p><b>Brown Spiders (aka Brown Recluse or Fiddleback)<sup>2</sup></b></p> <ul style="list-style-type: none"> <li>• Habitat: Builds small retreat webs behind objects of any type.</li> <li>• Appearance: Golden brown, dark fiddle shape on top of leg attachment region with neck pointing toward the abdomen.</li> <li>• Size: 1/4 to 3/4 inch long.</li> <li>• Bite symptoms: Vary from none to severe. Bite generally reddens in several hours. Systemic reaction within 24 to 36 hours characterized by restlessness, fever, chills, nausea, weakness, and joint pain. Tissue at and around bite site dies and eventually sheds.</li> <li>• Treatment: Clean bite with soap and water. Apply ice. Elevate and immobilize extremity. Seek medical attention immediately.</li> </ul>	

Sources:

1. OSHA, 2024. "Black Widow Spider." OSHA Fact Sheet. Accessed September 13, 2024. Available at: [https://www.osha.gov/sites/default/files/publications/black\\_widow\\_spider.pdf](https://www.osha.gov/sites/default/files/publications/black_widow_spider.pdf).
2. OSHA, 2024. "Brown Recluse Spider." OSHA Fact Sheet. Accessed September 13, 2024. Available at: [https://www.osha.gov/sites/default/files/publications/brown\\_recluse\\_spider.pdf](https://www.osha.gov/sites/default/files/publications/brown_recluse_spider.pdf).

Photography credits:

Top: "Black Widow" by CanyonlandsNPS, marked with Public Domain Mark 1.0.

Bottom: Brown Spider: CC0 licensed photo by creativemz from the WordPress Photo Directory.

### 11.2.7 Chiggers

According to mayoclinic.org, chiggers are tiny mites that can be found in tall grass and weeds. They may attach to your pant cuffs or shirt sleeves and make their way onto your skin. They will, however, normally fall off after a few days, leaving behind clusters of itchy, pink bumps.

Bites usually heal on their own within 1 to 2 weeks. If you are bitten, vigorously scrub the area with soap and water to remove the chiggers. Control itching with calamine lotion or an over-the-counter anti-itch cream, such as hydrocortisone cream.

### 11.2.8 Bees and Wasps

Many encounters with bees and wasps occur when nests built in well casings or excavation areas are disturbed. Before opening a well casing, take a few moments to observe whether or not insects are entering or exiting. If they are flying to and from the casing, avoid it if possible. If you must be in an area where disturbing a nest is likely, be sure to wear long pants and a long-sleeved shirt. Stinging insects fly around the top of their target, so if you get into trouble, pull a portion of your shirt over your head and run away.

If you get stung, look for a stinger and, if one is present, remove it as soon as possible. Several over-the-counter products or a simple cold compress can be used to alleviate the pain of the sting. If the sting is followed by severe symptoms, or if it occurs in the neck or the mouth, seek medical attention immediately because swelling could cause suffocation.

If you need to destroy a nest, consult with the PM and project FL first. Commercially available aerosols to control stinging insects are very effective but could potentially contaminate the well. Once the nest is destroyed, fine mesh may be applied over the exit and entry points of a well casing to prevent re-infestation.

Employees who know they are allergic to insect stings or bites and carry an EpiPen are encouraged to notify the FL to ensure that proper support is provided to the employee when exposed to these hazards.

### 11.2.9 Ticks

Ticks in North America can be carriers of several diseases, including Lyme disease, Rocky Mountain spotted fever, and ehrlichiosis. A guide to identifying ticks is presented in Table 11-6.

Limiting exposure to ticks reduces the likelihood of infection when exposed to tick-infested habitats. Measures to prevent tick exposure include the following:



- Remove leaf litter and brush in areas where you will be working before tick season.
- Wear light-colored clothing so that ticks are visible.




- Tuck your pant legs into your socks.
- Apply repellents to discourage tick attachment.
- Promptly inspect your body and remove crawling or attached ticks when you leave a tick-infested area.
- Conduct tick checks on buddies upon exiting any suspect area (may be needed multiple times per work day).
- Be aware of seasonal activity; ticks are often most active in the spring.

Observe the following procedures and practices if you are bitten by a tick:

- Use fine-tipped tweezers or shield your fingers with tissue, paper towel, or rubber gloves.
- Grasp the tick as close to the skin surface as possible and pull upward with steady, even pressure. Do not twist or jerk the tick; this may cause mouthparts to break off and remain in the skin.
- Do not squeeze, crush, or puncture the body of the tick because its fluids may contain infectious organisms.
- Do not handle the tick with bare hands because infectious agents may enter through mucous membranes or breaks in the skin.
- After removing the tick, thoroughly disinfect the bite site and wash your hands with soap and water.
- You may wish to save the tick for identification in case you become ill within 2 to 3 weeks. Place the tick in a sealed plastic bag in the freezer and mark the bag with the date of the bite.

**Table 11-6**  
**Tick Identification Guide**

Tick Identification Guide	
<p><b>American Dog Tick</b></p> <ul style="list-style-type: none"> <li>• Found mainly east of the Rocky Mountains and in parts of the West Coast.</li> <li>• Bite from an American dog tick can spread Rocky Mountain spotted fever and tularemia.</li> <li>• Scientific name is <i>Dermacentor variabilis</i>. Some populations made up of a related tick, <i>D. similis</i>.</li> <li>• Female is approximately 3 mm in size (abdomen).</li> </ul>	
<p><b>Blacklegged Tick (aka Deer Tick)</b></p> <ul style="list-style-type: none"> <li>• Found mainly in the eastern half of the United States and in the Midwest.</li> <li>• Bite from a blacklegged deer tick can spread anaplasmosis, babesiosis, ehrlichiosis, Lyme disease, Borrelia miyamotoi disease, and Powassan virus disease.</li> <li>• Scientific name is <i>Ixodes scapularis</i>.</li> <li>• Female is approximately 2 mm in size (abdomen and head).</li> </ul>	

Tick Identification Guide	
<b>Brown Dog Tick</b> <ul style="list-style-type: none"> <li>Found throughout the United States.</li> <li>Bite from a brown dog tick can spread Rocky Mountain spotted fever in the southwestern United States and along the border with Mexico.</li> <li>Scientific name is <i>Rhipicephalus sanguineus</i>.</li> <li>Female is approximately 2 mm in size (abdomen).</li> </ul>	
<b>Lone Star Tick</b> <ul style="list-style-type: none"> <li>Found mainly in the southern and eastern United States.</li> <li>Bite from a blacklegged deer tick can spread ehrlichiosis, Heartland virus disease, southern tick-associated rash illness (STARI), Bourbon virus disease, and tularemia.</li> <li>Scientific name is <i>Amblyomma americanum</i>.</li> <li>Female is approximately 2 mm in size (abdomen).</li> </ul>	
<b>Gulf Coast Tick</b> <ul style="list-style-type: none"> <li>Found mainly in states along the Atlantic and Gulf of Mexico coasts.</li> <li>Bite from a Gulf Coast tick can spread a form of spotted fever called <i>Rickettsia parkeri</i> rickettsiosis.</li> <li>Scientific name is <i>Amblyomma maculatum</i>.</li> <li>Female is approximately 2 mm in size (abdomen).</li> </ul>	

Source:

Mayo Clinic, 2024. "Guide to different tick species and the diseases they carry." Accessed September 13, 2024. Available at: <https://www.mayoclinic.org/diseases-conditions/alpha-gal-syndrome/in-depth/tick-species/art-20546861>.

Photography credits:

1. "American dog tick in hand" by U.S. Fish and Wildlife Service - Midwest Region, marked with Public Domain Mark 1.0.
2. "black legged tick" by Bethany Teigen, marked with CC0 1.0.
3. "brown dog tick" by Klaus Wehrlin, marked with CC0 1.0.
4. "lone star tick" by kcthetc1, marked with CC0 1.0.
5. "gulf coast tick" by Becky Dill, marked with CC0 1.0.

## 11.2.10 Mosquitoes

Mosquitoes in the United States have been known to carry West Nile virus, Zika virus, St. Louis encephalitis, and dengue fever. Avoid mosquito bites by doing the following:

- Apply insect repellent containing DEET (N,N-diethyl-meta-toluamide) when outdoors. DEET is very effective but could potentially contaminate samples.
- Read and follow the product directions whenever you use insect repellent.
- Wear long-sleeved clothes and long pants treated with repellent to further reduce your risk, or stay indoors during peak mosquito feeding hours (dusk until dawn).
- Limit the number of places available for mosquitoes to lay their eggs by eliminating standing water sources from around the work area.
- If you need to destroy a nest, consult with the PM and project FL first.

- Check to see if there is an organized mosquito control program near the project site. If no program exists, work with the local government officials to establish a program.

### 11.2.10.1 Zika Virus

The Zika virus has generated concern starting in 2016 in the southern United States. According to the Centers for Disease Control and Prevention (CDC),<sup>4</sup> Zika infection during pregnancy can cause a birth defect of the brain called microcephaly and other severe fetal brain defects. There have also been increased reports of Guillain-Barré syndrome, an uncommon sickness of the nervous system, in areas affected by Zika. The practices listed in the previous section should be followed to avoid mosquito bites and help prevent contraction of the Zika virus. Symptoms of Zika and treatment options are listed below, should you suspect that you or another employee has been in contact with Zika-infected mosquitoes:

- The most common symptoms of Zika (similar to those of dengue fever) are fever, rash, joint pain, or conjunctivitis (red eyes). Other common symptoms include muscle pain and headache. The incubation period (the time from exposure to symptoms) for Zika virus disease is not known but is likely to be a few days to a week.
- The illness is usually mild, with symptoms lasting for several days to a week. Severe disease requiring hospitalization is uncommon.
- Call WorkCare or see your healthcare provider if you develop the symptoms described above and have visited an area where Zika is found. If you have recently traveled, tell your healthcare provider when and where you traveled. Your healthcare provider may order blood tests to look for Zika or other similar viruses like dengue fever.

### 11.2.11 *The Public at Large*

The community residents around work sites may pose their own specific hazards. These conditions may include the following:

- Unintentional disruption of work
- Benign or malicious trespass
- Criminal intent

Scenarios may include the following:

- Pedestrians, cyclists, or motorists disregarding site boundaries due to distraction or willful disobedience.
- Public use of private site facilities for shelter, relief, and other reasons with no ill-intention.
- Public use of private site facilities for mischievous or criminal activity, such as loitering, vandalism, or theft.

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<sup>4</sup> Source: CDC, 2024. "Zika Virus." Available at: <https://www.cdc.gov/zika/index.html>.

- Encounters with community members who are disgruntled with the project activity.
- Encounters with criminal activities on or near a project site.
- Encounters with hunters who may intentionally or unintentionally disregard site boundaries.

If any of the previously mentioned scenarios are anticipated to be likely, take the following precautions as appropriate:

- Verify that the site is adequately marked and barricaded to limit unintentional disruptions of the work by the public.
- Review the site for attractive nuisances (e.g., hazards or conditions that are likely to attract children), and mitigate those.
- Secure all equipment and site facilities to prevent unauthorized access or use.
- Remove valuable items from the site or adequately secure them on site to limit the temptation for potential criminals.
- Have contact information for the client's or owner's public relations office while on site, and direct disgruntled community members to that office. If necessary, vacate the site to relieve the situation and notify the PM or FL.
- Work in pairs when uncertain of the public safety situation at a site. In questionable situations, postpone work as necessary until a plan of action can be developed to verify a safe working environment.

### *11.2.12 Personal Health and Safety*

In addition to hazards associated with chemicals of concern, equipment, operations, or site conditions discussed above, there may be additional personal safety issues to consider at a site, including those related to one or multiple protected classes, such as race, gender, religion, ability, sexual orientation, or gender identity. These conditions may involve the following, perpetrated by the public or those associated with the work:

- Malicious disruption of work
- Harassment, including unwanted comments, gestures, or actions
- Threats of violence, either implied (using derogatory language) or explicit
- Assault

**It is critical that the work environment be discussed within the project team to evaluate risks, ways to avoid those risks, and communication protocols. Anchor QEA requires that work be performed in teams.**

Specifically, if any of the above are anticipated, take the following precautions as appropriate:

- Alert the PM, FL, CHSM, and Human Resources Department of potential issue(s).

- Formulate a plan of action to verify and maintain a safe working environment before field work, which may include the following:
  - Working in pairs and/or within a certain physical distance of other work groups.
  - Coordinated check-ins (calls to or from the office or visual check-ins with other field members).
- Whenever possible, schedule work only within daylight hours (which fluctuate seasonally) or on weekends when questionable scenarios may be less likely.
  - If night work is required, maintain a minimum of two field personnel at all times, and potentially increase the total number of personnel.
  - If working in high-risk areas, discuss the possibility of hiring security if work needs to be performed at night, in low light, or near potentially dangerous areas (e.g., abandoned buildings, public displays of hostility, discrimination, or gang-related activity).
- Maintain a field phone with active GPS and non-locking 911 capability at all times while out in the field.
- If a need arises for a change in field work (e.g., additional sampling or moving to an area that was not planned) or travel plans (e.g., dead battery or flat tire), immediately alert the FL and PM as to the event.

In addition, practice active awareness of your environment. Discuss personal health and safety concerns at the daily safety tailgate meeting. If you feel unsafe based on the potential behavior of others, immediately bring it up to field team coworkers. If the issue is not resolved to your satisfaction, alert the PM, FL, CHSM, and Human Resources Department to assist in resolving any potential issue(s).

## 12 Medical Monitoring Program

This section describes the medical monitoring program that Anchor QEA field personnel must comply with when working on sites where there is a potential for exposure to hazardous wastes or other hazardous substances.

### 12.1 General Requirements

Anchor QEA employees shall be enrolled in a medical monitoring program in compliance with OSHA standards (29 CFR 1910.120(f)) under the following circumstances:

- If they are involved with any of the following operations:
  - **Cleanup operations** required by a governmental body, whether federal, state, local, or other, involving hazardous substances that are conducted at uncontrolled hazardous waste sites (including, but not limited to, the EPA's National Priority List [NPL] sites, state priority list sites, sites recommended for the EPA NPL, and initial investigation of government-identified sites that are conducted before the presence or absence of hazardous substances has been ascertained)
  - **Corrective actions** involving cleanup operations at sites covered by the Resource Conservation and Recovery Act of 1976 (RCRA) as amended (42 *United States Code* 6901 et seq.)
  - **Voluntary cleanup operations** at sites recognized by federal, state, local, or other governmental bodies as uncontrolled hazardous waste sites
  - **Operations involving hazardous wastes** that are conducted at treatment, storage, and disposal (TSD) facilities regulated by 40 CFR 264 and 40 CFR 265 pursuant to RCRA or by agencies under agreement with the EPA to implement RCRA regulations
  - **Emergency response operations** for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the hazard
- And, if they meet the following criteria:
  - Are or may be exposed to hazardous substances or health hazards at or above the established PEL, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more per year
- In addition, employees are required to be enrolled in the medical monitoring program if they meet any of the following conditions:
  - Wear a respirator for 30 days or more per year
  - Are injured, become ill, or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operations
  - Are members of a Hazardous Materials (HAZMAT) team

Anchor QEA employees required to be enrolled in a medical monitoring program under 29 CFR 1910.120(f) shall have medical examinations and consultations made available to them by Anchor QEA on the following schedule:

- Before assignment
- At least once every 12 months unless the attending physician believes a longer interval (not greater than biennially) is appropriate
- At termination of employment or reassignment to an area where the employee would not be covered if the employee has not had an examination within the last 6 months
- As soon as possible upon notification that the employee has developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards, or that the employee has been injured or exposed above the PEL or published exposure levels in an emergency situation
- At more frequent times, if the examining physician determines that an increased frequency of examination is medically necessary

As part of the HAZWOPER program, employees will participate in pulmonary function tests and heavy metal biomonitoring. The content of medical examinations or consultations made available to employees shall be determined by the attending physician but shall include, at a minimum, a medical and work history with special emphasis on symptoms related to the handling of hazardous substances and health hazards, and to fitness for duty including the ability to wear any required PPE under conditions (i.e., temperature extremes) that may be expected at the work site.

The attending physician shall provide Anchor QEA with a written opinion for each examined employee that contains the following information:

- Whether the employee has any detected medical conditions that would place the employee at an increased risk of impairment of the employee's health from hazardous waste operations work, emergency response, or respirator use
- Any recommended limitations on the employee's assigned work
- A statement that the employee has been informed of the results of the medical examination and any medical conditions that require further examination or treatment

The written opinion obtained by Anchor QEA shall not reveal specific findings or diagnoses unrelated to occupational exposures. Medical monitoring and other employee-related medical records shall be retained for at least the duration of employment plus 30 years.

## 12.2 Team Self-Monitoring

All personnel will be instructed to look for and inform each other of any deleterious changes in their physical or mental condition during the performance of all field activities. Examples of such changes are as follows:

- Headaches
- Dizziness
- Nausea
- Blurred vision
- Cramps
- Irritation of eyes, skin, or respiratory system
- Skin chafing from damp or wet clothing
- Changes in complexion or skin color
- Changes in apparent motor coordination
- Increased frequency of minor mistakes
- Excessive salivation or changes in papillary response
- Changes in speech ability or speech pattern
- Symptoms of heat stress or heat exhaustion
- Symptoms of hypothermia

If any of these conditions develop, the affected person will be moved from the immediate work location and evaluated. If further assistance is needed, personnel at the local hospital will be notified, and an ambulance will be summoned if the condition is thought to be serious. If the condition is the result of sample collection or processing activities, procedures and/or PPE will be modified to address the problem.

## Appendix A

### Health and Safety Logs and Forms

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ANCHOR  
QEA



## Submit a Playing It Safe Event

**TOPICS COVERED:** *Highlighted topics are required*

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> Emergency Procedures and Evacuation Route                            | <input type="checkbox"/> Lines of Authority                             | <input type="checkbox"/> Lifting Techniques             |
| <input type="checkbox"/> Directions to Hospital   | <input type="checkbox"/> Communication                                  | <input type="checkbox"/> Slips, Trips, and Falls        |
| <input type="checkbox"/> HASP Review and Location   | <input type="checkbox"/> Site Security                                  | <input type="checkbox"/> Hazard Exposure Routes         |
| <input type="checkbox"/> Safety Equipment Location  | <input type="checkbox"/> Vessel Safety Protocols                        | <input type="checkbox"/> Heat and Cold Stress           |
| <input type="checkbox"/> Proper Safety Equipment Use  | <input type="checkbox"/> Work Zones                                     | <input type="checkbox"/> Overhead and Underfoot Hazards |
| <input type="checkbox"/> Employee Right-to-Know/<br>SDS Location                              | <input type="checkbox"/> Vehicle Safety and Driving/<br>Road Conditions | <input type="checkbox"/> Chemical Hazards               |
| <input type="checkbox"/> Fire Extinguisher Location   | <input type="checkbox"/> Equipment Safety and Operation                 | <input type="checkbox"/> Flammable Hazards              |
| <input type="checkbox"/> Eye Wash Station Location  | <input type="checkbox"/> Proper Use of PPE                              | <input type="checkbox"/> Biological Hazards             |
| <input type="checkbox"/> Buddy System   | <input type="checkbox"/> Decontamination Procedures                     | <input type="checkbox"/> Eating/Drinking/Smoking        |
| <input type="checkbox"/> Self and Coworker Monitoring   | <input type="checkbox"/> Near Miss Reporting Procedures                 | <input type="checkbox"/> Reviewed Prior Lessons Learned |
| <input type="checkbox"/> Field Team Medical Conditions for Emergency Purposes (Confidential): |   |   |

☐ Other: \_\_\_\_\_[illegible]

# Field Safety Equipment Checklist

The following is a list of safety-related gear that may be appropriate depending on the type of work being conducted. The purpose of this checklist is twofold: 1) ensure that all field crew members think about appropriate safety gear needs before heading to the worksite; and 2) provide an extensive list of gear to consider in order to serve as a reminder of potential safety gear needs during a field effort.

## ☐ Safety Briefing Log or Notebook

### Personal Protective Gear

- ☐ Rain pants and jacket
- ☐ Hard hats
- ☐ Boots (steel-toed, if appropriate)
- ☐ Safety glasses
- ☐ Ear protection
- ☐ Nitrile gloves (inner and outer pair)
- ☐ Tyvek overalls
- ☐ H<sub>2</sub>S sensor
- ☐ Flashlight
- ☐ EpiPen (inquire if any field staff use one)
- ☐ Other:

### Communications

- ☐ Notify office staff of day's field plan
- ☐ Walkie Talkies
- ☐ Cell phones
- ☐ Satellite phone (if appropriate)
- ☐ Contact numbers (e.g., for other field crew members, the PM, or others to notify that you are accessing site)

### Boat Safety Gear

*U.S. Coast Guard Required Gear:*

- ☐ 1. Personal flotation device (PFD), preferably life jacket, for each occupant
- ☐ 2. Fire extinguisher (filled to operable range)
- ☐ 3. Flares (unexpired)
- ☐ 4. Horn
- ☐ 5. Navigation lights
- ☐ First aid kit
- ☐ Bowline and stern line
- ☐ Anchor and anchor line
- ☐ Paddle

### Warm Weather Safety Gear

- ☐ Sunscreen
- ☐ Water
- ☐ Hat
- ☐ Light clothes

### Cold Weather Safety Gear

- ☐ Warm clothes (preferably synthetics)
- ☐ Hat
- ☐ Gloves
- ☐ Boot warmers
- ☐ Thermos of warm drink/soup

### General Gear for Work Near Water

- ☐ Life jacket
- ☐ Boots or waders (hip or chest)
- ☐ Throwline

- ☐ Spare propeller and linchpin
- ☐ Appropriate personal protective gear (boots or waders) to step onto shore if necessary
- ☐ Drain plug (and spare)
- ☐ Boat fuel and oil
- ☐ Weather radio (if appropriate)
- ☐ Weather, tides, and currents forecasts
- ☐ Warm clothes/blanket in dry bag

# Modification to Health and Safety Plan



Date: \_\_\_\_\_

Project No: \_\_\_\_\_

Project Name: \_\_\_\_\_

Modification: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Reason for Modification: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Site Personnel Briefed

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Approvals

Field Lead: \_\_\_\_\_  
Printed Name Signature Date

Project Manager: \_\_\_\_\_  
Printed Name Signature Date

# Heat Stress Monitoring Record



Date: \_\_\_\_\_  
 Project No: \_\_\_\_\_  
 Project Name: \_\_\_\_\_  
 Location: \_\_\_\_\_

Employee Name	Monitoring Results												
	Initial Reading Time:	First Work Period Time:			Second Work Period Time:		Third Work Period Time:		Fourth Work Period Time:		Fifth Work Period Time:		Sixth Work Period Time:
	WBGT (°F):	WBGT (°F):			WBGT (°F):		WBGT (°F):		WBGT (°F):		WBGT (°F):		WBGT (°F):
	Air Temp (°F):	Air Temp (°F):			Air Temp (°F):		Air Temp (°F):		Air Temp (°F):		Air Temp (°F):		Air Temp (°F):
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	Initial H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:
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Notes:

Completed by:

Printed Name

Signature

Date

# Incident Report Form



Please immediately contact your manager when a work-related incident has occurred. It is your responsibility (or your manager's if you are not able) to contact Human Resources (HR) and Health and Safety (H&S) ASAP when an incident happens.

This Incident Report is the first form you must complete when a work-related incident has occurred. Once completed, forward this form to HR and H&S.

**Incident Type:** ☐ Injury ☐ Illness ☐ Near Miss ☐ Spill ☐ Fire ☐ Other \_\_\_\_\_

## Employees Involved in Incident

**Was anyone injured?** ☐ Yes ☐ No

(If **Yes**, complete **a** and **b** below)

### a. Information Regarding Injured or Ill Employee

**Full name:** \_\_\_\_\_  
**Street:** \_\_\_\_\_  
**City:** \_\_\_\_\_ **State:** \_\_\_\_\_ **Zip:** \_\_\_\_\_  
**Date of birth:** \_\_\_\_\_ **Sex:** \_\_\_\_\_  
**Date hired:** \_\_\_\_\_ **Job title:** \_\_\_\_\_

### b. Information about the Physician or Health Care Professional

**Was medical treatment required?** ☐ Yes ☐ No

**First aid only:** ☐ Yes ☐ No

**Name of physician/health care professional:** \_\_\_\_\_

**If treatment was given away from the worksite, where was it given?**

**Facility:** \_\_\_\_\_  
**Street:** \_\_\_\_\_  
**City:** \_\_\_\_\_ **State:** \_\_\_\_\_ **Zip:** \_\_\_\_\_

**Was employee treated in emergency room?** ☐ Yes ☐ No

**Was employee hospitalized overnight as an in-patient?** ☐ Yes ☐ No

**Did the employee miss a full day of work following the incident?** ☐ Yes ☐ No

**Date of last day worked:** \_\_\_\_\_

**Date of return to work:** \_\_\_\_\_

**Number of restricted days of work:** \_\_\_\_\_

# Incident Report Form



## Information about the Incident:

**Date of incident:**

---

**Time of incident:**

---

**Location of incident:**

---

**Were there any witnesses?**

☐ Yes ☐ No

**Name and phone number of witness:**

---

---

**What was employee doing just before the incident occurred?** Describe the activity, as well as the tools, equipment, or material the employee was using. Be specific (e.g., climbing a ladder while carrying roofing materials, spraying chlorine from hand sprayer, daily computer key-entry).

**What happened?** Tell us how the injury occurred (e.g., when ladder slipped on wet floor, worker fell 20 feet; worker was sprayed with chlorine when gasket broke during replacement; worker developed soreness in wrist over time).

# Incident Report Form



**If an injury or illness, what was it?** Tell us the part of the body that was affected and how it was affected.

**Employer Use Only:**

**Date Recorded in Incident Log:** \_\_\_\_\_ **By:** \_\_\_\_\_

**Investigation:**

**Date Investigation Started:** \_\_\_\_\_ **Date Investigation Concluded:** \_\_\_\_\_

**Investigation Team Leader and Title:** \_\_\_\_\_

**Investigation Team Member Names and Titles:**

Name	Title
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

# Incident Report Form



**Root Cause Determination** (attach other sheets as necessary)

Any statements, photographs, sketches, or other documents should be attached to this document.

# Incident Report Form



**Corrective Actions:** \*Documentation supporting completion of corrective actions should be attached to this report.

Corrective Action	Person Responsible	Due Date	Completion Date	Completion Notes	Completed By

## Appendix B

### Job Safety Analysis Documents

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# Job Safety Analysis



## Field Activities – General

<b>Project Name:</b> Chambers Creek Wastewater Treatment Plant Sediment Monitoring	<b>Project Number:</b> 240767-01.01	<b>JSA Number:</b> 001	<b>Issue Date:</b> 12/24/2024
<b>Location:</b> 10311 Chambers Creek Road W, University Place, WA, 98467	<b>Contractor:</b> Anchor QEA, Inc.	<b>Analysis by:</b> Robert Bennington	<b>Analysis Date:</b> 12/19/2024
<b>Work Operation:</b> Field activities	<b>Superintendent/Competent Person:</b> Catherine Banks	<b>Revised by:</b> Robert Bennington	<b>Revised Date:</b> 12/19/2024
<b>Required Personal Protective Equipment (PPE):</b> <ul style="list-style-type: none"> <li>Modified Level D—Long pants, long sleeves, and steel-toed footwear conforming to ASTM International (ASTM) F2412-05/ASTM F2413-05</li> <li>Depending on activity, the following PPE may also be required: safety glasses/splash goggles, hard hat, nitrile gloves, and, if boating, U.S. Coast Guard-approved personal flotation device (PFD; see cold stress section for cold-weather PFD information)</li> </ul>		<b>Reviewed by:</b> Matthew Gruber	<b>Reviewed Date:</b> 12/19/2024
		<b>Approved by:</b> Ariel Blanc	<b>Approved Date:</b> 12/24/2024

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
If boating		<ul style="list-style-type: none"> <li>Follow the Job Safety Analysis (JSA) for boating activities.</li> </ul>	
Outdoor, physical activity	Slips, trips, and falls	<ul style="list-style-type: none"> <li>Avoid walking while writing or texting—maintain a heads-up posture.</li> <li>Be aware of potentially slippery surfaces and tripping hazards. Use handrails where available. Wear footwear that has sufficient traction.</li> <li>Maintain good housekeeping practices. Clean up all spills immediately.</li> <li>Be aware of weather effects on the work area, including wet and/or frozen ground.</li> <li>Jumping, running, and horseplay are prohibited.</li> <li>Keep all areas clean and free of debris to prevent any trips and falls.</li> <li>Be aware of and limit loose clothing or untied shoelaces that may contribute to slips, trip, and falls.</li> <li>Notify the field team members of any unsafe conditions.</li> </ul>	<ul style="list-style-type: none"> <li>Routinely inspect work area for unsafe conditions.</li> </ul>

# Job Safety Analysis



## Field Activities – General

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Outdoor, physical activity (continued)	Heat stress	<ul style="list-style-type: none"> <li>Adjust work schedules, as necessary, to avoid the hottest part of the day.</li> <li>Take rest breaks as warranted.</li> <li>Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.</li> <li>Maintain body fluids at normal levels.</li> <li>Train workers to recognize the symptoms of heat-related illness.</li> </ul>	<ul style="list-style-type: none"> <li>Review weather forecast prior to field work.</li> <li>Monitor workers' physical conditions.</li> <li>Monitor outside temperature versus worker activity.</li> </ul>
	Cold stress	<ul style="list-style-type: none"> <li>Provide shelter (enclosed, heated environment) to protect personnel during rest periods.</li> <li>Educate workers to recognize the symptoms of frostbite and hypothermia.</li> <li>Use appropriate cold-weather gear, up to and including Mustang-type bib coveralls or jacket/bib combinations.</li> <li>Consider additional precautions if working near water in cold weather.</li> <li>Have a dry change of clothing available.</li> <li>Train workers to recognize the symptoms of cold-related illness.</li> </ul>	<ul style="list-style-type: none"> <li>Review weather forecast prior to field work.</li> <li>Monitor workers' physical conditions and PPE.</li> <li>Monitor outside and water temperature versus worker activity and PPE.</li> </ul>
	Rain or snow	<ul style="list-style-type: none"> <li>Wear appropriate PPE (rain gear).</li> <li>Be aware of slip hazards, puddles, and electrical hazards when working in wet conditions.</li> <li>If extremely cold conditions are forecast, consider additional precautions or postponing work activity.</li> </ul>	<ul style="list-style-type: none"> <li>Review weather forecast prior to field work.</li> <li>Inspect PPE daily prior to use.</li> <li>Routinely inspect work area for deteriorating conditions.</li> </ul>
	Sunshine	<ul style="list-style-type: none"> <li>Have sunscreen available for ultraviolet protection.</li> <li>Have abundant water available to prevent dehydration.</li> <li>Consider wearing wide-brimmed headwear and light-colored, lightweight, sun-blocking clothing.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that sunscreen and water are available.</li> </ul>
	Lightning	<ul style="list-style-type: none"> <li>Do not begin or continue work until lightning subsides for at least 30 minutes. Disconnect and do not use or touch electronic equipment.</li> <li>Immediately head for shore if on the water and lightning is observed. If not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm.</li> </ul>	<ul style="list-style-type: none"> <li>Obtain weather forecast and updates as needed.</li> </ul>

# Job Safety Analysis



## Field Activities – General

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Outdoor, physical activity (continued)	High winds	<ul style="list-style-type: none"><li>Wear goggles or safety glasses if dust or debris are visible.</li></ul>	<ul style="list-style-type: none"><li>Review weather forecast prior to field work.</li><li>Ensure that goggles or safety glasses are available.</li></ul>
	Biological hazards (fauna [e.g., bees, spiders, mosquitoes])	<ul style="list-style-type: none"><li>Be aware of likely biological hazards in the work area.</li><li>Wear appropriate clothing (i.e., hat, long-sleeve shirt, long pants and, boots, as appropriate), and apply insect repellent.</li></ul>	<ul style="list-style-type: none"><li>Ensure that insect repellent is available.</li><li>Inspect clothing and skin for insects after working in insect-prone areas.</li></ul>
	Noise exposure	<ul style="list-style-type: none"><li>Wear hearing protection in high noise environments or when working around heavy machinery or equipment (action level of 85 decibels averaged over an 8-hour day).</li></ul>	<ul style="list-style-type: none"><li>Ensure that hearing protection is available.</li></ul>

## Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- If boating is involved, and a professional captained vessel is not in use, boat operators must take the appropriate state or provincial boater safety courses.
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

# Job Safety Analysis



## Sediment Sampling

<b>Project Name:</b> Chambers Creek Wastewater Treatment Plant Sediment Monitoring	<b>Project Number:</b> 240767-01.01	<b>JSA Number:</b> 002	<b>Issue Date:</b> 12/24/2024
<b>Location:</b> 10311 Chambers Creek Road W, University Place, WA, 98467	<b>Contractor:</b> Anchor QEA, Inc.	<b>Analysis by:</b> Robert Bennington	<b>Analysis Date:</b> 12/19/2024
<b>Work Operation:</b> Sediment sampling	<b>Superintendent/Competent Person:</b> Catherine Banks	<b>Revised by:</b> Robert Bennington	<b>Revised Date:</b> 12/19/2024
<b>Required Personal Protective Equipment (PPE):</b> <ul style="list-style-type: none"> <li>Modified Level D—Long pants, long sleeves, and steel-toed footwear conforming to ASTM International (ASTM) F2412-05/ASTM F2413-05</li> <li>Depending on activity, the following PPE may also be required: safety glasses/splash goggles, hard hat, nitrile gloves, and, if boating, U.S. Coast Guard-approved personal flotation device (PFD; see cold stress section for cold-weather PFD information)</li> </ul>		<b>Reviewed by:</b> Matthew Gruber	<b>Reviewed Date:</b> 12/19/2024
		<b>Approved by:</b> Ariel Blanc	<b>Approved Date:</b> 12/24/2024

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
If boating		<ul style="list-style-type: none"> <li>Follow the Job Safety Analysis (JSA) for boating activities.</li> </ul>	
If using glassware		<ul style="list-style-type: none"> <li>Follow the JSA for handling glassware.</li> </ul>	
Sediment sample retrieval and processing	Injury from hand and power tool operation (e.g., spatula or drill)	<ul style="list-style-type: none"> <li>Be aware of sharp edges on hand tools (e.g., spatulas, knives, drill bits, and saw blades).</li> <li>Be aware of electrical connections and water hazards when working with electric- or battery-operated tools.</li> <li>Ensure that all tools are working properly; repair or replace defective tools. Repair when unplugged and off.</li> <li>Keep guards on power tools when not in use.</li> </ul>	<ul style="list-style-type: none"> <li>Inspect tools to ensure that they are in good working order.</li> <li>Inspect electrical connections (if applicable).</li> <li>Inspect tools periodically to ensure dry and clean operation.</li> </ul>
	Noise exposure	<ul style="list-style-type: none"> <li>Wear hearing protection in high noise environments or when working around heavy machinery or equipment (action level of 85 decibels averaged over an 8-hour day).</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that hearing protection is available.</li> </ul>

# Job Safety Analysis



## Sediment Sampling

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Sediment sample retrieval and processing (continued)	Slips, trips, and falls	<ul style="list-style-type: none"> <li>• Avoid walking while writing or texting—maintain a heads-up posture.</li> <li>• Be aware of potentially slippery surfaces, including boat decks, riprap, muddy or algae-covered rocks, shoreline plants/seaweed, thick mud, and tripping hazards. Use handrails where available. Wear footwear that has sufficient traction.</li> <li>• Maintain good housekeeping practices. Clean up all spills immediately.</li> <li>• Be aware of weather effects on the work area, including wet and/or frozen ground.</li> <li>• Jumping, running, and horseplay are prohibited.</li> <li>• Be cautious when entering or exiting the vessel, and load/unload items onto/off of the pier or shore once boarded.</li> <li>• Keep all areas clean and free of debris to prevent any trips and falls.</li> <li>• Notify the field team members of any unsafe conditions.</li> </ul>	<ul style="list-style-type: none"> <li>• Routinely inspect work area for unsafe conditions.</li> </ul>
	Ingestion of contaminants, or skin or eye contact with contaminants	<ul style="list-style-type: none"> <li>• Wear appropriate PPE to prevent/reduce exposure.</li> <li>• Contact 911, as necessary; perform CPR if breathing stops.</li> <li>• Move exposed person away from source of contamination, and rinse mouth. If exposure to skin occurs, promptly wash contaminated skin using soap or mild detergent and water. Rinse eyes with large amounts of water.</li> <li>• Follow decontamination procedures as outlined in the Health and Safety Plan (HASP).</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure that decontamination procedures are on hand and are reviewed.</li> <li>• Ensure that PPE and rinsing water are available.</li> </ul>
	Muscle strain or injuries from improper lifting	<ul style="list-style-type: none"> <li>• Use proper lifting techniques or ask for assistance with heavy objects.</li> <li>• If boating, avoid carrying objects directly onto or off the boat; rather, load/unload objects while on the boat to/from the pier/shore.</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate weight and center of gravity of heavier items prior to lifting or moving.</li> </ul>
	Pinch points	<ul style="list-style-type: none"> <li>• If boating, secure any unsecured objects on deck; they may shift on deck quickly in wave, current, or engine acceleration conditions.</li> <li>• Maintain a safe distance from closing mechanisms and moving parts on sampling gear.</li> <li>• Avoid placing hands or self between boat and dock/piles.</li> </ul>	

# Job Safety Analysis



## Sediment Sampling

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Sediment sample retrieval and processing (continued)	Wading	<ul style="list-style-type: none"> <li>• Be aware of potentially slippery surfaces and tripping hazards such as fallen brush, logs, rocks, and other debris. Wear footwear that has sufficient traction.</li> <li>• Be aware of water depth and potential drop-offs.</li> <li>• Be aware of existing and projected river flows.</li> <li>• Wear hip or chest waders as appropriate for traction and to protect against cold water.</li> <li>• Keep extra dry clothes on hand, including socks.</li> <li>• Use a wading staff for balance and to check for obstructions in murky water.</li> <li>• Always wear a PFD equipped with a whistle, even if water looks shallow or slow; drop-offs occur and water is often moving faster than it looks.</li> <li>• Waders should fit the person and not be overly baggy.</li> <li>• A wading belt should always be worn (some waders come equipped with one).</li> <li>• Wear felt and/or studded wading boots.</li> <li>• When water is deeper than knee deep, walk sideways, at an angle, or shuffle your feet when walking and never cross your feet.</li> <li>• Bottom conditions, water conditions, and flow can change and must be considered when determining safe allowable wading depth. Higher flow conditions will reduce the safe allowable wading depth.</li> <li>• Water should be entered from the bank and only from a boat that is anchored or on the bank.</li> <li>• If a boat is being used, all applicable boating H&amp;S procedures should be followed (e.g., throwable safety buoy/line, also called a throw bag).</li> <li>• When entering the water, depth at entry point should be 1 foot or less and the bottom should be visible.</li> <li>• Wading should not be conducted if there is overhanging vegetation, logs, or other obstructions that would prevent standing upright while wading.</li> <li>• If the current makes it difficult to hold your position, stop and cease wading.</li> <li>• Deepest water depth acceptable for wading is to an individual's waist. If water depth increases beyond that point, do not proceed into deeper water. Look for an area with shallower water. If shallower water cannot be found, work must be completed from a boat.</li> </ul>	<ul style="list-style-type: none"> <li>• Inspect work area for tripping hazards visible from streambank.</li> <li>• Inspect waders for leaks.</li> <li>• Check depths and flows before wading.</li> <li>• Ensure that change of dry clothes is available if wading in cold weather or cold water conditions.</li> <li>• Inspect PFDs for integrity, particularly the cartridge charge on inflatable PFDs.</li> </ul>

# Job Safety Analysis



## Sediment Sampling

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Working outdoors	Heat stress	<ul style="list-style-type: none"> <li>Adjust work schedules, as necessary, to avoid the hottest part of the day.</li> <li>Take rest breaks as warranted.</li> <li>Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.</li> <li>Maintain body fluids at normal levels.</li> <li>Train workers to recognize the symptoms of heat-related illness.</li> </ul>	<ul style="list-style-type: none"> <li>Review weather forecast prior to field work.</li> <li>Monitor workers' physical conditions.</li> <li>Monitor outside temperature versus worker activity.</li> </ul>
	Cold stress	<ul style="list-style-type: none"> <li>Provide shelter (enclosed, heated environment) to protect personnel during rest periods.</li> <li>Educate workers to recognize the symptoms of frostbite and hypothermia.</li> <li>Use appropriate cold-weather gear, up to and including Mustang-type bib coveralls or jacket/bib combinations.</li> <li>Consider additional precautions if working near water in cold weather.</li> <li>Have a dry change of clothing available.</li> <li>Train workers to recognize the symptoms of cold-related illness.</li> </ul>	<ul style="list-style-type: none"> <li>Review weather forecast prior to field work.</li> <li>Monitor workers' physical conditions and PPE.</li> <li>Monitor outside and water temperature versus worker activity and PPE.</li> </ul>
	Rain or snow	<ul style="list-style-type: none"> <li>Wear appropriate PPE (rain gear).</li> <li>Be aware of slip hazards, puddles, and electrical hazards when working in wet conditions.</li> <li>If extremely cold conditions are forecast, consider additional precautions or postponing work activity.</li> </ul>	<ul style="list-style-type: none"> <li>Review weather forecast prior to field work.</li> <li>Inspect PPE daily prior to use.</li> <li>Routinely inspect work area for deteriorating conditions.</li> </ul>
	Sunshine	<ul style="list-style-type: none"> <li>Have sunscreen available for ultraviolet protection.</li> <li>Have abundant water available to prevent dehydration.</li> <li>Consider wearing wide-brimmed headwear and light-colored, lightweight, sun-blocking clothing.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that sunscreen and water are available.</li> </ul>
	Lightning	<ul style="list-style-type: none"> <li>Do not begin or continue work until lightning subsides for 30 minutes. Disconnect and do not use or touch electronic equipment.</li> <li>Immediately head for shore if on the water and lightning is observed. If not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm.</li> </ul>	<ul style="list-style-type: none"> <li>Obtain weather forecast and updates as needed.</li> </ul>

# Job Safety Analysis



## Sediment Sampling

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Working outdoors (continued)	High winds	<ul style="list-style-type: none"><li>Wear goggles or safety glasses if dust or debris are visible.</li></ul>	<ul style="list-style-type: none"><li>Review weather forecast prior to field work.</li><li>Ensure that goggles or safety glasses are available.</li></ul>
	Biological hazards (fauna [e.g., bees, spiders, mosquitoes])	<ul style="list-style-type: none"><li>Be aware of likely biological hazards in the work area.</li><li>Wear appropriate clothing (i.e., hat, long-sleeve shirt, long pants and, boots, as appropriate), and apply insect repellent.</li></ul>	<ul style="list-style-type: none"><li>Ensure that insect repellent is available.</li><li>Inspect clothing and skin for insects after working in insect-prone areas.</li></ul>

## Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- If boating is involved, and a professional captained vessel is not in use, boat operators must take the appropriate state or provincial boater safety courses.
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

# Job Safety Analysis



## General Boating Activities

<b>Project Name:</b> Chambers Creek Wastewater Treatment Plant Sediment Monitoring	<b>Project Number:</b> 240767-01.01	<b>JSA Number:</b> 003	<b>Issue Date:</b> 12/24/2024
<b>Location:</b> 10311 Chambers Creek Road W, University Place, WA, 98467	<b>Contractor:</b> Anchor QEA, Inc.	<b>Analysis by:</b> Robert Bennington	<b>Analysis Date:</b> 12/19/2024
<b>Work Operation:</b> General boating activities	<b>Superintendent/Competent Person:</b> Catherine Banks	<b>Revised by:</b> Robert Bennington	<b>Revised Date:</b> 12/19/2024
<b>Required Personal Protective Equipment (PPE):</b> <ul style="list-style-type: none"><li>U.S. Coast Guard (USCG)-approved personal flotation device (PFD; see cold stress section for cold-weather PFD information)</li></ul>	<b>Reviewed by:</b> Matthew Gruber		<b>Reviewed Date:</b> 12/19/2024
	<b>Approved by:</b> Ariel Blanc		<b>Approved Date:</b> 12/24/2024

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Walking on deck	Pinch points	<ul style="list-style-type: none"><li>Secure any unsecured objects on deck; they may shift quickly in wave, current, or engine acceleration conditions.</li><li>Maintain a safe distance from closing mechanisms and moving parts, such as on sampling gear.</li><li>Avoid placing your hands or yourself between the boat and the dock or piles.</li></ul>	

# Job Safety Analysis



## General Boating Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Walking on deck (continued)	Slips, trips, and falls	<ul style="list-style-type: none"> <li>• Avoid walking while writing or texting—maintain a heads-up posture.</li> <li>• Be aware of potentially slippery surfaces, including boat decks, riprap, muddy or algae-covered rocks, shoreline plants or seaweed, thick mud, and tripping hazards. Use handrails where available. Wear footwear that has sufficient traction.</li> <li>• Maintain good housekeeping practices. Clean up all spills immediately.</li> <li>• Be aware of weather effects on the work area, including wet and/or frozen ground.</li> <li>• Jumping, running, and horseplay are prohibited.</li> <li>• Be cautious when entering or exiting the vessel, and load/unload items onto/off of the pier or shore once boarded.</li> <li>• Keep all areas clean and free of debris to prevent any trips and falls.</li> <li>• Notify the field team members of any unsafe conditions.</li> <li>• Keep rope lines neatly coiled and stowed. Avoid stepping on or over lines.</li> </ul>	<ul style="list-style-type: none"> <li>• Routinely inspect work area for unsafe conditions.</li> </ul>
	Exceeding boat capacity	<ul style="list-style-type: none"> <li>• Keep the number of passengers and equipment as posted on boat placards within limits at all times. If conditions warrant, reduce capacity to maintain boat stability.</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure that field team is aware of limits and adheres accordingly.</li> </ul>
	Noise exposure	<ul style="list-style-type: none"> <li>• Wear hearing protection in high noise environments or when working around heavy machinery or equipment (action level of 85 decibels averaged over an 8-hour day).</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure that hearing protection is available.</li> </ul>
Working outdoors	Heat stress	<ul style="list-style-type: none"> <li>• Adjust work schedules, as necessary, to avoid the hottest part of the day.</li> <li>• Take rest breaks as warranted.</li> <li>• Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.</li> <li>• Maintain body fluids at normal levels.</li> <li>• Train workers to recognize the symptoms of heat-related illness.</li> </ul>	<ul style="list-style-type: none"> <li>• Review weather forecast prior to field work.</li> <li>• Monitor workers' physical conditions.</li> <li>• Monitor outside temperature versus worker activity.</li> </ul>
	Cold stress	<ul style="list-style-type: none"> <li>• Provide shelter (enclosed, heated environment) to protect personnel during rest periods.</li> <li>• Educate workers to recognize the symptoms of frostbite and hypothermia.</li> <li>• If the combined air and water temperature is below 90 degrees Fahrenheit (°F), wear a USCG-approved float coat, Mustang-type bib coveralls, or one-piece survival suit.</li> <li>• Have a dry change of clothing available.</li> <li>• Train workers to recognize the symptoms of cold-related illness.</li> </ul>	<ul style="list-style-type: none"> <li>• Review weather forecast prior to field work.</li> <li>• Monitor workers' physical conditions and PPE.</li> <li>• Monitor outside and water temperature versus worker activity and PPE.</li> </ul>

# Job Safety Analysis



## General Boating Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Working outdoors (continued)	Rain or snow	<ul style="list-style-type: none"> <li>Wear appropriate PPE (rain gear).</li> <li>Be aware of slip hazards, puddles, and electrical hazards when working in wet conditions.</li> <li>If extremely cold conditions are forecast, consider additional precautions or postponing work activity.</li> </ul>	<ul style="list-style-type: none"> <li>Review weather forecast prior to field work.</li> <li>Inspect PPE daily prior to use.</li> <li>Routinely inspect work area for deteriorating conditions.</li> </ul>
	Sunshine	<ul style="list-style-type: none"> <li>Have sunscreen available for ultraviolet protection.</li> <li>Have abundant water available to prevent dehydration.</li> <li>Consider wearing wide-brimmed headwear and light-colored, lightweight, sun-blocking clothing.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that sunscreen and water are onboard.</li> </ul>
	Fog	<ul style="list-style-type: none"> <li>Wait for fog to lift for adequate visibility.</li> </ul>	<ul style="list-style-type: none"> <li>Review weather forecast prior to field work.</li> </ul>
	Lightning	<ul style="list-style-type: none"> <li>Do not begin or continue work until lightning subsides for at least 30 minutes. Disconnect and do not use or touch electronic equipment.</li> <li>Immediately head for shore if on the water and lightning is observed.</li> <li>If not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm.</li> </ul>	<ul style="list-style-type: none"> <li>Obtain weather forecast and updates as needed.</li> </ul>
	High river flows or high waves	<ul style="list-style-type: none"> <li>Be aware of waves and forecasts and recent rainfall in your watershed.</li> </ul>	<ul style="list-style-type: none"> <li>Have forecast available.</li> </ul>
	High winds	<ul style="list-style-type: none"> <li>Wear goggles or safety glasses if dust or debris are visible.</li> <li>Stow or secure loads or equipment that could be moved by wind, particularly when underway.</li> </ul>	<ul style="list-style-type: none"> <li>Review weather forecast prior to field work.</li> <li>Ensure that goggles or safety glasses are onboard.</li> </ul>
	Biological hazards (fauna [e.g., bees, spiders, mosquitoes])	<ul style="list-style-type: none"> <li>Be aware of likely biological hazards in the work area.</li> <li>Wear appropriate clothing (i.e., hat, long-sleeve shirt, long pants and, boots, as appropriate), and apply insect repellent.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that insect repellent is available.</li> </ul>

# Job Safety Analysis



## General Boating Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Vessel emergencies	Person overboard	<p>If you witness someone fall overboard:</p> <ul style="list-style-type: none"> <li>• Yell, "Person overboard!"</li> <li>• Throw a flotation device immediately.</li> <li>• If the engine is running, take it out of gear and swing the stern clear to keep from hitting the person.</li> <li>• Call 911 or USCG as appropriate.</li> <li>• Assign a spotter to keep the person in sight at all times.</li> <li>• Contact nearby vessels for assistance.</li> <li>• Recover the person from the water.</li> </ul> <p>If you fall overboard:</p> <ul style="list-style-type: none"> <li>• Hold your mouth and nose closed and protect your head.</li> <li>• When you reach the surface, look for movement, listen for sounds, and call for help. Use the whistle attached to the PFD and activate the beacon light.</li> <li>• It is only sensible to swim if there is reason to believe you have a chance of reaching your destination. Too much movement in cold water causes hypothermia.</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure that flotation devices are available.</li> <li>• Ensure that team wears PFDs.</li> <li>• Inspect PFDs for integrity, particularly the cartridge charge on inflatable PFDs.</li> </ul>
	Fire, abandon ship	<ul style="list-style-type: none"> <li>• Be prepared to abandon ship in case of major fire (too large to control with a fire extinguisher), or other emergency.</li> <li>• Only the boat captain can order abandon ship.</li> <li>• Communicate intent to abandon ship to all personnel onboard.</li> <li>• Notify USCG and nearby vessels of intent to abandon ship.</li> <li>• Call 911.</li> <li>• Notify the Project Manager and Field Lead, if time permits.</li> <li>• Be aware of the propeller position before abandoning ship.</li> <li>• Identify a rally point for all personnel.</li> <li>• Know the dangers of hypothermia.</li> <li>• Use the buddy system to support injured personnel.</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure that fire extinguisher is available, current, and in working order.</li> <li>• Review abandon ship procedures with field team prior to work.</li> </ul>
Navigation	Boat traffic	<ul style="list-style-type: none"> <li>• Maintain a safe operating distance from shoreline and other vessels.</li> </ul>	<ul style="list-style-type: none"> <li>• Be aware of on-water surroundings.</li> </ul>

# Job Safety Analysis



## General Boating Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Motor vehicle operation and trailering	Boat not secured properly	<ul style="list-style-type: none"><li>• Ensure that latches, straps, antennas, and onboard gear are secure. Ensure that motor is up and lights are plugged in for driving.</li><li>• Follow Job Safety Analysis (JSA) for motor vehicle operation.</li></ul>	<ul style="list-style-type: none"><li>• Inspect around entire boat before driving.</li></ul>

## Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- If professional captained vessel is not in use, boat operators must take appropriate state or provincial boater safety courses.
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

# Job Safety Analysis



## Decontamination Activities

<b>Project Name:</b> Chambers Creek Wastewater Treatment Plant Sediment Monitoring	<b>Project Number:</b> 240767-01.01	<b>JSA Number:</b> 004	<b>Issue Date:</b> 12/24/2024
<b>Location:</b> 10311 Chambers Creek Road W, University Place, WA, 98467	<b>Contractor:</b> Anchor QEA, Inc.	<b>Analysis by:</b> Robert Bennington	<b>Analysis Date:</b> 12/19/2024
<b>Work Operation:</b> Decontamination activities	<b>Superintendent/Competent Person:</b> Catherine Banks	<b>Revised by:</b> Robert Bennington	<b>Revised Date:</b> 12/19/2024
<b>Required Personal Protective Equipment (PPE):</b> <ul style="list-style-type: none"> <li>Hard hat where overhead hazards and/or heavy equipment are present</li> <li>U.S. Coast Guard-approved personal flotation device (PFD), if boating (see cold stress section for cold-weather PFD information)</li> </ul>		<b>Reviewed by:</b> Matthew Gruber	<b>Reviewed Date:</b> 12/19/2024
		<b>Approved by:</b> Ariel Blanc	<b>Approved Date:</b> 12/24/2024

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
If boating		<ul style="list-style-type: none"> <li>Follow the Job Safety Analysis (JSA) for boating activities.</li> </ul>	
Decontamination area set up	Vehicle, heavy equipment traffic, or boat traffic in work area	<ul style="list-style-type: none"> <li>Wear high-visibility safety vest and hard hat PPE.</li> <li>Be alert when working around heavy equipment and/or other boats, especially if wearing hearing protection.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that safety vests are available for staff and visitors.</li> </ul>
	Muscle strain or injuries from improper lifting	<ul style="list-style-type: none"> <li>Use proper lifting techniques or ask for assistance with heavy objects.</li> <li>If boating, avoid carrying objects directly onto or off of the boat; rather, load/unload objects while on the boat to/from the pier/shore.</li> </ul>	<ul style="list-style-type: none"> <li>Evaluate weight and center of gravity of heavier items prior to lifting or moving.</li> </ul>
	Biological hazards (fauna [e.g., bees, spiders, mosquitoes])	<ul style="list-style-type: none"> <li>Be aware of likely biological hazards in the work area.</li> <li>Wear appropriate clothing (i.e., hat, long-sleeve shirt, long pants and, boots, as appropriate), and apply insect repellent.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that insect repellent is available.</li> <li>Inspect clothing and skin for insects after working in insect-prone areas.</li> </ul>

# Job Safety Analysis



## Decontamination Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Decontamination activities	Injury from hand and power tool operation (e.g., spatula or drill)	<ul style="list-style-type: none"> <li>Be aware of sharp edges on hand tools (e.g., spatulas, knives, drill bits, and saw blades).</li> <li>Be aware of electrical connections and water hazards when working with electric- or battery-operated tools.</li> <li>Ensure that all tools are working properly; repair or replace defective tools. Repair when unplugged and off.</li> <li>Keep guards on power tools when not in use.</li> </ul>	<ul style="list-style-type: none"> <li>Inspect tools to ensure that they are in good working order.</li> <li>Inspect electrical connections (if applicable).</li> <li>Inspect tools periodically to ensure dry and clean operation.</li> </ul>
	Noise exposure	<ul style="list-style-type: none"> <li>Wear hearing protection in high noise environments or when working around heavy machinery or equipment (action level of 85 decibels averaged over an 8-hour day).</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that hearing protection is available.</li> </ul>
	Slips, trips, and falls	<ul style="list-style-type: none"> <li>Avoid walking while writing or texting—maintain a heads-up posture.</li> <li>Be aware of potentially slippery surfaces and tripping hazards. Use handrails where available. Wear footwear that has sufficient traction.</li> <li>Maintain good housekeeping practices. Clean up all spills immediately.</li> <li>Be aware of weather effects on the work area, including wet and/or frozen ground.</li> <li>Jumping, running, and horseplay are prohibited.</li> <li>Keep all areas clean and free of debris to prevent any trips and falls.</li> <li>Notify the field team members of any unsafe conditions.</li> </ul>	<ul style="list-style-type: none"> <li>Routinely inspect work area for unsafe conditions.</li> </ul>
	Ingestion of contaminants or decontamination fluids, or skin or eye contact with contaminants or decontamination fluids	<ul style="list-style-type: none"> <li>Wear appropriate PPE to prevent/reduce exposure.</li> <li>Contact 911, as necessary; perform CPR if breathing stops.</li> <li>Move exposed person away from source of contamination, and rinse mouth. If exposure to skin occurs, promptly wash contaminated skin using soap or mild detergent and water. Rinse eyes with large amounts of water.</li> <li>Follow decontamination procedures as outlined in the Health and Safety Plan (HASP).</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that decontamination procedures are on hand and are reviewed.</li> <li>Ensure that PPE and rinsing water are available.</li> </ul>

# Job Safety Analysis



## Decontamination Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Working outdoors	Heat stress	<ul style="list-style-type: none"> <li>Adjust work schedules, as necessary, to avoid the hottest part of the day.</li> <li>Take rest breaks as warranted.</li> <li>Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.</li> <li>Maintain body fluids at normal levels.</li> <li>Train workers to recognize the symptoms of heat-related illness.</li> </ul>	<ul style="list-style-type: none"> <li>Review weather forecast prior to field work.</li> <li>Monitor workers' physical conditions.</li> <li>Monitor outside temperature versus worker activity.</li> </ul>
	Cold stress	<ul style="list-style-type: none"> <li>Provide shelter (enclosed, heated environment) to protect personnel during rest periods.</li> <li>Educate workers to recognize the symptoms of frostbite and hypothermia.</li> <li>Use appropriate cold-weather gear, up to and including Mustang-type bib coveralls or jacket/bib combinations.</li> <li>Consider additional precautions if working near water in cold weather.</li> <li>Have a dry change of clothing available.</li> <li>Train workers to recognize the symptoms of cold-related illness.</li> </ul>	<ul style="list-style-type: none"> <li>Review weather forecast prior to field work.</li> <li>Monitor workers' physical conditions and PPE.</li> <li>Monitor outside and water temperature versus worker activity and PPE.</li> </ul>
	Rain or snow	<ul style="list-style-type: none"> <li>Wear appropriate PPE (rain gear).</li> <li>Be aware of slip hazards, puddles, and electrical hazards when working in wet conditions.</li> <li>If extremely cold conditions are forecast, consider additional precautions or postponing work activity.</li> </ul>	<ul style="list-style-type: none"> <li>Review weather forecast prior to field work.</li> <li>Inspect PPE daily prior to use.</li> <li>Routinely inspect work area for deteriorating conditions.</li> </ul>
	Sunshine	<ul style="list-style-type: none"> <li>Have sunscreen available for ultraviolet protection.</li> <li>Have abundant water available to prevent dehydration.</li> <li>Consider wearing wide-brimmed headwear and light-colored, lightweight, sun-blocking clothing.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that sunscreen and water are available.</li> </ul>
	Lightning	<ul style="list-style-type: none"> <li>Do not begin or continue work until lightning subsides for at least 30 minutes.</li> <li>Disconnect and do not use or touch electronic equipment.</li> </ul>	<ul style="list-style-type: none"> <li>Obtain weather forecast and updates as needed.</li> </ul>

# Job Safety Analysis



## Decontamination Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Working outdoors (continued)	High winds	<ul style="list-style-type: none"><li>Wear goggles or safety glasses if dust or debris are visible.</li></ul>	<ul style="list-style-type: none"><li>Review weather forecast prior to field work.</li><li>Ensure that goggles or safety glasses are available.</li></ul>

## Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- If boating is involved, and a professional captained vessel is not in use, boat operators must take the appropriate state or provincial boater safety courses.
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

# Job Safety Analysis



## Anchor QEA Motor Vehicle Operation

<b>Project Name:</b> Chambers Creek Wastewater Treatment Plant Sediment Monitoring	<b>Project Number:</b> 240767-01.01	<b>JSA Number:</b> 005	<b>Issue Date:</b> 12/24/2024
<b>Location:</b> 10311 Chambers Creek Road W, University Place, WA, 98467	<b>Contractor:</b> Anchor QEA, Inc.	<b>Analysis by:</b> Robert Bennington	<b>Analysis Date:</b> 12/19/2024
<b>Work Operation:</b> Anchor QEA motor vehicle operation	<b>Superintendent/Competent Person:</b> Vehicle Driver	<b>Revised by:</b> Robert Bennington	<b>Revised Date:</b> 12/19/2024
<b>Required Personal Protective Equipment (PPE):</b> <ul style="list-style-type: none"> <li>Wear seat belt at all times</li> <li>Make sure that clothing will not interfere with driving</li> </ul>		<b>Reviewed by:</b> Matthew Gruber	<b>Reviewed Date:</b> 12/19/2024
		<b>Approved by:</b> Ariel Blanc	<b>Approved Date:</b> 12/24/2024

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Anchor QEA motor vehicle operation	Unfamiliar with the vehicle	<ul style="list-style-type: none"> <li>Allow yourself some time to get familiar with an Anchor QEA vehicle, a rental vehicle, or one not used often.</li> <li>Test the lights, windshield wipers, hazard lights, horn, parking brake, and other important functions.</li> <li>Review the dashboard controls, steering radius, and overhead and side clearances.</li> <li>Allow extra side, front, and back space around the vehicle while driving or parking an unfamiliar vehicle.</li> <li>Adjust mirrors and the seat while the vehicle is in park.</li> <li>Drive slowly in confined locations, as in a parking garage, parking lots, or industrial settings. Confirm adequate clearances by sight before turning or backing up in tight or unfamiliar locations.</li> <li>Use a second person to be a spotter outside the vehicle if needed in tight spaces.</li> </ul>	<ul style="list-style-type: none"> <li>Inspect fluid levels and air pressure in tires, adjust mirrors and seat positions appropriately, monitor the fuel level, and fill up when the fuel level is low</li> </ul>

# Job Safety Analysis



## Anchor QEA Motor Vehicle Operation

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Anchor QEA motor vehicle operation (continued)	Speed and braking	<ul style="list-style-type: none"> <li>• Fasten and properly adjust the seat belt.</li> <li>• Obey all posted and designated speed limits.</li> <li>• Radar detectors are prohibited in all company-owned, leased, or rented vehicles.</li> <li>• Reduce travel speed during hazardous conditions (e.g., rain, fog, or snow).</li> <li>• Identify whether your vehicle has the Anti-Lock Braking System (ABS). If it does, DO NOT pump the brakes to stop when the vehicle has begun to skid. Apply steady pressure to the brakes. If the vehicle does not have ABS, pump the brakes to stop during slippery conditions.</li> </ul>	<ul style="list-style-type: none"> <li>• Seatbelt</li> <li>• Identify designated speed limits</li> <li>• Determine if vehicle has ABS</li> </ul>
	Distance spacing	<ul style="list-style-type: none"> <li>• Continually check your rear and side view mirrors.</li> <li>• Use the 3-second rule to keep a safe distance between vehicles.</li> <li>• Increase the 3-second rule as necessary during hazardous travel conditions.</li> <li>• Regularly scan the area you will be entering in the next 10 to 12 seconds.</li> <li>• Always leave yourself an "out" during travel.</li> <li>• When stopping, make sure that you leave enough distance between you and the car in front of you. You should be able to see the rear tires of the vehicle in front when stopped.</li> <li>• Obey the speed limit and traffic regulations.</li> <li>• When at a red light and it turns green, use the "delayed start" technique, by counting to three before you take your foot off the brake.</li> <li>• DO NOT TAILGATE.</li> <li>• Keep headlights (and running lights, if available) on for maximum visibility.</li> </ul>	<ul style="list-style-type: none"> <li>• Seatbelt</li> </ul>
	Skids	<ul style="list-style-type: none"> <li>• If the vehicle has begun to skid out of control, turn the steering wheel in the direction of the skid and re-adjust the wheel, as necessary.</li> <li>• Reduce speed during hazardous travel conditions.</li> <li>• Use 4-wheel drive, if available, when driving vehicles off-road, on steep inclines, or in muddy conditions.</li> <li>• Do not take vehicles off-road if they cannot be operated safely in such conditions.</li> </ul>	<ul style="list-style-type: none"> <li>• Seatbelt</li> </ul>

# Job Safety Analysis



## Anchor QEA Motor Vehicle Operation

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Anchor QEA motor vehicle operation (continued)	Blind spots	<ul style="list-style-type: none"> <li>• Become familiar with any blind spots associated with your vehicle.</li> <li>• Adjust mirrors to give the maximum viewing area.</li> <li>• Use your directional devices to signal all turns and when changing lanes; check rear and side view mirror and glance over your shoulder to check that the lane is clear.</li> <li>• Avoid other driver's blind spots; slow down and let the other vehicle pass.</li> <li>• If parked for an extended period and staying in the vehicle, be sure to inspect the area for changed conditions (e.g., a car that moved in behind you) before leaving.</li> </ul>	<ul style="list-style-type: none"> <li>• Seatbelt</li> <li>• Mirrors</li> </ul>
	Backing	<ul style="list-style-type: none"> <li>• Back into parking spaces upon arrival whenever possible.</li> <li>• Perform a 360-degree walk around the vehicle before backing to identify any new conditions or obstructions.</li> <li>• Use a spotter when backing whenever possible.</li> <li>• Understand hand signals.</li> <li>• Sound the horn prior to backing.</li> <li>• Check the rear and side view mirrors prior to backing.</li> <li>• Back slowly in areas of obstructed vision.</li> <li>• Anticipate others who may be backing out into your pathway and adjust accordingly.</li> </ul>	<ul style="list-style-type: none"> <li>• Seatbelt</li> <li>• Mirrors</li> </ul>
	Distractions (e.g., cell phones, reading maps or directions, eating)	<ul style="list-style-type: none"> <li>• Do not engage in distracted driving—focus on operating the vehicle, and on your surroundings (e.g., road conditions and other drivers).</li> <li>• Obey state or local laws regarding cell phone use, at a minimum.</li> <li>• Certain clients prohibit cell phone use regardless of the state you are operating in—know your client's policy.</li> <li>• Use hands-free devices (not hand-held cellular phones) while driving.</li> <li>• Pull over to the side of the road when making a call or checking directions.</li> </ul>	<ul style="list-style-type: none"> <li>• Seatbelt</li> <li>• Hands-free devices connected and ready for use</li> </ul>
	Accidents	<ul style="list-style-type: none"> <li>• In the event of an accident, use the following procedures: <ul style="list-style-type: none"> <li>– Stop, call for medical assistance, notify police, and complete an accident report and submit it to your supervisor.</li> <li>– Notify the Project Manager (PM) and Field Lead (FL).</li> <li>– Complete the appropriate incident investigation reports.</li> <li>– Contact Sara Weiskotten, Operations Liaison, at (857) 445-4987.</li> <li>– Contact Diana Reynolds, Insurance Liaison, at (302) 236-8403.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Seatbelt</li> </ul>

# Job Safety Analysis



## Anchor QEA Motor Vehicle Operation

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Anchor QEA motor vehicle operation (continued)	Influenced by drugs or alcohol	<ul style="list-style-type: none"> <li>• NEVER DRIVE UNDER THE INFLUENCE OF DRUGS OR ALCOHOL.</li> <li>• Keep in mind that the person in another vehicle may be under the influence of controlled substances, and be prepared for erratic or sudden driving changes on their part.</li> </ul>	<ul style="list-style-type: none"> <li>• Seatbelt</li> </ul>
	Driver attitude	<ul style="list-style-type: none"> <li>• Do not operate any vehicle when abnormally tired, temporarily disabled (i.e., injured), or under the influence of drugs or alcohol.</li> <li>• Keep an even temper when driving. Do not let the actions of others affect your attitude.</li> <li>• Do not allow yourself to become frustrated, rushed, distracted, or drowsy.</li> </ul>	<ul style="list-style-type: none"> <li>• Seatbelt</li> </ul>
	Fatigue	<ul style="list-style-type: none"> <li>• Stop and rest if fatigued. Exit the road and enter a safe area. Rest until fully refreshed.</li> <li>• Be aware that certain medications (such as cold or allergy medicines) may make you drowsy when driving a vehicle.</li> </ul>	<ul style="list-style-type: none"> <li>• Seatbelt</li> </ul>
	Vehicle loading	<ul style="list-style-type: none"> <li>• DO NOT OVERLOAD the vehicle.</li> <li>• Secure all equipment and supplies within the body of the vehicle using proper tie-downs.</li> <li>• Do not block side view mirrors with the load.</li> <li>• Do not transport U.S. Department of Transportation (DOT)-manifested hazardous materials.</li> <li>• Dispatch all equipment and personnel with proper forms and identification.</li> </ul>	<ul style="list-style-type: none"> <li>• Seatbelt</li> </ul>
	Equipment failure	<ul style="list-style-type: none"> <li>• Perform daily inspections of your vehicle.</li> <li>• Maintain vehicle safety equipment (e.g., mirrors, alarms, horns, wipers, lights, and brakes).</li> <li>• Maintain the vehicle (e.g., tire pressure and fluid levels).</li> <li>• Any vehicle with mechanical defects that may endanger the safety of the driver, passengers, or the public shall not be used.</li> <li>• Ensure that appropriate safety equipment is in the vehicle. Safety equipment should include a spare tire, jack, first-aid kit, fire extinguisher, and flashlight. Flares and/or reflective triangles should be available in larger trucks.</li> <li>• Ensure that the proper documentation is in the vehicle. Documentation should include an operations manual for the vehicle, insurance card, vehicle registration, and accident forms.</li> </ul>	<ul style="list-style-type: none"> <li>• Inspect and maintain the vehicle</li> </ul>

# Job Safety Analysis



## Anchor QEA Motor Vehicle Operation

### Training Requirements:

- All drivers are required to have a valid driver's license, and all vehicles must have appropriate state vehicle registration and inspection stickers. The use of hand-held wireless devices is prohibited while driving any vehicle for business use at any time, for personal use during business hours, and as defined by law.
- **If operating a vehicle or vehicle and trailer with a capacity greater than 10,000 pounds, U.S. Department of Transportation regulations may apply. Contact the PM prior to any travel in this configuration.**
- All assigned employees are required to read, familiarize themselves with the contents of this Job Safety Analysis, and sign the signature page before the operation of an Anchor QEA vehicle, and review it with their supervisor during their daily safety meeting.
- All assigned employees are required to complete required annual driver training.

# Job Safety Analysis



## Anchor QEA Motor Vehicle Operation

### Vehicle Operation Job Safety Analysis Acknowledgement Form

The Anchor QEA Motor Vehicle Operation Job Safety Analysis must be read, understood, and signed before the operation of any Anchor QEA vehicle. My signature below certifies that I have read and understand the procedures presented in the Anchor QEA Motor Vehicle Operation Job Safety Analysis and have completed annual driver training.

Date	Name (print)	Signature

# Job Safety Analysis



## Anchor QEA Motor Vehicle Operation

Date	Name (print)	Signature

# Job Safety Analysis



## Sample and Laboratory Glassware Handling

<b>Project Name:</b> Chambers Creek Wastewater Treatment Plant Sediment Monitoring	<b>Project Number:</b> 240767-01.01	<b>JSA Number:</b> 006	<b>Issue Date:</b> 12/24/2024
<b>Location:</b> 10311 Chambers Creek Road W, University Place, WA, 98467	<b>Contractor:</b> Anchor QEA, Inc.	<b>Analysis by:</b> Robert Bennington	<b>Analysis Date:</b> 12/19/2024
<b>Work Operation:</b> Sample and laboratory glassware handling	<b>Superintendent/Competent Person:</b> Catherine Banks	<b>Revised by:</b> Robert Bennington	<b>Revised Date:</b> 12/19/2024
<b>Required Personal Protective Equipment (PPE):</b> <ul style="list-style-type: none"> <li>Modified Level D—Long pants, long sleeves, and/or Tyvek coveralls if handling potentially contaminated media, and steel-toed footwear conforming to ASTM International (ASTM) F2412-05/ASTM F2413-05</li> <li>Depending on activity, the following PPE may also be required: safety glasses/splash goggles, hard hat, nitrile outer gloves and latex inner gloves, and, if boating, U.S. Coast Guard-approved personal flotation device (PFD)</li> </ul>		<b>Reviewed by:</b> Matthew Gruber	<b>Reviewed Date:</b> 12/19/2024
		<b>Approved by:</b> Ariel Blanc	<b>Approved Date:</b> 12/24/2024

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Transporting and using glassware	Breakage of containers during field activities	<ul style="list-style-type: none"> <li>Use appropriately sized tubs or bottle carriers with dividers to prevent bottle-to-bottle contact during transport.</li> <li>Consider using coated glassware, if practicable.</li> <li>Carry oversize bottles in tubs or bottle carriers using both hands during transfer to the sampling vessel and whenever the vessel is underway.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure dividers are sufficient and will remain in place during transport.</li> </ul>
	Faulty glassware	<ul style="list-style-type: none"> <li>Replace any glassware that is chipped, nicked, or cracked.</li> </ul>	<ul style="list-style-type: none"> <li>Inspect glassware before use.</li> </ul>
	Impact with equipment and other objects	<ul style="list-style-type: none"> <li>Use care when loading and unloading sampling equipment.</li> <li>Minimize the handling of individual containers to the extent possible.</li> </ul>	
Filling sample containers	Over-tightening of bottle lids causing breakage	<ul style="list-style-type: none"> <li>Avoid use of excessive force to tighten bottle caps (i.e., finger tight).</li> <li>Secure lids with clear tape to prevent opening during transport.</li> </ul>	

# Job Safety Analysis



## Sample and Laboratory Glassware Handling

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Filling sample containers (continued)	Breakage during sample collection	<ul style="list-style-type: none"> <li>Place containers in plastic tubs between aliquots to limit contact with hard surfaces.</li> <li>Place containers on a stable and non-slip surface during collection.</li> <li>Use the buddy system as needed to hold bottles during filling.</li> </ul>	
	Contact with sample preservatives (generally HCL or H <sub>2</sub> SO <sub>4</sub> to lower pH to less than 2)	<ul style="list-style-type: none"> <li>Wear nitrile gloves and protective eyewear to prevent skin and eye contact if a container is damaged.</li> <li>Do not open preserved bottles until necessary.</li> </ul>	
Packing samples for shipment	Breakage during packing and shipment	<ul style="list-style-type: none"> <li>Use bottle wraps, foam sleeves, or bubble wrap to prevent bottle contact in the cooler.</li> <li>Pack coolers snugly, but do not over pack.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure glass bottles do not touch to minimize potential breakage during transport.</li> </ul>
Unpacking glassware returned from a laboratory	Breakage during packing and shipment	<ul style="list-style-type: none"> <li>Carefully inspect cooler contents prior to reaching in with hands.</li> <li>If glassware is broken, utilize cut-resistant gloves or no-touch tool to remove from cooler.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure glassware did not break during packing or shipment.</li> </ul>
	Contact with sample preservatives (generally HCL or H <sub>2</sub> SO <sub>4</sub> to lower pH to less than 2)	<ul style="list-style-type: none"> <li>Wear nitrile gloves and protective eyewear to prevent skin and eye contact in the event that glassware preservatives have leaked into the cooler.</li> </ul>	<ul style="list-style-type: none"> <li>Look for unexpected moisture in cooler.</li> </ul>

## Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including, but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

## Appendix C

### Safety Data Sheets

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MSDS Number: A2052 \* \* \* \* \* Effective Date: 08/03/07 \* \* \* \* \* Supersedes: 02/16/06

**Material Safety Data Sheet**

From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865



24 Hour Emergency Telephone: 908-859-2151  
CHEMTREC: 1-800-424-9300

National Response in Canada  
CANUTEC: 613-996-6666

Outside U.S. And Canada  
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

# ALCONOX®

## 1. Product Identification

**Synonyms:** Proprietary blend of sodium linear alkylaryl sulfonate, alcohol sulfate, phosphates, and carbonates.

**CAS No.:** Not applicable.

**Molecular Weight:** Not applicable to mixtures.

**Chemical Formula:** Not applicable to mixtures.

**Product Codes:** A461

## 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Alconox® proprietary detergent mixture	N/A	90 - 100%	Yes

## 3. Hazards Identification

### Emergency Overview

**CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO EYES AND RESPIRATORY TRACT.**

**SAF-T-DATA<sup>(tm)</sup>** Ratings (Provided here for your convenience)

---

Health Rating: 1 - Slight

Flammability Rating: 0 - None

Reactivity Rating: 0 - None

Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES; LAB COAT; PROPER GLOVES

Storage Color Code: Green (General Storage)

---

**Potential Health Effects**

---

**Inhalation:**

May cause irritation to the respiratory tract. Symptoms may include coughing and shortness of breath.

**Ingestion:**

May cause irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea.

**Skin Contact:**

No adverse effects expected.

**Eye Contact:**

May cause irritation, redness and pain.

**Chronic Exposure:**

No information found.

**Aggravation of Pre-existing Conditions:**

No information found.

---

## 4. First Aid Measures

**Inhalation:**

Remove to fresh air. Get medical attention for any breathing difficulty.

**Ingestion:**

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention.

**Skin Contact:**

Wash exposed area with soap and water. Get medical advice if irritation develops.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

## 5. Fire Fighting Measures

**Fire:**

Not expected to be a fire hazard.

**Explosion:**

No information found.

**Fire Extinguishing Media:**

Dry chemical, foam, water or carbon dioxide.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus

with full facepiece operated in the pressure demand or other positive pressure mode.

---

## 6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8.

Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust. When mixed with water, material foams profusely. Small amounts of residue may be flushed to sewer with plenty of water.

---

## 7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Moisture may cause material to cake. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

## 8. Exposure Controls/Personal Protection

### **Airborne Exposure Limits:**

None established.

### **Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

### **Personal Respirators (NIOSH Approved):**

For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

### **Skin Protection:**

Wear protective gloves and clean body-covering clothing.

### **Eye Protection:**

Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

---

## 9. Physical and Chemical Properties

### **Appearance:**

White powder interspersed with cream colored flakes.

### **Odor:**

No information found.

### **Solubility:**

Moderate (1-10%)

---

**Specific Gravity:**

No information found.

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

0

**Boiling Point:**

No information found.

**Melting Point:**

No information found.

**Vapor Density (Air=1):**

No information found.

**Vapor Pressure (mm Hg):**

No information found.

**Evaporation Rate (BuAc=1):**

No information found.

---

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

No information found.

**Conditions to Avoid:**

No information found.

---

## 11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure.

-----\Cancer Lists\-----

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Alconox® proprietary detergent mixture	No	No	None

---

## 12. Ecological Information

**Environmental Fate:**

This product is biodegradable.

**Environmental Toxicity:**

No information found.

## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

Not regulated.

## 15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
Alconox® proprietary detergent mixture	Yes	No	No	No

-----\Chemical Inventory Status - Part 2\-----				
Ingredient	Korea	DSL	--Canada-- NDSL	Phil.
Alconox® proprietary detergent mixture	No	No	Yes	No

-----\Federal, State & International Regulations - Part 1\-----				
Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Alconox® proprietary detergent mixture	No	No	No	No

-----\Federal, State & International Regulations - Part 2\-----			
Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8 (d)
Alconox® proprietary detergent mixture	No	No	No

Chemical Weapons Convention: No      TSCA 12(b): No      CDTA: No  
 SARA 311/312: Acute: Yes      Chronic: No      Fire: No      Pressure: No  
 Reactivity: No      (Pure / Solid)

**Australian Hazchem Code:** None allocated.  
**Poison Schedule:** None allocated.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: 0 Flammability: 0 Reactivity: 0

**Label Hazard Warning:**

CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO EYES AND RESPIRATORY TRACT.

**Label Precautions:**

Avoid contact with eyes.

Keep container closed.

Use with adequate ventilation.

Avoid breathing dust.

Wash thoroughly after handling.

**Label First Aid:**

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. In all cases, get medical attention.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

MSDS Section(s) changed since last revision of document include: 3.

**Disclaimer:**

\*\*\*\*\*

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\*\*\*\*\*

**Prepared by:** Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

## Appendix D

### Certifications

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# Individual User Report

## Training Summary

### Audrey White

Report Date : May 13,2025

**Name:** Audrey White

Completion History		
Title	Completed	Expiry
Adult First Aid/CPR/AED [ProTrainings]	11/01/2024	11/01/2026
HAZWOPER 3-Day Supervised Field Training [Anchor QEA, LLC]	11/01/2024	-
HAZWOPER 40 Hour Training [Safety Unlimited, Inc.]	11/01/2024	-
HAZWOPER Supervisor 8 Hour Initial [Safety Unlimited, Inc.]	21/08/2024	-
Medical Surveillance Exam [Occupational Health Monitoring]	30/12/2024	30/12/2025
Mercury & Heavy Metals Testing [Occupational Health Monitoring]	12/01/2024	-
Washington L&I WAC 296-800-140 Accident Prevention Program [Anchor QEA, LLC]	29/01/2024	-
Corporate Health and Safety Program Acknowledgment	03/04/2025	03/04/2026
2025 Bloodborne Pathogens In-Person [Anchor QEA]	03-04-2025	03-04-2026
2025 Confined Space Awareness In-Person [Anchor QEA]	03-04-2025	03-04-2026
2025 Fire Extinguisher In-Person [Anchor QEA]	03-04-2025	03-04-2026

2025 HAZWOPER 8-Hour Refresher In-Person [Anchor QEA]	03-04-2025	03-04-2026
2025 Respiratory Protection In-Person [Anchor QEA]	03-04-2025	03-04-2026
All About Non-Permit Confined Spaces [BIZ Library]	16-09-2024	-
Driving Safety: The Basics [MARCOM_BIZ Library]	09-02-2024	-
Driving Safety: The Basics [MARCOM_BIZ Library]	10-03-2025	10-03-2026
Fire Extinguisher Training [Anchor QEA]	10-03-2025	10-03-2026
Inorganic Arsenic Hazard Awareness [Anchor QEA]	29-03-2024	-
Lead Exposure [BIZ Library]	29-03-2024	-
Mercury Safety [Anchor QEA]	29-03-2024	-

## Appendix E

### Heat and Cold Exposure Program

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Document No.: TBD  
Revision No.: 01  
Issue Date: July 12, 2024  
Corporate Health and Safety

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# Heat and Cold Exposure Program



July 12, 2024  
Corporate Health and Safety

# Heat and Cold Exposure Program

**Prepared by**  
Anchor QEA  
1201 3rd Avenue, Suite 2600  
Seattle, Washington 98101

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## Purpose and Scope

Anchor QEA is committed to providing a safe and healthy work environment for all employees. In pursuit of this goal, the purpose of the following program is to apply general principles and sound decision-making to reduce risk. It is Anchor QEA's intent to help employees make safety-related decisions at any time—including the decision to Stop Work if conditions appear, or may become, unsafe. This program has been developed to provide guidance to staff regarding heat and cold exposure.

## Program Responsibilities

All employees are required to follow the minimum procedures outlined in this program.

**Management.** Along with providing financial and leadership support, Anchor QEA management will assist Health and Safety, managers, field leads, and employees with complying with this program.

**Health and Safety.** Health and Safety is responsible for the following:

- Ensuring safety hazards are corrected as soon as possible
- Providing guidance and support regarding heat and cold exposure
- Reviewing this program annually and revising if necessary
- Ensuring necessary training is provided to employees

**Managers and Field Leads.** Managers and field leads are responsible for the following:

- Identifying conditions where exposure to heat and cold is possible and implementing proper controls
- Ensuring employees understand this program
- Ensuring employees comply with all aspects of this program
- Ensuring the necessary elements are part of the site-specific plan(s)
- Taking personal factors into consideration before assigning a task where there is a possibility of a heat- or cold-related illness occurring
- When indoor work conditions at company or client facilities exceeds 82°F, implementing additional controls in coordination with Health and Safety
- Understanding what conditions and practices are considered outdoor environments, including inside vehicles, sheds, tents, manholes, tunnels, or outside vaults without sufficient cooling, heating, or airflow
- Allowing for adequate rest breaks in shady or climate-controlled areas at appropriate frequencies depending upon temperatures and heat or cold index
- Documenting outdoor temperatures and heat/cold index at least every 2 hours on the Heat Stress Monitoring Record Form

- Field leads, or their designee, will serve as the heat and cold exposure safety coordinator for the particular work site.

**Employees.** Employees are responsible for the following:

- Reporting safety hazards to their manager, field lead, or Health and Safety
- Following the safe work practices outlined in this program
- Immediately notifying a manager or field lead if they experience signs or symptoms of a heat- or cold -related illness
- Understanding that those who work outdoors in cold weather could be exposed to cold stress

## Heat Exposure Management

This program is intended to be used primarily from May to September of each year; however, depending on temperatures it may also be needed during other months. Heat-related illnesses can happen if workplace activities in a hot environment overwhelm the body's ability to cool itself. This becomes more likely if any risk factors are present. Examples include working in a hot environment without adequate access to water for rehydration, working in protective gear that does not allow air circulation across the skin, and working where the humidity is too high for sweat to evaporate.

This program should be used for anyone working outdoors more than 15 minutes in any 60-minute period in heat index temperatures, as follows:

- As low as 52°F when wearing clothing that is non-breathable or that provides a vapor barrier, such as rain gear, chemical-resistant suits, or Level A suits
- At least 77°F when wearing double -layer woven clothing such as sweatshirts, coveralls, and jackets on top of other clothes
- At least 80°F when wearing any other type of clothing such as typical shirts and pants

Some individuals—for example, individuals who are not acclimatized or who come to work dehydrated—are more susceptible to heat stress than others.

## Prevention Measures

The field team shares responsibility for safety at the work site. This includes watching out for oneself and others because heat illness can become life threatening quickly if unnoticed or ignored. Any worker should speak up if they notice anything that could be unsafe or result in someone getting hurt or sick.

### *Set Up the Work Site for Shade*

Before work begins, the field lead will assess shade options for the work site. Shade from trees, walls, or structures like a portable canopy can be used. Fans can help if the air temperature does not go

above 95°F, but if air-conditioned spaces, such as cabs, are available, they can be used to cool individuals. The field lead is responsible for ensuring that equipment is available, functional, transported, and set up properly. More than one shaded area may be needed for rest breaks depending upon the size of the site and whether employees are working in a hot zone and choose to take a break in a suitable hot zone area. Such areas will not be used for consumption of food. The shade area must either be open to the air or provide mechanical ventilation for cooling. Shade must be provided with outdoor temperatures greater than 80°F. If an employee asks for a cool-down rest period, this request shall not be denied.

The area of shade present must be at least large enough to allow the staff on recovery or rest periods to sit in a normal position fully in the shade. The shade must be as close as practical to the areas where staff are working. Shade present during meal periods must be large enough to accommodate the number of staff that remain on site during the meal period. If shade cannot be provided because of safety or feasibility concerns, alternative cooling measures must be implemented.

### *Schedule Work to Reduce Heat Exposure*

The field lead, in coordination with the project manager, will consider changes in shift timing to avoid working during the hottest period of the day. This could include starting earlier, working in the evening, or splitting the day with a break during the hottest part of the day.

### *Stay Hydrated*

Staff should not wait to be thirsty to drink water, and they should not drink it all at once. In fact, it is best to start drinking water before work and to drink small amounts often throughout the day to stay hydrated. Additional water breaks are allowed during hot days. Potable water should be cool (66°F to 77°F) or cold (35°F to 65°F). During moderate activity in moderately hot conditions, staff should drink about 8 ounces of liquid every 15 to 20 minutes. The opportunity to drink at least one quart of water per hour should be provided and the water should be potable and of sufficient coolness. Water sources used for drinking water at work sites should be either bottled water or from sources having backflow preventers. Multi-use cups and/or use of hoses to deliver water are not acceptable.

Sports drinks low in sugar are all right but should not completely replace water. Drinks with caffeine and high sugar content, like sodas, should be avoided because they will not provide sufficient hydration.

The field lead will ensure enough water is available to allow each staff member to drink at least a quart of water each hour (at least 1 cup every 15 minutes) and that it is consumed on a regular basis.

Staff should be encouraged to eat regular meals and snacks because they provide enough salt and electrolytes to replace those lost through sweating—if enough water is consumed.

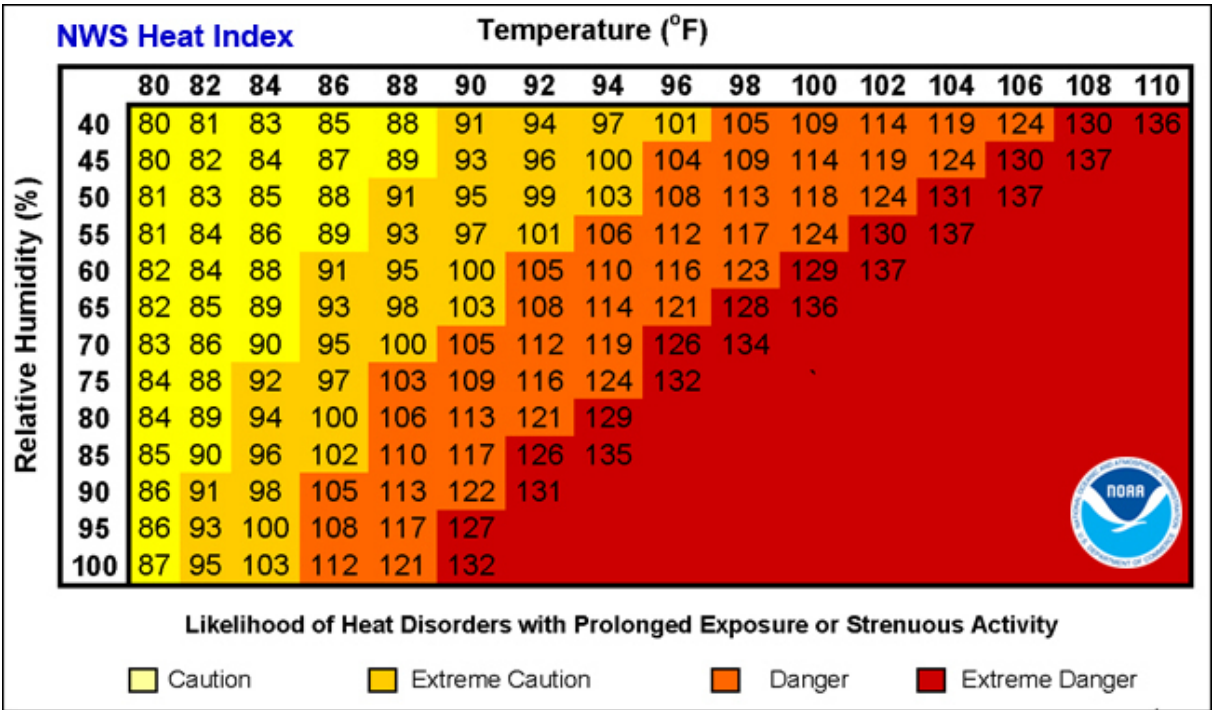
*Allow Time to Adjust to Heat (Acclimatization)*

It takes about 2 weeks to fully adjust to hot working conditions. This adjustment is lost if a worker is away from the hot conditions for a week or more. Acclimatization is especially critical for heavy work in hot temperatures.

To acclimatize, start with light physical work for short durations of work time and slowly increase each day. Increase by 20% (of the total shift) each day for non-acclimatized staff. Those that are in the process of acclimatization shall be observed more closely through the buddy system and/or by the field lead for signs and symptoms related to extreme heat or extreme cold. The observation methods for such individuals should be documented. Closer observation should be performed during heat waves when the predicted high temperature is at least 10 degrees higher than the average high temperature in the preceding 5 days.

*Training*

Each year, staff who may encounter the working conditions just discussed will be provided with safety training on the dangers of outdoor heat exposure, the steps Anchor QEA takes to protect them, and actions they must follow to prevent heat-related illness. This information will also be covered during tailgate meetings at the project site.



Source: <https://www.weather.gov/images/safety/heatindexchart-650.jpg>

## High Heat Practices

The following additional high-heat practices must be implemented when the ambient heat index exceeds 90°F:

- Ensure that effective communication by voice, observation, or electronic means is maintained so that staff at the work site can contact a supervisor when necessary. An electronic device, such as a mobile phone or text messaging device, may be used for this purpose only if reception in the area is reliable.
- Ensure that staff are observed for alertness and signs and symptoms of heat illness and are monitored to determine whether medical attention is necessary by implementing one or more of the following:
  - Establish regular communication with staff working alone, such as by radio, mobile phone, or other alternative means.
  - Create a mandatory buddy system.
  - Implement other equally effective means of observation or communication.
- The field lead must designate and equip one or more staff on the work site as authorized to call for emergency medical services and must allow other staff to call for emergency services when designated staff are not immediately available. (Such a practice supplements existing requirements to ensure that emergency medical care is immediately available in all workplaces.)
- The field lead must ensure that each staff member takes a minimum 10-minute preventative cool-down rest period in the shade at least every 2 hours, regardless of the overall length of the shift.

## Responding to Heat-Related Illness

Let a supervisor or someone nearby know if you or a coworker are experiencing any signs or symptoms of heat-related illness and take immediate action to ensure things do not get dangerously worse.

- Time is critical. Get the individual away from the hot area into a cool, shaded area. Quick action increases the chances for a full recovery. Means to either lead or transport such individuals to shaded areas should be addressed in the project-specific safety plan.
- Let the individual rest and drink cool water.
- Remove any personal protective equipment (PPE) as appropriate.
- Use ice packs or cooling towels as appropriate and available.
- Never leave an individual who is experiencing heat-related problems alone; things could get worse.
- If the individual is a lone worker, an Anchor QEA representative will stay on the line with the individual and emergency services will be called to the individual's location unless a representative of Anchor QEA or another company can quickly arrive at the location.

- If the individual does not respond quickly, call emergency medical services.
- Follow the steps in the main HASP for notifying emergency services to include directions to the site.
- If the individual is in a remote or non-developed area with unidentified roads, someone may be designated to meet emergency services at the closest point and guide them to the victim's location.
- Notify Health and Safety.

If an individual receives medical attention, a written authorization must be obtained from the provider indicating that the individual can get back to work and specifying any restrictions or limitations.

## Risk Factors

The following are environmental risk factors for heat illness:

- Air temperature above 90°F
- Relative humidity above 40%
- Radiant heat from the sun and other sources
- Conductive heat sources such as dark-colored work surfaces
- Lack of air movement
- Physical effort needed for the work
- Use of non-breathable protective clothing and other PPE

The following are personal risk factors for heat illness:

- Lack of acclimation to warmer temperatures
- Poor general health
- Dehydration
- Alcohol consumption
- Caffeine consumption
- Previous heat-related illness
- Use of prescription medications that affect the body's water retention or other physiological responses to heat, such as beta blockers, diuretics, antihistamines, tranquilizers, and antipsychotics

## Heat-Related Illnesses

### *Heat Rash*

Heat rash is the most common health problem in hot work environments. It is caused by sweating and looks like a red cluster of pimples or small blisters. Heat rash usually appears on parts of the

body that overlap or rub other parts of the body, such as in the groin, under arms or breasts, and in knee or elbow creases. If an individual has symptoms of heat rash, provide a cooler, less humid work environment, if possible. Advise the individual to keep the area dry and not to use ointments and creams that make the skin warm or moist because they can make the rash worse.

### *Heat Exhaustion*

Heat exhaustion can best be prevented by being aware of one's physical limits in a hazardous environment on hot, humid days. It is especially important to drink enough clear fluids (especially water, not alcohol or caffeine) to replace fluids lost to perspiration. Signs and symptoms of heat exhaustion typically include the following:

- Profuse sweating
- Weakness and fatigue
- Nausea and vomiting
- Muscle cramps (associated with dehydration)
- Headache
- Light-headedness or fainting (fainting or loss of consciousness is potentially serious and should be treated as a medical emergency)

When you recognize heat exhaustion symptoms in an individual, you must intervene; stop the activity, and move the individual to a cooler environment. Cooling off and rehydrating with water (or electrolyte-replacing sports drinks) is the cornerstone of treatment for heat exhaustion. If the individual resumes work before their core temperature returns to normal, symptoms may quickly return.

If there is no intervention and the body's temperature regulation fails, heat exhaustion can rapidly progress to heat stroke, a life-threatening condition!

### *Heat Stroke*

Heat stroke requires an immediate emergency medical response. The individual may stop sweating, become confused or lethargic, and may even have a seizure! Their internal body temperature may exceed 106°F. Signs and symptoms of heat stroke typically include the following:

- Absence of sweating
- Dry skin
- Agitation or strange behavior
- Dizziness, disorientation, or lethargy
- Seizures or signs that mimic those of a heart attack

Ensure that emergency responders are summoned immediately if heat stroke is suspected. While waiting for emergency responders to arrive, move the individual to an air-conditioned environment or a cool, shady area and help them remove any unnecessary clothing. Do not leave the individual unattended. Heat stroke requires immediate medical attention to prevent permanent damage to the brain and other vital organs that can result in death.

## Responsibilities

Staff need to be aware of the following:

- How heat can make them sick and how to recognize the common signs and symptoms of heat-related illness in themselves and coworkers. The four most common signs and symptoms are heat rash, heat cramps, heat exhaustion, and heat stroke.
- The environmental factors that increase risk for heat-related illness, such as higher temperatures, humidity, sunlight (working in direct sunlight makes it feel about 15°F hotter), additional sources of heat such as powered equipment and asphalt, the lack of wind, their level of physical activity, and wearing PPE or layers of clothing
- Personal factors that may increase susceptibility to heat-related illness—including age, not being acclimatized, medical conditions such as hormonal and heart issues and diabetes, dehydration, and the use of substances that can affect the body's response to heat such as drugs, alcohol, caffeine, nicotine, and medications
- The importance of removing heat-retaining PPE such as non-breathable chemical-resistant clothing during all breaks to allow the body to cool down
- How to stay well hydrated by drinking small quantities of water or other acceptable beverages frequently throughout the day
- The importance of acclimatization (to get used to the hot working conditions). It takes about 5 days to start and 2 weeks to be fully acclimated.
- How to immediately report signs or symptoms of heat-related illness they experience or observe in coworkers and how to immediately respond to prevent the situation from becoming a medical emergency
- The importance of closely observing new workers and newly assigned workers working in hot areas during a 14-day acclimatization period, as well as all workers during a heat wave. Utilize the buddy system.
- How to identify and what to do during a heat-related medical emergency (e.g., potential heat stroke)

In addition, supervisors also need to know the following:

- How to implement the heat-related illness prevention plan, including the acclimatization schedule; how to keep track of environmental conditions throughout the day including how to check weather reports; when to increase the number of breaks or stop work early; checking

that staff are accessing shade and water (especially for mobile operations); encouraging staff to stay hydrated; and communicating with lone workers to ensure they are safe. The free OSHA-NIOSH Heat Safety Tool app could be helpful:

<https://www.cdc.gov/niosh/topics/heatstress/heatapp.html>.

- When to provide PPE such as cooling vests and gel-filled bandanas
- What the supervisor needs to do if an individual shows signs and symptoms of possible heat-related illness, including appropriate emergency response procedures and how to transport any affected staff to a medical service provider

## Sources

<https://osha.oregon.gov/OSHAPubs/pubform/heat-sample-program.pdf>

<https://www.lni.wa.gov/safety-health/docs/HRIAPPAddendum.doc>

## Cold Weather and Cold Stress Management

Observe the following procedures and practices regarding cold stress:

- Conduct an assessment to determine the types of work that could expose staff to cold stress on work sites.
- Walkways and travel ways should be sanded, salted, or cleared of snow and ice as soon as practicable.
- Take breaks in heated shelters when working in extremely cold temperatures.
- Upon entering the shelter, remove the outer layer of clothing and loosen other layers to promote evaporation of perspiration.
- Drink warm liquids to reduce susceptibility to cold stress.
- Be aware of cold stress symptoms, including shivering, numbness in the extremities, and sluggishness.
- Provide adequate insulating dry clothing to maintain warmth if work is performed in air temperatures below 40°F. Wind chill cooling rates and the cooling power of air are critical factors. The higher the wind speed and the lower the temperature in the work area, the greater the insulation value of the protective clothing required.
- If the air temperature is 32°F or less, hands should be protected.
- If only light work is involved and if the clothing on a worker may become wet on the job site, the outer layer of the clothing in use should be impermeable to water. With more severe work under such conditions, the outer layer should be water repellent, and the outer wear should be changed as it becomes wet. The outer garments should include provisions for easy ventilation to prevent wetting of the inner layer by sweat.

- If available clothing does not give adequate protection to prevent cold injury, work should be modified or suspended until adequate clothing becomes available or weather conditions improve.
- Cold weather supplies will be regularly inspected and restocked when necessary.
- Implement a buddy system in which site personnel are responsible for observing fellow workers for early signs and symptoms of cold stress.
- Take proper precautions around snow and ice buildups to include barricading the areas and keeping people out. Snow and ice buildup can create hazards of engulfment or the snow or ice collapsing on individuals.

## Signs, Symptoms, and Treatment

Cold stress can range from frostbite to hypothermia. The signs and symptoms of cold stress are listed here. The appropriate guidelines should be followed if any personnel exhibit these symptoms:

**Frostbite.** Frostbite is characterized by pain in the extremities and loss of manual dexterity. "Frostnip," or reddening of the tissue, is accompanied by continuous shivering and tingling or loss of sensation in the extremities.

**Hypothermia.** Hypothermia is characterized by pain in the extremities and loss of manual dexterity, with severe, uncontrollable shivering, and an inability to maintain the level of activity. Symptoms include excessive fatigue, drowsiness, irritability, or euphoria. Severe hypothermia includes clouded consciousness, low blood pressure, pupil dilation, cessation of shivering, unconsciousness, and possible death.

**Trench foot.** According to the Centers for Disease Control and Prevention, symptoms of trench foot include a tingling and/or itching sensation, pain, swelling, cold and blotchy skin, numbness, and a prickly or heavy feeling in the foot. The foot may be red, dry, and painful after it becomes warm. Blisters may form, followed by skin and tissue dying and falling off. In severe cases, untreated trench foot can involve the toes, heel, or entire foot.

Move the individual to a warm, dry place. If the individual's clothing is wet, remove it and replace it with dry clothing. Keep the individual warm. Re-warming of the individual should be gradual to avoid stroke symptoms. Dehydration, or the loss of body fluids, may result in a cold injury due to a significant change in blood flow to the extremities. If the individual is conscious and alert, warm sweet liquids should be provided. Coffee and other caffeinated liquids should be avoided because of their diuretic and circulatory effects. Extremities affected by frostbite should be gradually warmed and returned to normal temperature. Moist compresses should be applied; begin with lukewarm compresses and slowly increase the temperature as changes in skin temperature are detected. Keep the individual warm and calm and move them to a medical facility as soon as possible.

Cold Water Work

When the combined air and water temperature is below 90°F, field personnel working on or near water shall wear either a float coat and bib overalls (e.g., a full two-piece “Mustang” survival suit or similar) or a one-piece survival suit. Suits or float coats shall be U.S. Coast Guard-approved. If extremely cold or severe weather conditions are forecast, work activities should be postponed. Work activities will be continually reviewed, and adjustments will be made if wearing a survival suit during work activities potentially poses a hazard due to warm air temperatures or to limited mobility or agility. In addition, proximity of water work to shore and the scope, duration, and timing of work activities will be considered when stipulating the above requirement. Overall, if watercraft will be used during work, or work will be conducted near water, it is imperative that site-specific conditions are considered and evaluated so that proper safeguards and procedures are in place prior to beginning work.

Employee Training

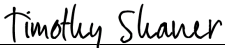
Employees should be regularly trained on heat and cold exposure. They should be trained initially and annually regarding the health effects of heat and cold exposure. Employees responsible for supervising staff, where heat and/or cold exposure are a risk, will be trained in preventing heat- and cold-related illnesses prior to supervising employees. This includes training on Anchor QEA’s heat and cold illness emergency response procedures. Additionally, all field staff should be current on first aid training to include heat and cold exposure.

Periodic Program Review

At least annually, Health and Safety will conduct a review to assess the progress and success of the program.

John Colvin  
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Author’s Name

Health and Safety Manager/Industrial Hygienist  
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Title

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**Revision History**

Revision No.	Issue Date of Revision	Revision Changes
01	07/12/2024	Minor updates due to the Proposed Heat Injury and Illness Prevention Plan (HIIPP) Federal Standard