**Lower Duwamish Waterway Group**

*Port of Seattle / City of Seattle / King County / The Boeing Company*

# QUALITY ASSURANCE PROJECT PLAN:

## PRE-DESIGN SURVEYS OF THE LOWER DUWAMISH WATERWAY MIDDLE REACH

## FINAL

**Prepared for:**

**The U.S. Environmental Protection Agency**
**Region 10**
Seattle, WA

**October 19, 2021**

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# TITLE AND APPROVAL PAGE

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| | | |
|---|---|---|
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# ABBREVIATIONS

| | |
|---|---|
| QAPP | quality assurance project plan |
| DGPS | differential global positioning system |
| DQO | data quality objective |
| DTM | digital terrain model |
| Ecology | Washington State Department of Ecology |
| EPA | U.S. Environmental Protection Agency |
| FS | Feasibility Study |
| GIS | geographic information system |
| GPS | global positioning system |
| HASP | Health and Safety Plan |
| LDW | Lower Duwamish Waterway |
| LiDAR | light detection and ranging |
| LDWG | Lower Duwamish Waterway Group |
| MLLW | mean lower low water |
| NAD | North American Datum |
| NOAA | National Oceanic and Atmospheric Administration |
| NWH | Northwest Hydro, Inc. |
| PDI | Pre-Design Investigation |
| POS/MV | Position and Orientation System for Marine Vessels |
| QC | quality control |
| RD | Remedial Design |
| ROD | Record of Decision |
| RM | river mile |
| RTK | real-time kinematic |
| S/V | survey vessel |
| SVP | sound velocity profiles |
| TPU | Total Propagated Uncertainty |
| True North | True North Land Surveying, Inc. |
| USACE | U.S. Army Corps of Engineers |

# 1 Introduction

This quality assurance project plan (QAPP) describes the methods and quality control (QC) for conducting riverbed elevation surveys for the Lower Duwamish Waterway (LDW) middle reach (river miles [RM] 1.6 to 3.0), consistent with the Lower Duwamish Waterway Fifth Amendment of the Administrative Order on Consent (EPA 2021). Bathymetric surveying (using a survey vessel) will need to be conducted over all aquatic areas between RM 1.5 to 3.0 to the extent practicable, to support the design of the remedy in the middle reach.

This Survey QAPP is focused on bathymetric surveying methods and QC, in order to expedite collecting bathymetric data to inform the Remedial Design (RD) and Pre-Design Investigation (PDI) Work Plans. Topographic surveying (or land surveying) may be needed in shoreline areas where remedial action is determined to be required, but a topographic survey will not be needed throughout the entire middle reach. Because final remedial action areas will be determined after future PDIs are completed, topographic surveying will be conducted at a future date, to be determined. Topographic survey methods and QC will be described in a QAPP addendum prior to conducting required topographic surveys.

Access restrictions and river conditions (e.g., moored vessels and tidal elevations) at the time of the initial bathymetric survey may prevent obtaining all bathymetric data required for RD in one survey event, but an initial expedited bathymetric survey is proposed to support the development of the RD Work Plan and related documents (e.g., PDI Work Plan). Additional bathymetric survey(s), if needed to obtain full coverage of the LDW middle reach, will be proposed in the PDI Work Plan. The scope of any additional bathymetric surveys would be proposed to the U.S. Environmental Protection Agency (EPA) for review; the initial and any subsequent bathymetric surveys will follow the methods and QC procedures as described in this QAPP.

EPA guidance for QAPPs was followed in the preparation of this project plan (EPA 2002). This plan is organized into the following sections:

- Section 2 – Project Management and Data Quality Objectives
- Section 3 – Data Generation and Acquisition
- Section 4 – Assessment and Oversight
- Section 5 – Data Validation and Usability
- Section 6 – References

# 2 Project Management and Data Quality Objectives

## 2.1 Project Organization

The bathymetric survey will be conducted by Northwest Hydro, Inc. (NWH), under the direction of Anchor QEA. Anchor QEA will be responsible for overall project coordination and for performing the administrative tasks needed to ensure timely and successful completion of the project. Anchor QEA will also be responsible for communicating with King County, the Lower Duwamish Waterway Group (LDWG), and EPA on schedule, any significant deviations from the QAPP, and administrative details. NWH will be responsible for conducting the survey, conducting post-processing of the survey data, and for reporting deviations from the QAPP to the Anchor QEA project manager.

Tom Wang will serve as the Anchor QEA project manager:

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Jo Miller, of True North Land Surveying, Inc. (True North), will serve as the quality assurance manager for the bathymetric survey.

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True North is part of the overall surveying team for the project, primarily responsible for topographic surveying, and is not directly involved in collecting bathymetric survey data.

## 2.2 Problem Definition and Background

The last sitewide bathymetry survey of the middle reach was completed in 2003. Updated[1] bathymetric survey data are required to inform the PDI and provide a base map for the RD. The bathymetric data are planned to be used to:

- Establish the current waterway bed elevations in the LDW middle reach.
- Develop an accurate base map, representative of current bathymetric conditions, which is needed to develop engineering drawings and quantity calculations.
- Provide physical conditions information, as noted in Table 23 of the Record of Decision (ROD), to help refine, if needed, areal designations of Recovery Categories, which is also based, in part, on the Sediment Transport Modeling completed during the LDW Feasibility Study (FS) in 2012; and the Waterway User Survey (Integral 2018) and contaminated trends analysis summarized in the Recovery Categories Recommendation Report (Integral 2019), completed during the LDW Third Amendment to the Administrative Order on Consent.
  - Update the delineation of potential vessel scour areas identified in the FS (AECOM 2012), to inform Recovery Category designation
  - Provide the data to generate new sun illumination maps that identify areas with scour from propellers and other vessel interactions with the sediment
  - Update the depth contours that define the upper and lower bounds for the propeller scour potential area
- Use updated bathymetric elevations to inform sampling locations for the PDI. Bed elevations will be considered when selecting sample locations.
- Use updated bathymetric survey to identify elevations of new surface and subsurface data.

## 2.3 Project Description

A multibeam bathymetric survey will be performed to produce an accurate, up-to-date bathymetric dataset containing bank-to-bank data (where possible) for the LDW middle reach RD, addressing the data needs identified in Section 2.2. As much as possible, the survey will be performed at high tide when surveying near shorelines, to allow collection of

[1] The U.S. Army Corps of Engineers (USACE) periodically surveys the navigation channel of the LDW, and survey data from the USACE will be evaluated in the PDI.

data as high as possible on the banks of the waterway using bathymetric multibeam survey equipment. Limited use of single-beam equipment may need to be implemented in areas of very shallow water depth where the multibeam equipment may not be as effective. All single-beam data collection will occur as a separate survey event on separate calendar days.

Data coverage will be extended downstream of the LDW middle reach boundary to the extent practicable to provide overlap for potential future survey work and to allow for engineering evaluations along the boundaries of the study area. The bathymetric survey coverage area will extend from RM 1.5 to RM 3.0, as shown on Figure 1. The downstream coverage will extend 0.1 RM past RM 1.6 to ensure adequate survey coverage; the 2019 bathymetric survey of the LDW upper reach extended downstream of RM 3.0 to RM 2.75, so surveying to RM 3.0, the boundary between the upper and middle reaches, will provide overlap with the previous survey on the upstream boundary. Due to the potential that vessels or barges may limit survey access to some middle reach areas, more than one bathymetric survey event may be needed to provide full coverage of the middle reach.

Future topographic surveys may be needed in shoreline areas where remedial action is determined to be required and will be performed at low tide to allow overlap with the bathymetric survey data; topographic surveying methods will be described in a separate Survey QAPP addendum. Bathymetric data will be collected using methods described in Sections 3 through 5 of this QAPP, to meet the needs identified in Section 2.2.

The bathymetric survey will be performed as soon as practical after receiving EPA approval of this QAPP, considering factors such as the occurrence of daytime high tides, to allow for the use of the information in preparation of the middle reach RD and PDI Work Plans. The schedule for completing the survey and preparing deliverables is presented in Section 3.2.5.

## 2.4 Data Quality Objectives and Criteria

The data collection and targeted methods selected for this survey will be implemented using state-of-the-art equipment and technology and will meet the data needs presented in Sections 2.2 and 2.3. The completeness of final data (i.e., areal coverage) will be evaluated in consultation with EPA to determine if there are data gaps requiring further bathymetric surveying to support RD, and the need for alternative surveying methods (e.g., single-beam bathymetric survey or light detection and ranging [LiDAR]).

The overall data quality objectives (DQOs) for this project include the following elements:

1. Provide the bathymetric data to generate new sun illumination maps that identify areas with scour from propellers and other vessel interactions with the sediment; this information will be used to potentially modify the Recovery Category area designations.
2. Define the current bathymetry of the LDW middle reach with sufficient confidence (as presented in the accuracy discussion in this section) to inform selection of sampling locations for PDI data collection to support the RD.
3. Provide a base map, subject to modification with the addition of follow-up bathymetric and topographic survey data, if needed, for the RD.

The DQOs were developed in conformance with the *Guidance for the Data Quality Objectives Process* (EPA 2000) and are outlined in Table 1. Parameters used to assess data quality include precision, bias, accuracy, representativeness, comparability, completeness, and sensitivity. These data quality parameters are discussed as follows:

**Precision:** The measure of agreement among repeated measurements will be evaluated during data processing using a HyPack HySweep multibeam editor by comparing overlapping swaths. During swath editing, each individual swath will be color-coded to allow for comparison of horizontal and vertical features from swath to swath.

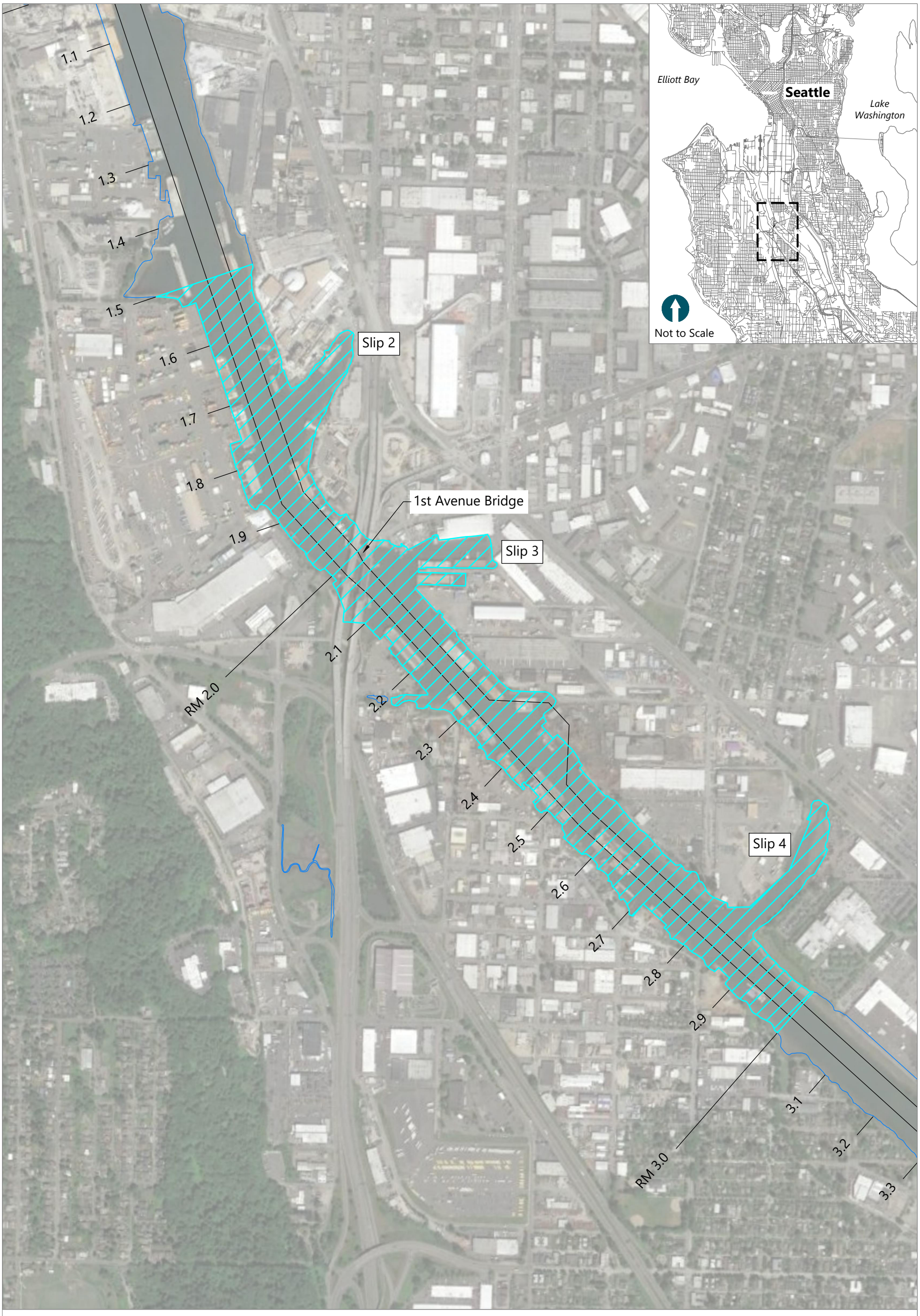
**Bias:** Bathymetric surveying methods are not prone to systemic or persistent distortions that cause errors in one direction. Corrections for various distortions are discussed in Section 3.2. Readings from the multibeam survey will be referenced to control points to tie into topographic surveys and for comparison to previous bathymetric information.

**Accuracy:** The target horizontal accuracy is 3 feet at a 95% confidence level, and target vertical accuracy is +/- 0.5 foot at a 95% confidence level.[2] These accuracy levels meet or exceed the minimum performance standards for measurement and payment level surveys for soft bottom material navigation and dredging support surveys in the U.S. Army Corps of Engineers (USACE) Hydrographic Surveying Engineering Manual (USACE 2013). Accuracy will be demonstrated in the cross-line analysis,[3] which provides a confidence level for each sonar beam. Additionally, Total Propagated Uncertainty (TPU) data will be calculated in

[2] Although data are collected and processed using metric units with the hydrographic information processing system (see Section 3.4), final maps will be produced in units of feet for consistency with previous surveys in the LDW.

[3] Cross-line analysis is a method of quality assurance that compares measurements made at intersecting points from survey lines run across the primary survey lines to the data obtained from the same points on the primary survey lines.

accordance with USACE Hydrographic Survey Manual – Appendix D. The horizontal and vertical datums for the survey are identified in Section 3.1.




**SOURCE:** Aerial by Google Earth dated 5/26/18.

**LEGEND:**

Bathymetric Survey Area

RM 3.0 — River Mile

0 800

Feet

Publish Date: 2021/09/22 9:51 AM | User: jbigsby
Filepath: K:\Projects\0067-King County\LDW Upper Reach Engineering Services\0067-RP-018 LDW Bathy-Middle Reach.dwg Figure 1

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**Figure 1**
**Coverage for Bathymetric Survey of the Lower Duwamish Waterway Middle Reach**

Quality Assurance Project Plan
Pre-Design Surveys of the Lower Duwamish Waterway Middle Reach

**Table 1**
**DQO Process for Bathymetric Survey**

| DQO Step | DQO No. 1<br>Inform Recovery Category Designation Modifications | DQO No. 2<br>Inform Selection of Sampling Locations | DQO No. 3<br>Provide a Base Map for the Remedial Design |
|---|---|---|---|
| 1. State the Problem | Recovery Categories were identified based on lines of evidence indicated in the ROD. These include using 2003 bathymetric data, sediment-transport modeling output, empirical chemistry data, and the waterway user survey. Bathymetric data are now more than 18 years old and may not reflect current navigational uses of the waterway. | The selection of sediment and geotechnical sampling locations for PDI and RD should be informed by bathymetric conditions. Establishing required elevations for remedial actions needs accurate bathymetry elevations. | The current site base map is based on bathymetric data that are more than 18 years old. Current data are needed to design activities such as dredging and capping, and to calculate accurate quantities. |
| 2. Identify the Decision | Recovery Category designation areas will be reviewed during RD using new bathymetric data (sun illumination maps) to assess evidence of vessel scour or other disturbances to the bed (as one line of evidence to inform potential recovery category modifications). | The results of the bathymetric survey will be considered when selecting sampling locations. RD sampling data will be referenced to elevations from the new bathymetric survey. | Current bathymetry mapped to a contour interval of 1.0 foot will be used in the RD to define extents of remedial construction activities (such as dredging and capping), calculate quantities, and define water depths to inform contractor's equipment selection to perform construction activities. |
| 3. Identify the Inputs to the Decision | The density of bathymetric survey data and the accuracy of the survey method will follow USACE hydrographic survey guidance for design-level surveys and be sufficient to have confidence that the bathymetric surface created from the survey is representative of actual conditions. | | |
| 4. Define the Boundaries of the Study | The boundaries of the study are defined by the Record of Decision, the Fifth Amendment to the Administrative Order on Consent, and the scope of work as RM 1.6 to .3.0. To the extent practicable, the sediment surface between RM 1.5 and 3.0 will be surveyed. | | |

| DQO Step | DQO No. 1<br>Inform Recovery Category Designation Modifications | DQO No. 2<br>Inform Selection of Sampling Locations | DQO No. 3<br>Provide a Base Map for the Remedial Design |
|---|---|---|---|
| 5. Develop a Decision Rule | Established techniques for collecting and processing bathymetric survey data, including QC and quality assurance, will be used to collect data. The techniques are described in Sections 3 through 5. | | |
| 6. Specify Tolerable Limits on Decision Errors | The probability of decision errors will be minimized through strategies to minimize statistical sampling errors and measurement errors. "Sampling errors," which in the context of a bathymetric survey are a failure to account for the variability of the bathymetry, are addressed by the data density in the design of the survey. Several techniques are used to detect and correct for measurement errors. Survey design is described in Section 3.1, QC techniques are described in Section 3.5, and data validation is described in Section 5. | | |
| 7. Optimize the Design for Obtaining Data | The bathymetric survey methods, equipment, and spacing of survey lines were selected to provide data that would meet the needs of the RD project. The details of the survey design are described in Section 3.1. | | |
| 8. Applicable Survey Method to Meet DQO | Bathymetric Survey | Bathymetric Survey | Bathymetric and Topographic Surveys |

**Representativeness:** The overall degree to which the data appropriately reflect the LDW environment will be evaluated through visual analysis of the resulting sun-illuminated image to identify data anomalies or artifacts, and through comparison to prior surveys.

**Comparability:** The results of the 2003 and 2021 (and additional) surveys of the LDW middle reach should be directly comparable, given the similarities in the survey methods and equipment. Also, the results of the overlapping areas (RM 2.75 to 3.0) between the 2019 survey of the LDW upper reach and the 2021 survey of the LDW middle reach should be directly comparable. The same horizontal and vertical datums will be used for the 2021 survey as those used in 2003 and 2019 (as discussed in Section 3.1). Table 2 provides a summary of the equipment and software used and the target accuracies for the two surveys.

**Table 2**
**Comparison of 2003, 2019, and 2021 Bathymetric Survey Methods**

| Feature | 2003 Survey | 2019 and 2021 Surveys |
|---|---|---|
| Multibeam Sonar System | Reason 8101 | R2Sonic 2022 |
| RTK GPS Inertial Navigation System | Applanix POS-MV | Applanix POS-MV |
| Hydrographic Processing Software | Caris Hydrographic Information Processing System | HyPack HySweep |
| Sounding Selection Method | 1-foot by 1-foot average | 1-foot by 1-foot average |
| Horizontal Accuracy | +/- 3 feet | +/- 3 feet |
| Vertical Accuracy | +/- 0.5 feet | +/- 0.5 feet |
| National Oceanographic Survey Tidal Epoch | 1960 - 1978 | 1983 - 2001 |

**Completeness:** The objective of the survey is to provide bank-to-bank coverage where the survey vessel can safely navigate. The targeted water elevation for surveying shorelines is ≥5 feet above mean lower low water (MLLW). The following factors will affect the ability to collect bank-to-bank data:

- Tidal stage: increased water depth allows for increased coverage toward shore from the survey vessel. The progress of the survey will be timed to gather data from the banks at the time around the high tide and from deeper water within the channel when tide levels are not critical to data collection.
- Obstructions such as docks, moored vessels, or pilings, which may restrict vessel operations or block sonar signals. The survey vessel will work around existing

structures as they are encountered. LDWG may need to ask owners of moored vessels to move their vessels, but vessel owners may choose not to comply with requests from LDWG. Obstructions that prevent access for surveying will be noted in the field log and reported as explanatory notes with the final survey drawings. The nature of the obstruction and the size of the affected area will be noted.

- Bank slope: a long shallow bank will not be mapped as close to shore as a steep bank. The survey vessel operator will adjust survey methods to the extent practicable, as described in Section 3.2, to collect data as high as possible on shallowly sloped banks.

It is expected that there will be data gaps that cannot be avoided, such as those caused by obstructions[4] or shallow areas. These areas will be evaluated on a case-by-case basis, and an assessment will be made in consultation with EPA to determine whether further bathymetric surveying or alternative surveying methods (e.g., single-beam bathymetric survey or LiDAR) are required to fill data gaps to inform the RD.

**Sensitivity:** The sonar swath will be limited to 60° throughout the project area with the exception of shoreline banks and slopes under existing piers and floats. The hydrographer that is onboard during data acquisition will make the determination on when it is appropriate to use sonar beams beyond 60°.

## 2.5 Special Training and Certification

NWH personnel have specialized training and extensive experience in conducting high-resolution multibeam surveys. NWH's field operations manager is a certified hydrographer under the American Congress on Surveying and Mapping Hydrographer Certification Program. Additional specialized training includes the following:

- University of New Brunswick: Ocean Mapping Group Multibeam Sonar Training Course (March 2007)
- HyPack Annual Training (latest: January 2021)
- Caris Hydrographic Information Processing System (March 2010)

## 2.6 Documentation and Records

Prior to mobilization for the bathymetric survey, the approved QAPP will be provided to all field personnel for review. The Anchor QEA project manager or his designee will confirm

[4] LDWG does not have day-to-day control over the location of ships and barges in the LDW to enable removal of these types of obstructions prior to the survey.

that all field personnel receive the final QAPP, including any addenda and modifications. The leader of the field operations will be responsible for conducting the survey in conformance with the requirements of the approved QAPP, and the NWH field operations manager will be responsible for overall quality assurance of the bathymetric survey product.

Multibeam bathymetric data will be presented as a series of maps that will be overlaid on sun-illuminated images of the bathymetric digital terrain model (DTM). Drawings will be compiled in AutoCAD at a mutually agreed-upon scale, to be determined during design. The maps will be projected in North American Datum (NAD) 83 through the 1991 adjustment (NAD83/91) Washington State Plane North (feet) and will include 1-foot elevation contours in feet MLLW. The multibeam sun-illuminated maps will represent a full coverage survey over the area imaged and will provide details of riverbed features. Sun-illuminated images will be produced in color. The multibeam data will also be exported into an ASCII XYZ format for use in CAD and geographic information systems (GIS).

The following information will be provided in the bathymetric survey data report, which will be submitted following completion of surveying, including an anticipated data gaps survey data collection. The data gaps survey is expected to occur during the same timeframe as the middle reach Phase I PDI:

- Written report of the survey describing survey methodology, equipment (including the sensitivity of the equipment), and analysis methodology (submitted as draft and final versions)
- Documentation of QC checks, TPU and identification of QC issues
- Deviations from this QAPP
- Contour maps at a mutually agreed-upon scale, to be determined during design
- Sun-illuminated maps at the same scale and layout as contour maps
- Electronic versions of data products, which will include Portable Document Format (PDF) files for reports, AutoCAD files (DWG format) of contours and imagery, ArcMap shape files of contours, and georeferenced TIFF files of imagery
- ASCII files of 1-foot binned data sets that include appropriate metadata in the file header

# 3 Data Generation and Acquisition

## 3.1 Survey Design

The bathymetric survey of the LDW middle reach will collect precision data in the primary survey area covering approximately 1.5 miles of the waterway starting at RM 1.5 and extending upstream to RM 3.0, as shown on Figure 1.

The survey will be conducted using multibeam sonar over most of the project area. In areas with sufficient water depth (greater than 8 feet), multibeam sonar allows for the collection of data with up to 100% coverage of the riverbed, compared to single-beam methodology, which covers a single track directly below the survey vessel and allows for only partial coverage. This method allows for the collection of high-resolution bathymetric data. The multibeam bathymetric data will be used to create a digital terrain model of the riverbed morphology, from which sun-illuminated images will be generated.

Data will be collected by running several lines parallel to the shoreline. Several perpendicular crosstie lines will also be surveyed to confirm system calibration and document accuracy.

The survey will be conducted on an established coordinate system, referenced by monuments established or recovered during a geodetic control survey of the site. The same horizontal and vertical datums will be used for the 2021 survey as those used in 2003 and the 2019 survey of the upper reach. The horizontal datum for this survey is NAD83 through the 1991 adjustment (NAD83/91), State Plane Coordinate System, Washington North Zone, measured in U.S. Survey Feet. Vertical datum for this survey will be feet MLLW. The GEOID12B model will be used to relate soundings to North American Vertical Datum of 1988. As with the 2019 bathymetric surveys, the 2021 survey will be on the same National Tidal Datum Epoch. The target horizontal and vertical accuracy of the bathymetric survey is presented in Section 2.4.

## 3.2 Survey Methods

This section describes the survey vessel and crew, control network, positioning, and acquisition of multibeam data. Safe working practices for conducting this survey are described in the Health and Safety Plan (HASP; see Appendix A).

### 3.2.1 Survey Vessel and Crew

The survey vessel (S/V) will be the S/V *Soundwave*, or equivalent, an 8-meter custom aluminum survey boat owned and operated by NWH. This vessel is equipped with an integrated navigation and data acquisition system and a custom mount for the R2Sonic 2022 sonar head and is ideal for shallow-water survey operations in tight quarters. A smaller vessel will be used in areas with restricted overhead clearance. The same survey equipment and QC procedures will be used with either vessel. The bathymetric survey crew will consist of a lead hydrographer and an assisting hydrographer from NWH.

### 3.2.2 Control Network

Prior to the multibeam survey, True North will establish a control network along the LDW. This control network will be based on NAD83/91, Washington North Zone horizontal positions, and MLLW elevations. As the primary vertical control for this survey will be provided by real-time kinematic (RTK) GPS observations based on this control network, an accurate ellipsoid separation model, which is built into the Hypack software, will be used to provide on-the-fly conversion from the WGS84 ellipsoid (ellipsoid from which GPS heights are derived) to MLLW. This requires ties to existing monuments for which MLLW elevations and NAD83/91 positions are published and placement of new monuments along the project corridor.[5]

In addition, the control network will be expanded to include ties to staff gauging sites positioned approximately 0.5 mile apart within the study area. New gauges will be placed along the LDW at approximately RM 2.1 and 2.6. Exact locations will be determined in the field (as a standard practice) and documented in the hydrographer's field log. Adjustments will be computed for each staff gauge to allow for a real-time comparison to RTK GPS-derived water surface elevations, which will be recorded at 1-minute intervals at a temporary monitoring station set up for the bathymetric survey.

A geodetic control survey will be conducted using GPS techniques from monuments with published positions and elevations. A network of observations will be made with redundant comparisons to document accuracy of the survey.

[5] Upland survey monuments will be placed at each end of the study area and at two locations within the study area. In addition, staff gauging locations will be positioned approximately 1 mile apart within the study area.

Survey control will be tied into the existing control set for the upper reach bathymetry survey, as well as some primary GPS WSDOT monuments. RTK GPS will be used to establish the location of the new control points at the site, and elevation will be established by running levels across them using a digital level and published benchmarks. Accuracies of the control points are 0.02 foot horizontally and 0.04 foot vertically. The details of the geodetic control survey will be reported with the results of the bathymetric survey.

### *3.2.3 Positioning*

Horizontal positions will be acquired with an Applanix Position and Orientation System for Marine Vessels (POS/MV) RTK positioning system and inertial navigation system. This system integrates two GPS receivers with a motion reference unit. Additionally, RTK GPS corrections will be input into the system to improve horizontal positioning accuracy to better than 0.5 meter (1.6 feet). The advantage of this system is that it not only provides motion information (i.e., heading, roll, pitch, and heave) to compute X, Y, Z data from the multibeam sonar measurements, but it also provides accurate inertial navigation through GPS outages for up to 30 seconds, which has been a major problem with conventional differential global positioning system (DGPS) equipment. These systems are preferred because the use of conventional equipment near bridges and alongside ships, a typical environment in the LDW, causes satellite signals to be blocked and/or reflected from these structures (multi-path), resulting in position jumps or large drifts in position, which can exceed survey tolerances. During these GPS signal outages, the inertial system takes over and provides accurate navigation until GPS signals are reestablished after passing the obstruction.

Position data will be used in real-time to provide navigation information to the vessel operator. A preliminary coverage plot will be generated in real-time to show multibeam swath coverage. The helmsman will be presented with a plan view of the survey area, with the vessel position and track. A color-coded swath of the multibeam coverage will be painted to the screen and used to navigate the survey vessel to fill the area. To check the accuracy of the positioning system and confirm that the geodetic parameters used in the real-time projection to the NAD83/91 Washington North Zone coordinate system are correct, a position check will be conducted daily on an established monument with a known position. Water surface measurements will be obtained by RTK GPS with on-the-fly ambiguity resolution, which is the ability to determine very accurate RTK GPS measurements while the survey vessel is moving. Water surface elevations obtained by RTK GPS will be

checked against a primary National Oceanic and Atmospheric Administration (NOAA) tide station (9447130), located at the Colman Ferry Terminal in downtown Seattle, at staff gauges placed every 1 to 2 miles along the study corridor, and at an automated water-level gauge deployed by NWH in the middle of the study area. All soundings will be reduced to MLLW elevations in the delivered data set.

The automated water-level gauge will be deployed continuously during the survey to record and time-tag 1-minute water level observations at the middle reach of the study area. The gauge consists of a pressure transducer and a surface interface and recording device. The following procedures will be followed for deployment:

- A temporary staff gauge will be surveyed in at the gauging site.
- The system clock will be synchronized with the data acquisition computers aboard the survey vessel prior to the survey.
- The pressure transducer will be calibrated relative to the staff gauge.

During the survey, system clock checks and comparisons of staff gauge results to automated gauge results will be conducted at least three times (beginning, middle, and end) per day of survey.

### *3.2.4 Bathymetric Data Acquisition*

Soundings, or precision water depth measurements, will be acquired with a R2Sonic 2022 broadband multibeam bathymetric sonar. Using a frequency of 450 kHz, the R2Sonic sonar illuminates up to a 160° (80° to starboard and 80° to port) by 1.0° swath along the riverbed, perpendicular to the ship's track, and resolves a slant-range measurement to the riverbed every 1.0° along the swath. Sonar ping rates vary, depending on the depth of the water and sonar range settings, but generally will be a minimum rate of 17 Hz as the vessel transits along the survey track line.

Multibeam data will be collected by running lines parallel with the shoreline. Although the R2Sonic multibeam sonar can acquire data out to 80° on both port and starboard sides under the standard deployment, data will not meet target vertical criteria beyond 60° on a flat bottom. During survey operations all lines offshore of the shoreline runs will have the sonar swath width limited to a maximum of 60° on both starboard and port beams (or less, depending on refraction and cross-line analysis) during processing. While collecting sloped shoreline and under-dock bathymetry, it may be necessary to tilt the multibeam sonar head,

which is mounted on the starboard side of the vessel, to starboard 20°. In this configuration, shoreline data can be collected as far up the bank as possible, on a steep bank, by making shoreline runs with the starboard side toward shore. Survey lines offshore of the shoreline runs will limit the starboard beams at 60° (or less, depending on refraction and cross-line analysis) during processing.

Running with a 120° swath (60° to port and starboard), the system still provides 3.5 times the water depth coverage in a single pass. The total swath width of full coverage mapping in a single pass will vary with the water depth, the cross-line comparison, and refraction analysis. If ships or barges, which may obstruct a planned survey transect, are shallow draft and not too wide, it may be possible to survey under them with the wide swath of the R2Sonic 2022. The POS/MV system will enable the survey vessel to run near ships at berth with minimal loss of positioning integrity. In addition to several parallel lines down the channel, crosstie lines will be run over the main scheme lines to confirm system calibration and document the accuracy of the survey. In addition, single-beam comparison lines will be run in shallow water along the shore to confirm accuracy of the outer beams. To account for vessel heave (vertical movement), pitch and roll, an Applanix POS/MV motion reference sensor, or equivalent, will be utilized. The POS/MV system will also be used to record vessel heading (yaw) from which the sonar beam orientation is derived. The POS/MV provides a higher degree of accuracy for heading measurements than a conventional gyrocompass.

Multibeam data will be acquired with HyPack HySweep data acquisition software. HySweep acquires and time-tags all sensor data, including multibeam sonar, position, heading, heave, pitch, and roll. The navigation system provides navigation output to the vessel operator's monitor and manages the survey. The acquisition systems can also be used to replay the survey so that the coverage and quality of the data can be reviewed prior to demobilization from the site.

Detailed measurements of the sound velocity profile through the water column are crucial in multibeam surveys and will be measured at 0.5-meter depth intervals from the water surface to the mudline in the part of the survey area with the deepest water. Changes in the sound velocity profile will not only affect acoustic distance measurements but can also cause refraction or bending of the sonar path as it passes through layers in the water column at different velocities. Because the velocity of sound is directly related to the density and temperature of water, changes in the sound velocity profile are expected to occur in the LDW due to the mixing of fresh and salt water during tidal changes. For this survey, an AML

BaseX$_2$ sound velocity profiler, or equivalent, will be used to directly measure sound velocity profiles (SVP) of the water column. It is anticipated that the SVP will have spatial and temporal variation. To account for spatial variation, the LDW will be divided into subsections. The size of the survey subsections will be determined at the time of surveying by collecting SVP data and adjusting the length of a subsection so that similar results are obtained at each end. Temporal change will be addressed by taking SVP measurements as the subsection is surveyed. Initial SVP measurements will be taken at least hourly through at least one complete tidal cycle. Subsequent measurements may be extended to every 2 hours, at the discretion of the lead hydrographer, based on the tidal cycle and observed measurement differences.

To confirm alignment of the sensor data with the sonar swath and verify delay times applied to the time-tagged sensor data, a patch test will be conducted. A patch test is a series of lines run in a specific pattern that are used in pairs to analyze roll, pitch, and heading alignment angles with the sonar swath, as well as latency (time delays) in the time tagging of the sensor data. A bar check and lead line check will be conducted to confirm draft of the sonar head. These tests will be conducted at the beginning and end of the survey and any time there are changes in the instrument configuration.

Data acquisition involves setting the motion sensor to the survey conditions and running slow, uniform lines in a systematic pattern. Adjustments will be made to scale and gain settings, as required, to maximize resolution of the survey.

During the survey, preliminary multibeam bathymetric data will be displayed in real-time on the HyPack computer. Pixels color-coded by depth will be drawn on screen, showing the coverage and agreement between adjacent swaths.

The high-resolution multibeam sonar system will be used during data acquisition for the vast majority of the site. In shallow areas (i.e., water depths less than 8 feet deep at high tide, a single-beam sonar system will be used in lieu of the multibeam), due to limitations of the multibeam system in shallow water depths. Examples of these areas might include: shorelines with low-angle slopes that prevent the vessel from getting close to the actual edge-of-water, inter-tidal mudflats, and shallow Green River areas above the turning basin. Line spacing for single-beam transects (if used) will be kept small (as determined by the field operations manager, based on survey vessel safe access and size of the area) to develop accurate modeling of the sediment contours. Bathymetry data acquisition will be

strategically planned to collect shallow-water data during daily high tide events to maximize the amount of high-resolution multibeam sonar coverage of the project area. Deeper, mid-channel multibeam bathymetry can be collected during any tidal state and will be the focus of data collection efforts during low tides.

### *3.2.5 Survey Schedule*

It is anticipated that the bathymetric survey will be conducted in October 2021 (with potential data gap survey concurrent with middle reach Phase I PDI timeframe in 2022). Field work is expected to require approximately 8 days, subject to factors such as tide conditions and interference from larger vessels. Within the planned bathymetric survey period, the surveyor will return to an incomplete coverage area if a moored vessel is moved to provide survey vessel access. The survey results will be used by subsequent documents, such as the PDI Work Plan. Any deviations from this QAPP in acquiring the bathymetric data will be noted in the bathymetric survey data report, which will be submitted as part of the PDI Data Evaluation Report.

## 3.3 Data Processing Methods

Post-processing of multibeam data will be completed using HyPack HySweep multibeam editing and analysis software. Patch test data will be analyzed and any alignment corrections will be applied. Water-level data will be verified and applied to adjust all depth measurements to MLLW. Sound velocity profiles will be generated from the AML SVP measurements taken in the field and used to correct slant range measurements and compensate for ray path bending. Due to the variable and dynamic nature of sound velocity profiles in the project area, sound velocity profiles are collected every 30 minutes at a minimum, and more frequently if the hydrographer determines that site conditions require additional sound velocity measurements.

Processing will begin with review of each survey line using the HySweep swath editor. Verified water surface correctors will be applied to the data set at this time. Position and sensor data will be reviewed and accepted, if no outliers are present, or removed if erroneous data are observed. Sounding data will be reviewed and edited for data flyers such as bottom multiples, returns from pilings and passing vessel wakes. These data points will be removed and will not be used as part of the final data set. Sounding data, including sonar beams reflecting from sediment in the water column or noise due to aeration in the water column, will be carefully reviewed to determine if these data points should be removed.

After swath editing, all data will be reviewed through the HySweep's area-based editing tools to ensure no flyers remained in the data set. In the HySweep editor, a set of lines will be reviewed together for line-to-line comparison to ensure agreement to one another.

To take advantage of the level of detail the multibeam survey will provide, a 1-foot resolution sun-illuminated model and 1-foot gridded data set will be exported from HySweep. This gridding process will use an inverse weighted mean of all soundings within a 1-foot by 1-foot cell. The 1-foot grid size will allow for comparisons with previous bathymetric surveys that were conducted with similar high-resolution methods, in order to interpret the possibility of shoaling or scouring. All original data will be archived at full resolution. The cross-line analysis for selected soundings will be performed on the data set at this stage. The sun-illuminated images will be reviewed for survey coverage and analyzed to determine if subtle artifacts remain in the data set, which may require further processing. The sun-illuminated plots will be exported as a georeferenced TIFF file that can be imported into AutoCAD or any GIS program for final presentation and plotting.

Export of accepted multibeam data will be imported into TerraModel software for generation of a DTM, from which contours will be generated.

## 3.4 Quality Control

The acquisition system and survey protocols are designed with some redundancy to demonstrate that the required accuracy is being achieved during the survey and to provide a backup to primary systems. Data integrity will be monitored throughout the survey by redundant system comparisons and checks against known values. All raw data are recorded to allow for adjustments to be made to any of the data during postprocessing, based on the results of comparisons and checks. Sound velocity and tide correctors can be modified at any time during processing. Data removed manually or through filtering will not be deleted, and this approach allows for review of all data to confirm or disprove anomalies.

**Positioning:** Positions will be recorded and archived in WGS84 geographic coordinates and projected onto NAD83/91 Washington North Zone coordinate system. A geodetic control survey will be conducted to provide positions for monuments within the study area. A position confidence check will be conducted daily on a monument that is accessible from the water. The check will consist of placement of an RTK GPS antenna over a project survey control monument. The obtained position will be compared to the surveyed value to assure the target horizontal and vertical accuracies are being obtained.

**Tides:** RTK GPS derived heights will be checked daily during the position checks. In addition, staff gauge observations will be made and compared to RTK GPS derived water elevations twice per day. Backup tidal observations from the NOAA automated gauge and the NWH-deployed automated gauge will be used to confirm and evaluate any anomalous data in the RTK GPS tidal values.

**Sonar draft:**

- A bar check will be conducted at the beginning and end of the project to confirm multibeam and single-beam[6] (if used) sonar draft below the water line. A bar will be lowered below the sonar to specific intervals below the water surface using calibrated marks on the attached chain.
- Sonar draft marks will be observed with the vessel trimmed to zero roll angle to confirm the static draft of the sonar.
- A comparison of multibeam and single-beam depth soundings will be performed at the beginning and end of the project to confirm multibeam and single-beam sonar draft below the water line in conformance with the Hydrographic Surveying Engineering Manuals (USACE 2013).
- A leadline depth observation will be made at the beginning and end of the project to confirm multibeam and single-beam sonar draft and sound velocity observations.

**Motion sensor, positioning system latency, and vessel heading calibration:** A patch test will be conducted at the beginning and end of the project to confirm that the sensor mounting angles and timing bias are correctly applied to multibeam sonar data.

**Cross-line analysis:** A cross-line analysis will be conducted across the full width of the survey, when there is sufficient water depth, to confirm that the beams used meet target accuracy. In addition, single-beam comparison lines will be run in shallow water along the shoreline to confirm accuracy of outer beams. In areas of shallow water (i.e., less than 8-foot depth), cross-line analysis will be used for verification in conformance with the Hydrographic Surveying Engineering Manual (USACE 2013).

**Sun-illuminated analysis:** A sun-illuminated image will be generated from a DTM of the accepted bathymetric data set. The image will be reviewed for anomalous data and consistency between adjacent sonar swaths.

[6] Some selected single-beam lines may be run to confirm multibeam measurements.

## 3.5 Instrument/Equipment Testing, Inspection, and Maintenance

Prior to mobilization, the survey vessel and equipment will be inspected and confirmed to be in operating order. The vessel is inspected and maintained daily by the vessel operator.

During mobilization, instrumentation will be tested and system performance testing will be conducted. Performance testing will include a bar check, patch test, leadline comparison to multibeam, single-beam echosounder comparison to multibeam, and position confidence check.

## 3.6 Instrument/Equipment Calibration and Frequency

Equipment calibration is verified through system performance testing (e.g., bar checks, position checks, staff or automated gauge comparison, multibeam patch test, leadline comparison, single beam comparison, and cross-line analysis). The exception is the AML SVP profiler, which is calibrated prior to the survey, verified with a pre- and post-survey bar check, and compared weekly to an independent temperature sensor.

Frequency of observations is as follows:

- Bar check, sonar draft mark observations, leadline and single beam comparison: beginning and end of project or any change in sonar mounting
- Position checks: daily
- Staff or automated gauge comparison: three times daily
- SVP profile: minimum of twice daily
- Multibeam patch test: beginning and end of project or any change in instrumentation
- Cross-line analysis: once per project

## 3.7 Inspection/Acceptance of Supplies and Consumables

No significant consumables are required because all data are digitally recorded. The survey vessel is equipped with survey log forms for survey documentation and a supply of solid state external hard-drives for data backup.

## 3.8 Non-Direct Measurements

The geodetic control survey will be based on existing monuments with published positions and elevations. Horizontal positions and elevations based on the North American Vertical

Datum of 1988 will be based on National Geodetic Survey published monuments. MLLW elevations along the LDW will be based on NOAA tidal benchmarks at Station 9447130, Seattle, Washington, and the USACE tide datum at Station 92 on the LDW.

## 3.9 Data Management

Data from the survey vessel will be backed up to solid-state external hard drives at the end of each survey day. Data will not be removed from the acquisition computers until they have been loaded and verified on archived NWH data server located in the home office.

# 4 Assessment and Oversight

## 4.1 Assessments and Response Actions

EPA or its designees may observe the survey, as needed. If situations arise wherein there is a significant inability to follow the QAPP methods precisely, the NWH field operations manager will coordinate with the Anchor QEA project manager to determine the appropriate actions and consult with EPA if the issue is significant. No field audits are proposed for this work. The NWH field operations manager will audit system checks and sun-illuminated imagery during post-processing. True North will perform QA on the complete scope of the bathymetric survey.

## 4.2 Reports to Management

Primary communications will be through the NWH field operations manager and the Anchor QEA project manager. This correspondence will primarily consist of emails sent during survey operations, which will include coverage images, general overview of survey progress, and any problems encountered during surveying. Anchor QEA will send copies of all communication to the King County project manager and LDWG.

# 5 Data Validation and Usability

## 5.1 Data Review, Verification, and Validation

Data will be reviewed and verified by evaluation of sun-illuminated imagery, cross-line analysis, comparison of multibeam data to redundant depth measurement techniques and comparison to adjacent soundings.

## 5.2 Verification and Validation Methods

Verification of multibeam data will be performed by comparison to intersecting and overlapping swath soundings, single-beam data, and (in areas of firm material) leadline soundings. Patch test data will be analyzed and a cross-line analysis will be performed to document the system performance. In areas where only single-beam surveying is possible (e.g., where water depth is insufficient for effective multibeam survey), cross-line analysis will be used for verification in conformance with the Hydrographic Surveying Engineering Manual (USACE 2013).

Sun-illuminated images will be reviewed for anomalous data and inconsistency between adjacent sonar swaths. Artifacts in the image will be investigated in HyPack HySweep editor by comparing the data to adjacent soundings and swaths.

## 5.3 Reconciliation with Data Quality Objectives

Data quality objectives for accuracy will be achieved by meeting the target horizontal and vertical accuracies at a 95% confidence level for the survey. Methods outlined in Sections 3.5, 3.7, and 5.2, will verify that the target accuracies are being obtained. Other data quality indicators, including completeness, representativeness, and precision, will be evaluated with a color-by-depth, sun-illuminated, coverage image generated in HyPack HySweep. This image processing system provides tools for data quality review (i.e., swath-to-swath comparison, 3D presentation color-coded by swath, etc.). Final review by the lead hydrographer will include the evaluation of sun-illuminated images for artifacts from system bias, and comparison to prior surveys.

Table 3 summarizes the key targets and related datums for the bathymetric survey. Horizontal accuracy of the survey is affected by several factors, including the positioning accuracy of the survey vessel and factors that can affect sonar data acquisition, such as vessel heave, pitch, and roll and signal interferences.

**Table 3**
**Key Targets and Related Datums**

| Description | Quantity or Datum |
|---|---|
| Horizontal Positioning Accuracy | 1.6 feet minimum |
| Horizontal Survey Accuracy | 3 feet at a 95% confidence interval |
| Horizontal Datum | NAD83/91 Washington North Zone |
| Vertical Survey Accuracy | +/- 0.5 feet at a 95% confidence interval |
| Vertical Datum | MLLW (Tidal epoch 1983-2001) |

# 6 References

AECOM, 2012. *Final Feasibility Study Lower Duwamish Waterway*. Prepared for Lower Duwamish Waterway Group. October 2012.

EPA (U.S. Environmental Protection Agency), 2000. *Guidance for the Data Quality Objectives Process*. Office of Environmental Information. EPA/600/R-96/055; EPA QA/G-4. August 2000.

EPA, 2002. *Guidance for Quality Assurance Project Plans*. Office of Environmental Information. EPA/240/R-02/009. December 2002.

EPA, 2021. Fifth Amendment of the *Administrative Order on Consent/or Remedial Investigation/Feasibility Study*, U.S. EPA, Region 10, CERCLA Docket No. 10-2001-0055, Ecology Docket No 00TCPNR-1895 (12/20/2000). July 2021.

Integral (Integral Consulting Inc.), 2018. *Waterway User Survey and Assessment of In-Water Structures—Data Report*. Prepared for Lower Duwamish Waterway Group. July 2018.

Integral, 2019. *Recovery Categories Recommendation Report* for Lower Duwamish Waterway. Prepared for U.S. Environmental Protection Agency, Region 10. February 2019.

USACE (U.S. Army Corps of Engineers), 2013. *Engineering and Design: Hydrographic Surveying*. EM 1110-2-1003. Department of the Army, US Army Corps of Engineers. November 2013.

# Appendix A
# Health and Safety Plan

# Updated Health and Safety Plan

By their signature, the undersigned certify that this Health and Safety Plan (HASP) is approved and that it will be used to govern health and safety aspects of fieldwork described in the Quality Assurance Project Plan to which it is attached.

October 19, 2021

Tom Wang, PE
Anchor QEA, LLC, Project Manager

Date

October 19, 2021

Tim Shaner
Anchor QEA, LLC, Health and Safety Program Lead

Date

October 19, 2021

James Glaeser
Northwest Hydro, Inc., Field Operations Manager/Health and Safety Officer

Date

# ACRONYMS

| | |
|---|---|
| CFR | Code of Federal Regulations |
| CPR | cardiopulmonary resuscitation |
| EPA | U.S. Environmental Protection Agency |
| FOM | Field Operations Manager |
| HASP | Health and Safety Plan |
| HAZMAT | hazardous materials |
| HAZWOPER | Hazardous Waste Operations and Emergency Response |
| HSM | Health and Safety Manager |
| HSO | Health and Safety Officer |
| HSPL | Health and Safety Program Lead |
| LDW | Lower Duwamish Waterway |
| MHHW | mean higher high water |
| OSHA | Occupational Safety and Health Administration |
| PFD | personal flotation device |
| PM | Project Manager |
| PPE | personal protective equipment |
| True North | True North Land Surveying, Inc. |
| USCG | U.S. Coast Guard |
| VHF | very high frequency |

## A.1.0 Introduction

This Health and Safety Plan (HASP) presents health and safety requirements and procedures that will be followed by personnel during survey work activities in the Lower Duwamish Waterway (LDW) (the site). This HASP was developed in accordance with Title 29 of the Code of Federal Regulations (CFR), Part 1910.120(b), and will be used in conjunction with applicable Health and Safety Programs. See Section A.1.1 for HASP modification procedures.

The provisions of this HASP are mandatory for all personnel assigned to the project. A copy of this HASP must be always maintained on site and available for employee review. Personnel assigned to work at the project site will be required to read this plan and must sign the HASP Acknowledgement Form (Attachment A.1) to confirm that they understand and agree to abide by the provisions of this HASP. During site work, this HASP will be implemented by the True North Land Surveying, Inc. (True North) Field Operations Manager (FOM), who is also the designated site Health and Safety Officer (HSO), in cooperation with the corporate Health and Safety Manager (HSM).

The objectives of this HASP are to identify potential physical, chemical, and biological hazards associated with field activities; establish safe working conditions and protective measures to control those hazards; define emergency procedures; and describe the responsibilities, training requirements, and medical monitoring requirements for site personnel.

Issuance of this approved HASP documents that the workplace has been evaluated for hazards. A hazard assessment was performed, 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.

## A.1.1 Health and Safety Plan Modifications

This HASP will be modified by amendment, if necessary, to address changing field conditions or additional work tasks not already described in this document. Modifications will be proposed by the FOM/HSO using the Modification to Health and Safety Plan form included as Attachment A.2. Modifications will be reviewed by the HSM or authorized representative and approved by the Project Manager (PM).

The field team has the responsibility to immediately report any potentially unsafe or hazardous conditions to the FOM/HSO, 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 FOM/HSO to identify potential unsafe conditions.

## A.2.0 Site Description and Project Scope

The surveying area is in the LDW (see Figure 1 in the attached QAPP). The area is affected by tidal fluctuations. The main activity covered by this HASP is bathymetric surveying, which will be conducted from a survey vessel and has a low likelihood of contact with sediment. This HASP also covers installation of survey monuments for the middle reach in the public right of way to support bathymetric survey controls. Survey monument installation will be performed by a topographic surveyor. No other topographic surveying is proposed for this phase of work.

## A.3.0 Health and Safety Personnel

Key health and safety personnel and their responsibilities are described below. These individuals are responsible for the implementation of this HASP.

**Anchor QEA Project Manager:** The PM has overall responsibility for the successful outcome of the project. The PM will ensure that adequate resources and budget are provided for the health and safety staff to carry out their responsibilities during fieldwork. The PM, in consultation with the HSM, makes final decisions concerning implementation of the HASP.

**NWH Field Operations Manager/Health and Safety Officer:** Because of the limited scope and duration of fieldwork, the NWH FOM and HSO will be the same person. The FOM/HSO will direct field surveying activities, coordinate the technical components of the field program with health and safety components, and ensure that work is performed according to the QAPP.

The FOM/HSO will implement this HASP at the work location and will be responsible for all health and safety activities and the delegation of duties to a health and safety technician in the field, if appropriate. The FOM/HSO also has stop-work authority, to be used if there is an imminent safety hazard or potentially dangerous situation. The FOM/HSO or their designee shall be present during surveying operations.

**True North Field Operations Manager/Health and Safety Officer:** The True North FOM and HSO will be the same person. The FOM/HSO will direct field surveying activities, coordinate the technical components of the field program with health and safety components, and ensure that work is performed according to the Survey QAPP addendum.

The FOM/HSO will implement this HASP at the work location and will be responsible for all health and safety activities and the delegation of duties to a health and safety technician in the field, if

appropriate. The FOM/HSO also has stop-work authority, to be used if there is an imminent safety hazard or potentially dangerous situation. The FOM/HSO or their designee shall be present during surveying operations.

**Anchor QEA Corporate Health and Safety Program Lead:** The HSPL has overall responsibility for preparation, approval, and revisions of this HASP. The HSPL will not necessarily be present during fieldwork, but will be readily available, if required, for consultation regarding health and safety issues during fieldwork.

**Field Crew:** All field crew members must be familiar with and comply with the information in this HASP. They also have the responsibility to report any potentially unsafe or hazardous conditions to the FOM/HSO immediately.

# A.4.0 Hazard Evaluation and Control Measures

This section covers potential physical and chemical hazards that may be associated with the proposed project activities and presents control measures for addressing these hazards. The activity hazard analysis, Section A.4.3, lists the potential hazards associated with each site activity and the recommended site control to be used to minimize each potential hazard.

Confined space entry will not be necessary for this project. Therefore, hazards associated with this activity are not discussed in this HASP.

## A.4.1 Physical Hazards

For this project, it is anticipated that physical hazards will present a greater risk of injury than chemical hazards. Physical hazards are identified and discussed below.

### *A.4.1.1 Slips, Trips, and Falls*

As with all fieldwork sites, caution should be exercised to prevent slips on slick surfaces. In particular, surveying requires careful attention to minimize the risk of falling down. Bathymetric surveying will be performed on a boat and care will be taken to minimize the risk of falling overboard. Slips will be minimized by wearing boots with good tread, made of material that does not become overly slippery when wet.

Trips are always a hazard on the uneven deck of a boat or in a cluttered work area. Personnel will keep work areas as free as possible from items that interfere with walking.

Falls may be avoided by working as far from exposed edges as possible, by erecting railings, and by using fall protection when working on elevated platforms. For this project, no work is anticipated that would present a fall hazard. As with any work from a floating platform, there is a chance of falling

overboard. Personal flotation devices (PFDs) will be worn while working on deck or working from an open boat. PFDs need not be worn while working inside an enclosed cabin, but must be readily available when going on deck from the cabin area. An individual in the water shall be considered a "person overboard" and appropriate rescue actions shall be taken immediately to prevent hypothermia. PFDs will be worn while working within 10 feet of the water's edge or on banks.

### *A.4.1.2 Manual Lifting*

Equipment must be lifted and carried. Back strain can result if lifting is done improperly. During any manual handling tasks, personnel should lift with the load supported by their legs and not their backs. For heavy loads, an adequate number of people will be used, or if possible, a mechanical lifting/handling device will be used.

### *A.4.1.3 Heat Stress, Hypothermia, or Frostbite*

The work crew and other personnel shall have adequate clothing and foul-weather gear in their possession prior to beginning work. Hypothermia is a potentially hazardous condition.

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. Rewarming 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 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 to a medical facility as soon as possible.

### *A.4.1.4 Weather*

In general, field team members will be equipped for the normal range of weather conditions. Work shall be preceded by an evaluation of weather reports and conditions by the FOM/HSO and vessel pilot to ascertain that safe working conditions exist and safe refuge of personnel is assured. An alternate safe harbor shall be designated for emergency situations. Field personnel shall maintain monitoring of the local area weather broadcasts or other readily available weather forecasting

services. Some conditions that might force work stoppage are electrical storms, high winds, or high waves resulting from winds.

### *A.4.1.5 Boating Operations*

The following precautions shall be taken when conducting boating trailer and launch activities. These procedures are provided as a reference; NWH will follow their own internal boating safety procedures and consider the procedures below.

- 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.

The following precautions shall be followed 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.

The following precautions shall be followed when working on a boat:

- Observe proper lifting techniques.
- Wear USCG-approved PFDs for work activities within 10 feet of the water.

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

**Table A-1**
**Safety equipment specific to in-water work**

| Additional Safety Equipment for Sampling Vessel per U.S. Coast Guard Requirements |
|---|
| • Proper vessel registration, numbering, and documentation (registered with state, certificate of vessel registration number displayed, and carrying a valid certificate of number)<br>• USCG-approved personal flotation devices (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.<br>• Appropriate, non-expired, visual distress devices for day and night use from the following:<br>– Three hand-held red flares (day and night), or<br>– One hand-held red flare and two parachute flares (day and night), or<br>– One hand-held orange smoke signal, two floating orange smoke signals (day), and one electric distress light (night only)<br>• Alternate means of propulsion (oars or paddles)<br>• Dewatering device (pump or bailer)<br>• 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)<br>• Proper ventilation of gasoline-powered vessels<br>• Sound-producing device (whistle, bell, or horn)<br>• VHF 2-way radio<br>• Proper navigational light display<br>• Throwable life ring with attached line (any vessel larger than 16 feet is required to carry one Type IV [throwable] PFD) |

| Additional Safety Equipment for Sampling Vessel per U.S. Coast Guard Requirements | |
|---|---|
| **Additional USCG Recommended Equipment Includes:** | |
| • Extra visual distress signals<br>• Primary and spare anchor<br>• Heaving line<br>• Fenders<br>• First aid kit<br>• Flashlight<br>• Mirror<br>• Searchlight<br>• Sunburn lotion<br>• Tool kit<br>• Spare fuel | • Boat hook<br>• Spare propeller<br>• Mooring line<br>• Food and water<br>• Binoculars<br>• Spare batteries<br>• Sunglasses<br>• Marine hardware<br>• Extra clothing<br>• Spare parts<br>• Pertinent navigational chart(s) and compass |

### *A.4.1.6 Working in a Roadway*

These procedures are provided as reference; NWH and True North will follow their own internal safety procedures for working in a roadway and consider the procedures below:

- Plan and conduct work in a manner that traffic may be continuously observed. This may require having a spotter equipped with a noise-making device such as an air horn or a whistle, as appropriate.
- Wear a high-visibility traffic vest and hardhat when a vehicle hazard exists. Include lighted elements when possible in high-hazard environments.
- Use cones, flag-mounted cones, caution tape, and/or barricades.
- Protect the work area with a vehicle or piece of heavy equipment if this does not pose an additional hazard. The vehicle should have a strobe light and operating headlights or running lights (if equipped).

## A.4.2 Chemical Hazards

The Record of Decision identified polychlorinated biphenyl compounds, carcinogenic polycyclic aromatic compounds, arsenic, and dioxins/furans are contaminants of concern in sediments below mean higher high water (MHHW). Direct contact with contaminated sediment may occur when working from a boat if equipment is lowered to the sediment surface and raised back into the boat.

### *A.4.2.1 Exposure Routes*

Possible routes of exposure to the chemicals potentially encountered on this project include inhalation, dermal contact, and ingestion of dust, mist, gas, vapor, or liquid. Exposure will be minimized by using safe work practices and by wearing the appropriate PPE. A further discussion of PPE requirements is presented in Section A.7.0.

### Inhalation

Inhalation of particulates, dust, mist, gas, or vapor during field activities is possible. Chemicals of concern at this site are not volatile and strongly adsorb to sediment, so the principal route of inhalation exposure is through contaminated particulate or dust. Wet sediment should generate little dust, but dried sediment may present a hazard of inhalation. Care should be taken when working in areas with contaminated sediment, generally below MHHW in the work areas, and when decontaminating personal protective equipment and survey equipment that has been in contact with sediment.

### Dermal Contact

Dermal 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.

### Ingestion

Direct ingestion of contaminants can occur by inhaling airborne dust, mist, or vapors, or by swallowing contaminants trapped in the upper respiratory tract. Indirect ingestion can occur by introducing the contaminants into the mouth by way of food, tobacco, fingers, or other carriers. Although ingestion of contaminants can occur, proper hygiene, decontamination, and contamination reduction procedures should reduce the probability of this route of exposure.

### Chemicals of Concern Profile

Table A-2 provides a summary profile for the chemicals of concern for this project. This profile is based on recent site history and site characterization information. For more detailed and specific information, always refer to the Safety Data Sheet.

**Table A-2**
**Chemicals of Concern**

| Chemical | Exposure Routes | Symptoms | Target Organs | OEL (STEL) | Odor Threshold (ppm) | LEL (%) | Ionization Energy (eV) |
|---|---|---|---|---|---|---|---|
| PCBs<br>(Chlorodiphenyls)<br>(42% Cl / 53469-21-9)<br>(54% Cl / 11097-69-1) | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes, chloracne; liver damage; reproductive effects<br><br>Potential occupational carcinogen | Skin, eyes, liver, reproductive system | 0.001 mg/m$^3$ TWA8<br>Skin<br><br>IDLH / Ca – 5 mg/m$^3$ | N/A | N/A | N/A |
| Polycyclic aromatic hydrocarbons (PAHs) – as coal tar pitch volatiles. (Includes benzo(a)pyrene, chrysene, phenanthrene, fluoranthene, pyrene, acenaphthene, methylnaphthalenes, and anthracene) | Skin, eye, inhalation, and ingestion hazard | Direct contact or exposure to the vapors may be irritating to the eyes. Direct contact can be highly irritating to the skin and can cause dermatitis. Exposure to high vapor concentrations may cause headaches, nausea, vomiting, and other symptoms. Includes human carcinogens. Exposure to all routes should be carefully controlled to levels as low as possible.<br><br>Confirmed animal carcinogen. | Respiratory system, skin, bladder, kidneys | 0.2 mg/m$^3$ TWA8<br>0.1 mg/m$^3$ TWA8 (Cyclohexane-extractable fraction)<br><br>IDLH / Ca – 80 mg/m$^3$ | Varies | N/A | N/A |
| Dioxins/Furans<br>(as 2,3,7,8-Tetrachloro-dibenzo-p-dioxin) - TCDD | Inhalation, skin absorption, ingestion, skin and/or eye contact | Irritation eyes; allergic dermatitis, chloracne; porphyria; gastrointestinal disturbance; possible reproductive, teratogenic effects; In Animals: liver, kidney damage; hemorrhage<br><br>Potential occupational carcinogen | Eyes, skin, liver, kidneys, reproductive system | Lowest Feasible Concentration (LFC)<br>Proposed OEL of 0.2 ng/m$^3$<br>Skin<br>IDLH / Ca - LFC | N/A | N/A | N/A |
| Hydrogen Sulfide (H2S)<br>(7783-06-04)<br><br>1 ppm = 1.40 mg/m3 | Inhalation, skin and/or eye contact | Irritation eyes, respiratory system; apnea, coma, convulsions; conjunctivitis, eye pain, lacrimation (discharge of tears), photophobia (abnormal visual intolerance to light), corneal vesiculation; dizziness, headache, lassitude (weakness, exhaustion), irritability, insomnia; gastrointestinal disturbance; liquid: frostbite | Eyes, respiratory system, central nervous system | 1 ppm TWA8<br>(5 ppm)<br>C – 10 ppm (10-min over an 8-hr shift)<br><br>IDLH - 100 ppm | 0.03 ppm | 4.0 | 10.46 |
| Arsenic, and inorganic compounds as<br>(7440-38-2) | Inhalation, skin absorption, skin and/or eye contact, ingestion | Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, resp irritation, hyperpigmentation of skin<br><br>Potential occupational carcinogen | Liver, kidneys, skin, lungs, lymphatic system | Ceiling limit of 0.002 mg/m$^3$ [15-Minute]<br><br>IDLH / Ca – 5 mg/m$^3$ | N/A | N/A | N/A |
| Barium and soluble compounds, as Ba, including Barium chloride<br>(7440-39-3)<br>(10361-37-2) | Inhalation, skin and/or eye contact | irritation eyes, skin, upper respiratory system; skin burns; gastroenteritis; muscle spasm; slow pulse, extrasystoles (heart contractions); hypokalemia (deficiency of potassium in the bloodstream). | Eyes, skin, respiratory system, heart, central nervous system | 0.5 mg/m$^3$ TWA8<br>IDLH – 50 mg/m$^3$ | N/A | N/A | N/A |
| Cadmium and compounds, as Cd<br>(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<br><br>Potential occupational carcinogen | respiratory system, kidneys, prostate, blood, prostatic & lung cancer | 0.005 mg/m$^3$ TWA8<br>IDLH / Ca – 9 mg/m$^3$ | N/A | N/A | N/A |

| Chemical | Exposure Routes | Symptoms | Target Organs | OEL (STEL) | Odor Threshold (ppm) | LEL (%) | Ionization Energy (eV) |
|---|---|---|---|---|---|---|---|
| Chromium (II) inorganic compounds, as Cr | Inhalation, ingestion, skin and/or eye contact | Irritation eyes; sensitization dermatitis | Eyes, skin | 0.5 mg/m$^3$ $TWA_8$<br>IDLH – 250 mg/m$^3$ | N/A | N/A | N/A |
| Chromium (III) inorganic compounds, as Cr<br>(7440-47-3) | Inhalation, ingestion, skin and/or eye contact | Irritation eyes; sensitization dermatitis | Eyes, skin | 0.5 mg/m$^3$ $TWA_8$ (total dust)<br>0.003 mg/m$^3$ $TWA_8$ (inhalable fraction)<br>IDLH – 25 mg/m$^3$ | N/A | N/A | N/A |
| Chromium (VI) inorganic compounds, as Cr<br>(18540-29-9)<br>(1333-82-0 as CrO3) | Inhalation, ingestion, skin and/or eye contact | Irritation respiratory system; nasal septum perforation; liver, kidney damage; leukocytosis (increased blood leukocytes), leukopenia (reduced blood leukocytes), eosinophilia; eye injury, conjunctivitis; skin ulcer, sensitization dermatitis<br><br>Potential occupational carcinogen | Blood, respiratory system, liver, kidneys, eyes, skin, lung cancer | 0.0002 mg/m$^3$ $TWA_8$<br>IDLH / Ca – 15 mg/m$^3$ | N/A | N/A | N/A |
| Lead and inorganic compounds, as Pb<br>(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 (gum) tissue | 0.05 mg/m$^3$ $TWA_8$<br>IDLH – 100 mg/m$^3$ | N/A | N/A | N/A |
| Mercury, elemental and inorganic compounds, as Hg<br>(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 (inflammation of mucous membranes of the mouth), salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria (abnormal quantities of protein in the urine) | Eyes, skin, respiratory system, central nervous system, kidneys | 0.025 mg/m$^3$ $TWA_8$<br>C– 0.1 mg/m$^3$<br>Skin<br>IDLH – 10 mg/m$^3$ | N/A | N/A | N/A |
| Selenium compounds, as Se<br>(7782-49-2) | Inhalation, ingestion, skin and/or eye contact | Irritation eyes, skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal disturbance; dermatitis; eye, skin burns; In Animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage | Eyes, skin, respiratory system, liver, kidneys, blood, spleen | 0.2 mg/m$^3$ $TWA_8$<br>IDLH – 1 mg/m$^3$ | N/A | N/A | N/A |
| Silver metal, and soluble compounds, as Ag<br>(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 | 0.01 mg/m$^3$ $TWA_8$<br>IDLH – 10 mg/m$^3$ | N/A | N/A | N/A |

$TWA_8$ – 8-hour time weighted average
Skin – OEL based primarily on skin exposure hazard
C – Ceiling Limit
Ca – potential or confirmed human carcinogen
IDLH – Immediately Dangerous to Life or Health
LFC – Lowest Feasible Concentration
OEL– Occupational Exposure Limit
STEL– Short Term Exposure Limit
LEL– Lower Explosive Limit

### A.4.3 Activity Hazard Analysis

The activity hazard analysis summarizes the field activities to be performed during the project, outlines the hazards associated with each activity, and presents controls that can reduce or eliminate the risk of the hazard occurring. Table A-3 presents the activity hazard analysis for conducting the bathymetric survey.

**Table A-3**
**Activity Hazard Analysis**

| **Required PPE:** ANSI/ASTM compliant hard hat (if overhead hazards), high-visibility vest, safety glasses, safety shoes or boots, a face covering and the following as needed for hazards present: safety goggles, dust masks, gloves, hearing protection (if noise is 85 decibels or above), chaps, foul weather gear, PFD if on a boat or within 10 feet of water's edge on banks.[1] | | | |
|---|---|---|---|
| **Work Activity** | **Potential Hazards** | **Preventive or Corrective Measures** | **Inspection Requirements** |
| Outdoor, physical activity and surveying | Slips, trips, and falls | • Avoid walking while writing or texting—maintain a heads-up posture.<br>• Be aware of potentially slippery surfaces and tripping hazards. Use handrails where available. Wear footwear that has sufficient traction.<br>• Maintain good housekeeping practices. Clean up all spills immediately.<br>• Be aware of weather effects on the work area, including wet and/or frozen ground.<br>• Jumping, running, and horseplay are prohibited.<br>• Keep all areas clean and free of debris to prevent any trips and falls.<br>• Be aware of and limit loose clothing or untied shoelaces that may contribute to slips, trip, and falls.<br>• Notify the field team members of any unsafe conditions. | • Routinely inspect work area for unsafe conditions. |

| **Required PPE:** ANSI/ASTM compliant hard hat (if overhead hazards), high-visibility vest, safety glasses, safety shoes or boots, a face covering and the following as needed for hazards present: safety goggles, dust masks, gloves, hearing protection (if noise is 85 decibels or above), chaps, foul weather gear, PFD if on a boat or within 10 feet of water's edge on banks.[1] | | | |
|---|---|---|---|
| **Work Activity** | **Potential Hazards** | **Preventive or Corrective Measures** | **Inspection Requirements** |
| Outdoor, physical activity and surveying (continued) | Heat stress | • Adjust work schedules, as necessary, to avoid the hottest part of the day.<br>• Take rest breaks as warranted.<br>• Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.<br>• Maintain body fluids at normal levels.<br>• Train workers to recognize the symptoms of heat-related illness. | • Review weather forecast prior to field work.<br>• Monitor workers' physical conditions.<br>• Monitor outside temperature versus worker activity. |
| | Cold stress | • Provide shelter (enclosed, heated environment) to protect personnel during rest periods.<br>• Educate workers to recognize the symptoms of frostbite and hypothermia.<br>• Use appropriate cold-weather gear, up to and including Mustang-type bib coveralls or jacket/bib combinations.<br>• Consider additional precautions if working near water in cold weather.<br>• Have a dry change of clothing available.<br>• Train workers to recognize the symptoms of cold-related illness. | • Review weather forecast prior to field work.<br>• Monitor workers' physical conditions and PPE.<br>• Monitor outside and water temperature versus worker activity and PPE. |
| | Rain or snow | • Wear appropriate PPE (rain gear). | • Review weather forecast prior to field work.<br>• Inspect PPE daily prior to use. |

| **Required PPE:** ANSI/ASTM compliant hard hat (if overhead hazards), high-visibility vest, safety glasses, safety shoes or boots, a face covering and the following as needed for hazards present: safety goggles, dust masks, gloves, hearing protection (if noise is 85 decibels or above), chaps, foul weather gear, PFD if on a boat or within 10 feet of water's edge on banks.[1] | | | |
|---|---|---|---|
| **Work Activity** | **Potential Hazards** | **Preventive or Corrective Measures** | **Inspection Requirements** |
| Outdoor, physical activity and surveying (continued) | | • Be aware of slip hazards, puddles, and electrical hazards when working in wet conditions.<br>• If extremely cold conditions are forecast, consider additional precautions or postponing work activity. | • Routinely inspect work area for deteriorating conditions. |
| | Sunshine | • Have sunscreen available for ultraviolet protection.<br>• Have abundant water available to prevent dehydration.<br>• Consider wearing wide-brimmed headwear and light-colored, lightweight, sun-blocking clothing. | • Ensure that sunscreen and water are available. |
| | Lightning | • Do not begin or continue work until lightning subsides for at least 30 minutes. Disconnect and do not use or touch electronic equipment.<br>• 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. | • Obtain weather forecast and updates as needed. |
| | High winds | • Wear goggles or safety glasses if dust or debris are visible. | • Review weather forecast prior to field work.<br>• Ensure that goggles or safety glasses are available. |
| | Biological hazards<br>(flora [e.g., poison ivy and poison oak] | • Be aware of likely biological hazards in the work area. | • Ensure that insect repellent is available. |

| **Required PPE:** ANSI/ASTM compliant hard hat (if overhead hazards), high-visibility vest, safety glasses, safety shoes or boots, a face covering and the following as needed for hazards present: safety goggles, dust masks, gloves, hearing protection (if noise is 85 decibels or above), chaps, foul weather gear, PFD if on a boat or within 10 feet of water's edge on banks.[1] | | | |
|---|---|---|---|
| **Work Activity** | **Potential Hazards** | **Preventive or Corrective Measures** | **Inspection Requirements** |
| Outdoor, physical activity and surveying (continued) | and fauna [e.g., ticks, bees, spiders, mosquitoes, and snakes]) | • Wear appropriate clothing (i.e., hat, long-sleeve shirt, long pants, leather gloves, boots, and Tyvek coveralls, as appropriate), and apply insect repellant.<br>• Wear hand and arm protection when clearing plants or debris from the work area.<br>• Be aware of potential wildlife and defensive behavior (e.g., nesting birds, or animals with young). | • Inspect clothing and skin for insects (e.g., ticks) after working in insect-prone areas. |
| | Noise exposure | • 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). | • Ensure that hearing protection is available. |
| | SARS-CoV-2 virus (COVID-19) | All basic program elements in the General Coronavirus Prevention Under Stay at Home - Stay Healthy Guidelines (L&I 2020a) will be met, except for distancing more than 6 ft at all times (distances of less than 6 ft may occur at times on boats). Therefore, per L&I guidance referenced below, a hazard assessment was done to determine that this work site is a medium transmission risk. Based on this risk, the required PPE was identified and included in the alternative strategies in addition to basic program | • Confirm by observation that work conforms to preventive measures. |

| **Required PPE:** ANSI/ASTM compliant hard hat (if overhead hazards), high-visibility vest, safety glasses, safety shoes or boots, a face covering and the following as needed for hazards present: safety goggles, dust masks, gloves, hearing protection (if noise is 85 decibels or above), chaps, foul weather gear, PFD if on a boat or within 10 feet of water's edge on banks.[1] | | | |
|---|---|---|---|
| **Work Activity** | **Potential Hazards** | **Preventive or Corrective Measures** | **Inspection Requirements** |
| | | elements. In total, the following control actions will be taken.<br>• Stay at home if sick or exhibiting COVID-19 symptoms.<br>• Avoid group meetings in enclosed spaces.<br>• Drive separately to/from work site. Monitor workers' temperatures for signs of fever.<br>• Maintain social distancing (i.e., minimum 6-ft distance) to extent possible from other people.<br>• Follow proper coughing and sneezing etiquette and personal hygiene (e.g., frequent and thorough handwashing or using sanitizer with at least 60% alcohol).<br>• Avoid sharing tools and equipment and decontaminate/disinfect all tools, equipment, and supplies frequently.<br>• Wear modified Level D PPE, including gloves and protective face coverings with safety glasses or face shields.<br>• Limit number of personnel to minimum needed to complete the work and modify work spaces to allow greater distancing. | |

| **Required PPE:** ANSI/ASTM compliant hard hat (if overhead hazards), high-visibility vest, safety glasses, safety shoes or boots, a face covering and the following as needed for hazards present: safety goggles, dust masks, gloves, hearing protection (if noise is 85 decibels or above), chaps, foul weather gear, PFD if on a boat or within 10 feet of water's edge on banks.[1] | | | |
|---|---|---|---|
| **Work Activity** | **Potential Hazards** | **Preventive or Corrective Measures** | **Inspection Requirements** |
| | | • Refer to Attachment A.3 for additional details. | |
| | Physical injury from moving heavy equipment | Follow procedures outlined in Section A.4.1.5 for safely launching a boat from a trailer. | • Confirm by observation that work conforms to preventive measures. |
| | Falling overboard | Use care in boarding/departing from vessel. Wear PFD when on deck. Follow safe work practices related to vessel operations specified in Section A.6.0. | • Confirm by observation that work conforms to preventive measures. |

Note:
1. https://pdhonline.com/courses/l101/02_surveys.pdf

## A.5.0 Work Zones and Shipboard Access Control

Direct contact with contaminated media may occur if retrieving equipment that has been in contact with contaminated sediment; however, no physical sample collection or processing will occur. The only designated contaminated work zone is below MHHW and will require minimal decontamination upon exit. Any security or access control problems will be reported to the property owner or appropriate authorities. When accessing other property through access agreements, HASP requirements will be coordinated with those owners and any other HASPs that may be applicable on that site.

Security and control of access to the boat will be the responsibility of the FOM/HSO and boat captain. Boat access will be granted only to necessary project personnel and authorized visitors. Visitors will be provided a copy of the HASP, a briefing on the project and related health and safety requirements, and an opportunity to ask questions about the HASP, and they will be required to sign the acknowledgement in Attachment A.1.

## A.6.0 Safe Work Practices

Due to the nature of the bathymetric surveying, safe work practices are primarily related to slips, trips, and falls. Some operations may be performed from a boat or other floating platform, which would introduce additional potential hazards. All employees actively working on projects involving vessel operations will be thoroughly trained in the applicable safety, underway, docking, fueling, and various necessary operational procedures. The minimum responsibilities of the field crew members are as follows:

1. Do not climb over or under obstacles of questionable stability.
2. Work only in well-lighted spaces.
3. Make eye contact with equipment operators when moving within the range of their equipment.
4. Be aware of the movements of equipment when not in the operator's range of vision.
5. Get immediate first aid for all cuts, scratches, abrasions, or other minor injuries.
6. Always use the buddy system.
7. Be alert to your own and other workers' physical condition.
8. Have contact information for the client or owner while on site. If unauthorized personnel or a homeless encampment is encountered during work, the individuals should not be disturbed, the field crew should leave the area, contact the client or owner, and notify the PM or field lead.
9. Report all accidents, no matter how minor, to the FOM/HSO.
10. Do not do anything dangerous or unwise even if ordered by a supervisor.

The following safety rules are specific to on-water operations:

1. During all vessel operations the boat captain is in charge and takes full responsibility for safe operation of the vessel.
2. All vessel operators shall have adequate knowledge of the US Coast Guard (USCG) regulations, "Rules of The Road" and shall be approved for vessel operation by the FOM.
3. Vessels over 20 feet shall be inspected annually by a qualified marine surveyor to ensure structural integrity and safe operating conditions exist. Records of inspections shall be maintained on the vessel for vessels over 20 feet and shall be available to the designated authority.
4. When the vessel is brought onto a job site, it shall be inspected and tested by the vessel crew and determined to be in safe operating condition prior to the initiation of prescribed work.
5. Any vessel found to be in an unsafe condition shall be taken out of service and its use prohibited until the specified unsafe conditions have been corrected.
6. Prior to vessel departure from the dock, all onboard personnel shall be familiar with their duties and responsibilities in the event of an emergency, and the location of the vessel's emergency first-aid and firefighting equipment, as verbally communicated by a qualified member of the vessel crew.
7. All vessels shall be equipped with a PFD for each person onboard, a VHF marine radio and all USCG required safety equipment.
8. Navigation lights, radar systems, radios, depth sounders, and other navigational equipment shall be operated, inspected, and recorded each week and prior to each job by qualified personnel to ensure their proper operation.
9. A detailed daily work schedule that includes the approximate times, site locations, access points and other pertinent information necessary to locate crew members in the event of emergency, will be filed with the local field office or appropriate shore-side personnel.
10. Prior to departure from the dock, the vessel's fuel capacity will be checked to ensure adequate fuel is available to complete the day's work and maintain sufficient fuel reserves to allow for a reasonable margin of safety.
11. Fuel used on the outbound trip to assigned work areas shall not exceed one-third of the total fuel reserves. The pilot shall monitor fuel consumption throughout the work day and begin the inbound transit when remaining fuel reserves approach 150% of the fuel quantity used during the outbound transit.
12. Coast Guard approved PFDs shall be worn by all personnel when on deck or in an open vessel, regardless of other safety devices utilized. All safety devices must be inspected for defects prior to each use and those found to be defective replaced immediately. PFDs need not be worn while working inside an enclosed cabin, but must be readily available when going on deck from the cabin area.

13. Additional emergency/rescue equipment onboard vessels will include, but not be limited to, throw rings, throw ropes, dye markers, strobes, flares, boat hooks, and other safety equipment required by the USCG.
14. Vessel fuel valves shall be in the closed position when shutting down boat operations for the night or more than 8 hours.
15. Smoking shall be prohibited on the boat at all times and/or within 20 feet of fuel tanks.
16. A minimum of one 10-pound A-B-C fire extinguisher will be properly certified, maintained, and located conspicuously onboard all motor-driven vessels.
17. Work areas and access-ways shall be kept clean and clear of obstructions at all times.
18. A proper watch shall be maintained in order to avoid other vessels, floating debris, deadheads, and other obstructions.
19. When conducting night operations or working in reduced visibility, proper navigation lights shall be displayed, a safe speed (as warranted by the conditions) shall not be exceeded, and a proper watch shall be posted.

## A.7.0 Personal Protective Equipment and Safety Equipment

Appropriate PPE will be worn as protection against potential hazards. Specific PPE is outlined in the activity hazard analysis. In addition to PPE that will be worn by personnel, basic emergency and first aid equipment will also be provided. Equipment for the field team will include the following:

1. A copy of this HASP
2. First aid kit adequate for the number of personnel

The FOM/HSO will ensure that the safety equipment is utilized. Equipment will be checked daily to ensure its readiness for use.

## A.8.0 Monitoring Procedures for Site Activities

For this project, the monitoring program will consist of all workers monitoring themselves and their co-workers for signs that might indicate physical stress or illness. 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:

1. Headaches
2. Dizziness
3. Nausea
4. Symptoms of heat stress
5. Blurred vision
6. Cramps
7. Irritation of eyes, skin, or respiratory system

8. Changes in complexion or skin color
9. Changes in apparent motor coordination
10. Increased frequency of minor mistakes
11. Excessive salivation or changes in papillary response
12. Changes in speech ability or speech pattern
13. Shivering
14. Blue lips or fingernails

If any of these conditions develop, work shall be halted immediately and the affected person(s) 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 direct result of sample collection or handling activities, procedures will be modified to address the problem.

## A.9.0 Decontamination

Bathymetric surveyors have a low likelihood of contact with contaminated sediment, but decontamination protocols will be followed if contact occurs. At a minimum, boots and equipment that contact contaminated sediment will require decontamination before leaving contaminated areas. Decontamination stations will be set up adjacent to the boat to clean boots, equipment, and any other contaminated gear and avoid tracking contamination into clean areas. The following measures will be observed to prevent or minimize exposure to potentially contaminated materials:

- Do not walk through spilled materials.
- Do not handle, touch, or smell environmental media directly.
- Make sure PPE has no cuts or tears prior to use.
- Protect and cover any skin injuries.
- Stay upwind of airborne dusts and vapors.
- Do not eat, drink, chew tobacco, or smoke in the work zones.

### A.9.1 Decontamination Equipment

All equipment taken into potentially contaminated areas will be visually inspected and, if necessary, decontaminated prior to leaving the area. Rinsate from all decontamination activities will be collected for proper disposal. Decontamination of equipment and tools will take place within the contamination reduction zone.

The following supplies will be available to perform decontamination activities:

- Wash and rinse buckets
- Tap water and phosphate-free detergent
- Scrub brushes

- Distilled/deionized water
- Pressure washer/steam cleaner, if appropriate
- Paper towels and plastic garbage bags

### A.9.2 Personnel Decontamination

The FOM will verify that all site personnel are familiar with personnel decontamination procedures as listed below. All personnel wearing PPE in a contaminated work area must undergo decontamination, as appropriate, prior to entering the Safe Zone. Personnel will perform the following decontamination procedures:

- Wash and rinse outer gloves and boots in portable buckets to remove gross contamination.
- If suit is heavily soiled, rinse it off.
- Remove outer gloves; inspect and discard if damaged. Leave inner gloves on. Personnel will remove their outer garment and gloves, dispose of them, and properly label container or drum. Personnel will then decontaminate, as appropriate, their hard hats and boots with an aqueous solution of detergent or other appropriate cleaning solution. These items then will be hand-carried to the next station. Remove inner gloves.
- Thoroughly wash hands and face if they came into contact with sediment before leaving an area with contamination.

### A.9.3 Non-Disposable Personal Protective Equipment

Non-disposable PPE may include boots and gloves. When decontaminating boots and gloves, observe the following practices and procedures:

- Decontaminate the boots or gloves outside with a solution of detergent and water; rinse with water prior to leaving the site.
- Protect the boots or gloves from exposure by covering with disposable covers such as plastic to minimize required decontamination activities.

### A.9.4 Emergency Personnel Decontamination

Personnel with medical problems or injuries may also require decontamination. There is the possibility that the decontamination may aggravate or cause more serious health effects. If prompt lifesaving, first aid, and medical treatment are required, decontamination procedures will be omitted. In either case, a member of the site management team will accompany contaminated personnel to the medical facility to advise on matters involving decontamination.

## A.10.0 Disposal of Contaminated Materials

Contaminated materials must be contained and characterized for proper disposal. Anchor QEA will provide decontamination equipment and remove residue from decontamination.

## A.11.0 Training Requirements

HAZWOPER training is not required for bathymetric surveying personnel since this work will be performed from a boat and there will be limited, if any, contact with contaminated sediment. Field team members must have first-aid and cardiopulmonary resuscitation (CPR) training. Documentation will be kept in the project health and safety files.

## A.12.0 Medical Surveillance

A medical surveillance program conforming to the provisions of 29 CFR 1910§120(f) is not necessary for field team members because they do not meet any of the four criteria outlined in the regulations for implementation of a medical surveillance program:

- Employees who are or may be exposed to hazardous substances or health hazards at or above permissible exposure levels for 30 days or more per year (1910.120(f)(2)(I))
- Employees who must wear a respirator for 30 days or more per year (1910.120(f)(2)(ii))
- Employees who are injured or become ill due to possible overexposures involving hazardous substances or health hazards from an emergency response or hazardous waste operation (1910.120(f)(2)(iii))
- Employees who are members of HAZMAT teams (1910.120(f)(2)(iv))

As described in Section A.8, employees will monitor themselves and each other of any deleterious changes in their physical or mental condition during the performance of all field activities.

Specific attention will be given to the requirement to screen all workers at the beginning of their shifts by taking their temperatures and asking them if they have a fever, cough, shortness of breath, fatigue, muscle aches, or new loss of taste or smell. Thermometers used shall be 'no touch' or 'no contact' models to the greatest extent possible. If a 'no touch' or 'no contact' thermometer is not available, the thermometer will be properly sanitized between each use. Any worker with a temperature of 100.4°F or higher will be considered to have a fever and will be sent home.

As described in Section A.8, employees will monitor themselves and each other for any deleterious changes in their physical or mental conditions during the performance of all field activities.

Regarding monitoring exposures to the SARS-CoV-2 (COVID-19) virus, there are three possible scenarios:

- Primary exposure: When an employee has tested positive for the virus
- Secondary exposure: When an employee has had direct contact with someone diagnosed with COVID-19 within the last 14 days

- Tertiary exposure: When an employee has had direct contact with someone who has been quarantined due to close contact with someone else who has been diagnosed with or is being screened for COVID-19 within the last 14 days

The FC/HSO (or designee) will also act as the on-site COVID-19 Supervisor, and shall monitor the health of employees and enforce the measures established to minimize exposure to the SARS-CoV-2 virus. Workers are expected to inform the FC/HSO if they develop symptoms of or have been exposed to anyone with COVID-19.

## A12.1 COVID-19 Primary Exposure

If an employee has tested positive for COVID-19, the FC/HSO will immediately take the following actions:

- The employee will be immediately sent away for isolation (i.e., until cleared by a healthcare professional) if they are at the site.
- The employee's steps will be traced to identify work areas with which the individual may have been in contact.
- All identified areas will be quarantined and marked as off limits to all site personnel, until a decontamination/disinfection process following CDC guidelines has been implemented.
- Employees who have been in direct/close contact (within 6 feet for 15 minutes or greater during a 24-hour period) with the infected individual will be asked to quarantine until released by a healthcare professional and may be asked to seek medical testing.

## A12.2 COVID-19 Secondary Exposure

If an employee has had direct/close contact with someone who has been diagnosed with COVID-19 during a period as determined by a healthcare provider, the FC/HSO will immediately take the following actions:

- Immediately send the employee home until released by a healthcare professional.
- Consult with the Washington State Department of Health for additional guidance if the employee is diagnosed with COVID-19 and has been instructed to self-quarantine.
- Inform the CHSMs and PMs immediately.
- Follow up with the field team after test results for the potentially exposed employee have been received.
- Continue cleaning common touch areas with recommended disinfectants.
- Follow primary exposure scenario (Section A.12.1) if an employee is confirmed as positive for COVID-19.

## A12.3 COVID-19 Tertiary Exposure

It is more difficult to manage tertiary exposure because there is innately less control in a situation wherein an employee may have had direct contact with an acquaintance who has been quarantined due to close contact with someone else who has been diagnosed with or is being screened for COVID-19 within the last 14 days. The FC/HSO will request that all site workers provide any relevant exposure information. If an employee is believed to have been subject to tertiary exposure, take the following actions:

- Consult with the Washington State Department of Health for additional guidance if the acquaintance who is diagnosed with or screened for COVID 19 has been instructed to self-quarantine.
- Inform the CHSMs and PMs immediately.
- Follow up with the field team after test results for the potentially exposed employee have been received.
- Continue cleaning common touch areas with recommended disinfectants.
- Follow secondary exposure scenario (Section A.12.2) if the acquaintance is confirmed as positive for COVID-19.

## A12.4 COVID-19 Field Guidance

We must keep in mind that our underlying social distancing requirements and responsibilities are the foundation of all our activities. Do not come to work if you are feeling sick, and contact your Manager immediately if you have symptoms consistent with COVID-19, have tested positive for COVID-19, and/or suspect you have been exposed.

- If masks (i.e., N 95) are used, they should be used in accordance with OSHA 1910.120, stating, in part, that the user must be fit-tested and in a surveillance program.
- Prior to departing for the site, the Site Safety Officer should obtain enough supply of U.S. Environmental Protection Agency (EPA)-registered disinfectants, wipes, hand sanitizers, and gloves.
- Regardless of vaccination status, if staff feel that they are sick or showing symptoms, they are required to stay home and not report to work.
- All staff who work on the site will be required to undergo a site safety orientation (tailgate meeting), which will include information on specific measures to be followed to address efforts to prevent the spread of COVID-19. All field staff are required to vocalize concerns and ensure that protective measures that will slow the spread of COVID-19 are employed.
- Follow the site-specific HASP Personal Protective Equipment (PPE) requirements.
- One step to control spread of the virus at the project job site is focused on hygiene. All staff and management staff will follow CDC guidance regarding hand washing. https://www.cdc.gov/handwashing/index.html

- Hand wash stations and/or sanitizing wipes/sanitizing gel will be made readily available around the job site and within project office trailers. If these supplies are insufficient, work should be stopped until additional supplies are procured.
- Smart phones and radios should be wiped down frequently throughout the day and should not be shared to the greatest extent possible. If these items are shared, they are to be wiped down prior to handing off to another individual or placing in storage for the day.
- Field support areas, boats/vessels, and equipment cabs will be cleaned throughout the day and at every shift change. All "touch" surfaces will be thoroughly wiped clean using a disinfectant.
- Staff should follow published guidance to limit transmission at home and outside of work: https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-prevent-spread.html

## A.13.0 Reporting and Record Keeping

Each member of the field crew will sign the HASP review form (see Attachment A.1). If necessary, accident/incident report forms will be completed by the FOM/HSO.

The FOM/HSO or a designee will note health- and safety-related details of the project in the field logbook and record. The logbook must be bound, and the pages must be numbered consecutively. Entries will be made with indelible ink. At a minimum, each day's entries must include the following information:

1. Project name or location
2. Names of all personnel onboard
3. Weather conditions
4. Type of fieldwork being performed

The person maintaining the entries will initial and date the bottom of each completed page. Blank space at the bottom of an incompletely filled page will be lined out. Each day's entries will begin on the first blank page after the previous work day's entries.

## A.14.0 Emergency Response Plan

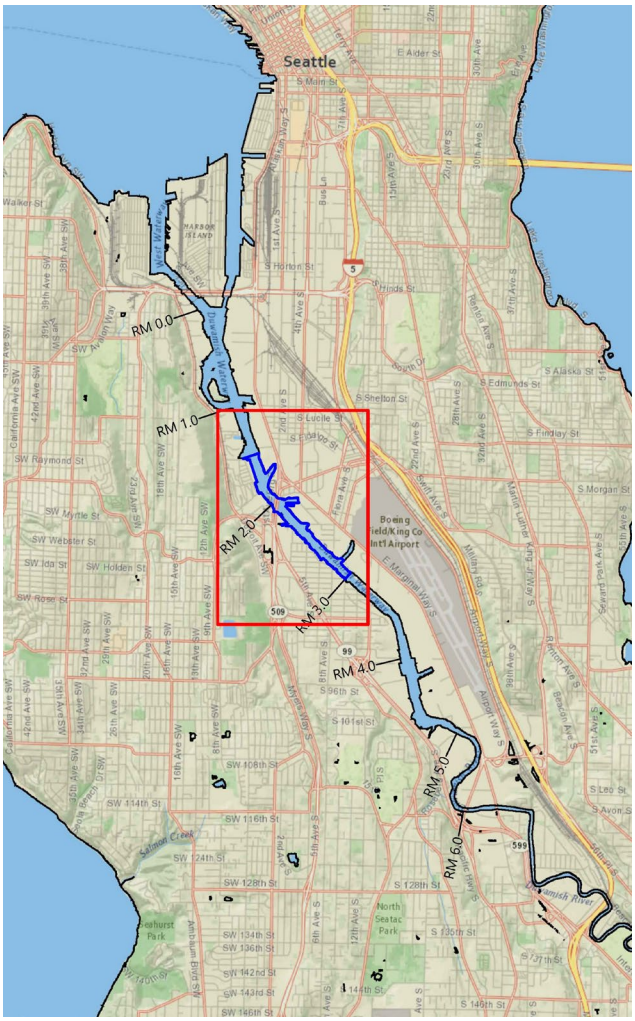
As a result of the hazards and the conditions under which operations will be conducted, the potential exists for an emergency situation to occur. Emergencies may include personal injury, fire, or explosion. Occupational Safety and Health Administration (OSHA) regulations require that an emergency response plan be available for use to guide actions in emergency situations.

The local fire department and ambulance service can provide timely response. Field personnel will be responsible for identifying an emergency situation, providing first aid if applicable, notifying the appropriate personnel or agency, and evacuating any hazardous area.

The following sections identify the onboard individual(s) who should be notified in case of emergency, provide a list of emergency telephone numbers, offer guidance for particular types of emergencies, and provide directions and a map for getting from any surveying location to a hospital.

## Site Map

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



| Category | Information |
|---|---|
| Possible Chemicals of Concern | Polychlorinated biphenyl compounds, carcinogenic polycyclic aromatic hydrocarbons, arsenic, dioxins/furans in sediment below MHHW |
| Minimum Level of Protection | Level D |
| Site Location | Lower Duwamish Waterway middle reach (between river miles 1.5 and 3.0) |

## A.14.1 Pre-Emergency Preparation

Before the start of field activities, the FOM/HSO will ensure that preparation has been made in anticipation of emergencies. Preparatory actions include the following:

1. Meeting with the FOM/HSO and equipment handlers concerning the emergency procedures in the event that a person is injured
2. A training session given by the FOM/HSO informing all field personnel of emergency procedures, locations of emergency equipment and their use, and proper evacuation procedures
3. A training session given by senior staff operating field equipment, to apprise field personnel of operating procedures and specific risks associated with that equipment
4. Ensuring that field personnel are aware of the existence of the emergency response plan in the HASP and ensuring that a copy of the HASP accompanies the field team

## A.14.2 Project Emergency Coordinator

The FOM/HSO will serve as the Project Emergency Coordinator in the event of an emergency. They will designate their replacement for times when they are not onboard or not serving as the Project Emergency Coordinator. The designation will be noted in the logbook. The Project Emergency Coordinator will be notified immediately when an emergency is recognized. The Project Emergency Coordinator will be responsible for evaluating the emergency situation, notifying the appropriate emergency response units, coordinating access with those units, and directing interim actions onboard before the arrival of emergency response units. The Project Emergency Coordinator will notify the HSM and the PM as soon as possible after initiating an emergency response action. The PM will have responsibility for notifying the client.

## A.14.3 Emergency Response Contacts

All onboard personnel must know whom to notify in the event of an emergency situation, even though the FOM/HSO has primary responsibility for notification. Table A-4 lists the names and phone numbers for emergency response services and individuals.

**Table A-4**
**Emergency Response Contacts**

| Contact | Telephone Number |
|---|---|
| **Emergency Numbers** | |
| Ambulance | 911 |
| Police | 911 |
| Fire | 911 |
| Harborview Medical Center | (206) 323-3074 |
| **Emergency Responders** | |
| U.S. Coast Guard | |
| Emergency<br>General information | (206) 286-5400<br>(206) 442-5295<br>UHF Channel 16 |
| National Response Center | (800) 424-8802 |
| EPA | (908) 321-6660 |
| Washington State Department of Ecology – Northwest Region Spill Response<br>(24-hour emergency line) | (206) 649-7000 |
| **Emergency Contacts** | |
| *King County Project Representative* | |
| Bryahna Davis | (206) 263-2540 (office) |
| *Project Manager* | |
| Tom Wang | (206) 903-3314 (office)<br>(206) 465-0900 (cell) |
| *Corporate Health and Safety Director* | |
| David Templeton | (206) 903-3312 (office)<br>(206) 910-4279 (cell) |
| *Health and Safety Program Lead* | |
| Tim Shaner | (251) 375-5282 (Office)<br>(251) 281-3386 (Cell) |
| *Field Operations Manager/Field Health and Safety Officer* | Site cellular telephone: |
| James Glaeser, Northwest Hydro, Inc. | (360) 241-7313 |
| Jo Miller, True North Land Surveying, Inc. | (206) 332-0800 (Office)<br>(253) 344-9069 (Cell) |

## A.14.4 Recognition of Emergency Situations

Emergency situations will generally be recognizable by observation. An injury or illness will be considered an emergency if it requires treatment by a medical professional and cannot be treated with simple first-aid techniques.

## A.14.5 Emergency Procedures Related to Vessel Operations

In deteriorating weather/sea conditions, radio the field office or U.S. Coast Guard (USCG) with your location, direction of travel, and approximate speed before a dangerous situation can develop. In an emergency, contact the USCG on VHF channel 16. Emergency VHF radio broadcasts should be proceeded by "Pan-Pan, Pan-Pan, Pan-Pan" for non-life-threatening emergencies and "Mayday, Mayday, Mayday" for life-threatening situations. Be prepared to provide your vessel name, location, and the nature of the emergency. Don life jackets and/or survival suits, take necessary measures to prevent hypothermia, and wait for the search and rescue.

## A.14.6 Fire

Field personnel will attempt to control only small fires, should they occur. If an explosion appears likely, personnel will follow evacuation procedures specified during the training session. If a fire cannot be controlled with a fire extinguisher on board that is part of the required safety equipment, personnel will either withdraw from the vicinity of the fire or evacuate the boat as specified in the training session.

## A.14.7 Personal Injury

In the event of serious personal injury, including unconsciousness, possibility of broken bones, severe bleeding or blood loss, burns, shock, or trauma, the first responder will immediately do the following:

1. Administer first aid, if qualified.
2. If not qualified, seek out an individual who is qualified to administer first aid, if time and conditions permit.
3. Notify the Project Emergency Coordinator of the incident, the name of the individual, the location, and the nature of the injury.
4. The Project Emergency Coordinator will immediately do the following:
    a. Notify the boat captain and the appropriate emergency response organization.
    b. Assist the injured individual.
    c. Follow the emergency procedures for retrieving or disposing equipment reviewed in the training session and leave the site en route to the predetermined land-based emergency pick-up.
    d. Designate someone to accompany the injured individual to the hospital.

e. If a life-threatening emergency occurs, i.e., injury where death is imminent without immediate treatment, the FOM/HSO or boat captain will call 911 and arrange to meet the Medic One unit at the nearest accessible dock. Otherwise, for emergency injuries that are not life threatening (i.e., sprains, minor lacerations, etc.) the Project Emergency Coordinator will follow the procedures outlined above and proceed to the Harbor Island Marina or to an alternative location of their choice if that would be more expedient.
f. Notify the HSM and the PM.

If the Project Emergency Coordinator determines that emergency response is not necessary, he or she may direct someone to transport the individual by vehicle to the nearest hospital. Directions and a map showing the route to the hospital are in Section A.14.10.

If a worker leaves the boat to seek medical attention, another worker should accompany them to the hospital. When in doubt about the severity of an injury or exposure, always seek medical attention as a conservative approach, and notify the Project Emergency Coordinator.

The Project Emergency Coordinator will have responsibility for completing all accident/incident field reports, OSHA Form 200s, and other required follow-up forms.

## A.14.8 Overt Personal Exposure or Injury

No overt exposure to toxic materials is expected to occur. Accordingly, no emergency procedures related to such exposure are required for this project.

## A.14.9 Spills and Spill Containment

No bulk chemicals or other materials subject to spillage are expected to be used during this project. Accordingly, no spill containment procedure is required for this project.

## A.14.10 Emergency Route to the Hospital

The name, address, and telephone number of the hospital that will be used to provide medical care is as follows:

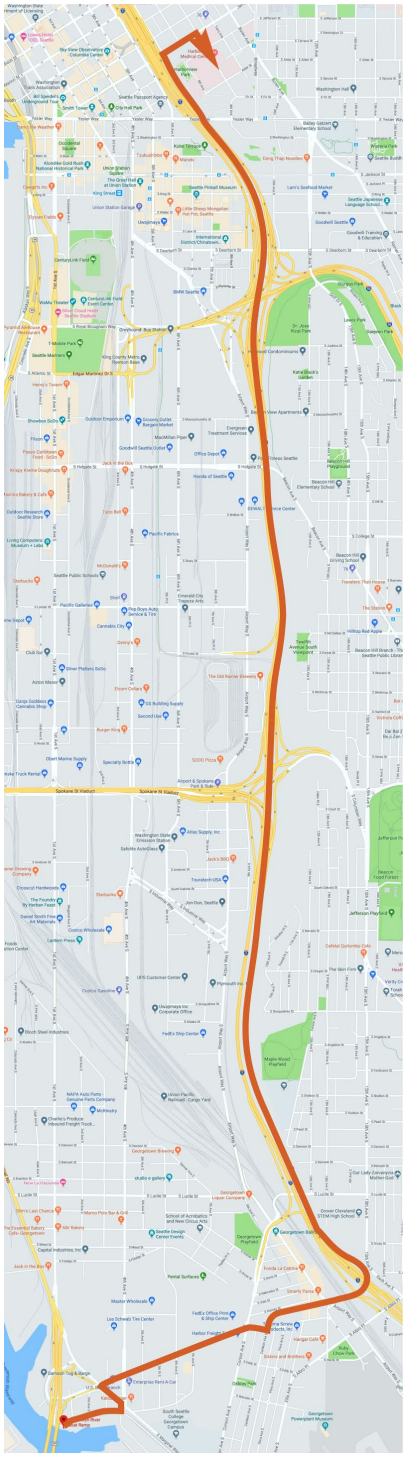
Harborview Medical Center
325 - 9th Ave.
Seattle, WA
(206) 323-3074

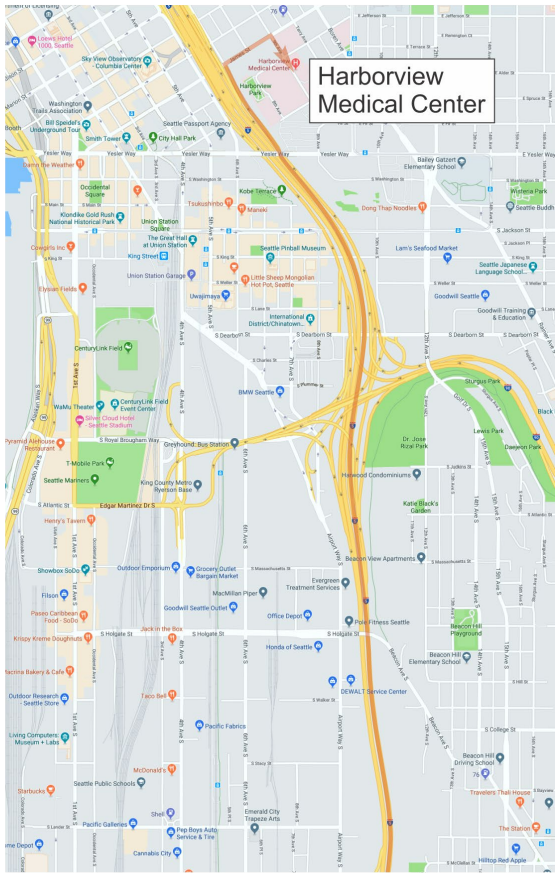
Directions from the Duwamish River Boat Ramp to Harborview Medical Center (Figure B) are as follows:

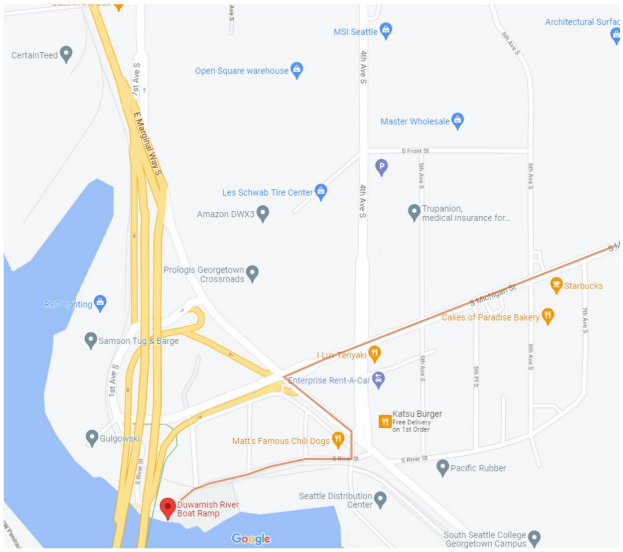
1. Dock the vessel at the 1st Avenue S boat launch (Duwamish River Boat Ramp).
2. Drive east on S River Street.

3. Turn left on 4th Avenue S.
4. Turn left on E Marginal Way S.
5. Turn right on S Michigan Street.
6. Look for entrance ramps to I-5 Northbound (left turn).
7. Head north on I-5.
8. Take the James Street exit.
9. Turn right on James Street to 9th Avenue.
10. Turn right on 9th Avenue.
11. Emergency entrance will be two blocks south on the right.

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





# Attachment A.1
# HASP Acknowledgement Form

## Attachment A.1. HASP Acknowledgement Form

I have read a copy of the Health and Safety Plan, which covers field activities that will be conducted to investigate potentially contaminated areas in the LDW. I understand the health and safety requirements of the project, which are detailed in this Health and Safety Plan.

| Signature | Date |
| --- | --- |
| Signature | Date |
| Signature | Date |
| Signature | Date |
| Signature | Date |
| Signature | Date |
| Signature | Date |
| Signature | Date |
| Signature | Date |
| Signature | Date |

# Attachment A.2
# Modification to Health and Safety Plan Form

# 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:** _____

**Name:** _____ **Date:** _____

**Name:** _____ **Date:** _____

**Name:** _____ **Date:** _____

**Name:** _____ **Date:** _____

**Name:** _____ **Date:** _____

**Approvals**

**Field Lead:** _____ _____ _____
Printed Name | Signature | Date

**Project Manager:** _____ _____ _____
Printed Name | Signature | Date

PLAYING IT SAFE

# Attachment A.3
# Phase I Construction Restart COVID-19
# Job Site Requirements

# Field Program COVID-19 Management Plan

**Date:** _____

**Project No:** _____

**Project Name:** _____

In response to the global situation regarding Coronavirus Disease 2019 (COVID-19), Anchor QEA, LLC, has compiled the following guidance to support our ongoing field efforts, whether sediment sampling efforts, wetland delineations, groundwater evaluation, site visits, or construction management. Anchor QEA strongly encourages all staff to be fully vaccinated when they are eligible in the location where they reside. Anchor QEA also requests that, while not required, staff upload a record of their vaccination into the WorkCare screening portal.

This Field Program COVID-19 Management Plan (Plan) is an addendum to the existing project-specific Health and Safety Plan (HASP) for field activities and shall remain a portion of the HASP until superseded by other notification. All personnel who have previously signed acknowledging the HASP must sign off acknowledging this Plan. Acknowledgement of this Plan will be included with future acknowledgements of the overall HASP.

***We must keep in mind that our underlying social distancing requirements and responsibilities are the foundation of all our activities. Do not come to work if you are feeling sick, and contact your Manager immediately if you have symptoms consistent with COVID-19, have tested positive for COVID-19, and/or suspect you have been exposed.*** We also need to be cognizant of changing state and local orders and directives (or removal of restrictions) associated with COVID-19. Specific field efforts will require discussions between the Project Manager, field staff, and client to address availability, travel, and other considerations. If necessary, specific state, local, or project-specific orders and directives can be included with this Plan after review by Health and Safety.

1. Field programs will follow this Field Program COVID-19 Management Plan unless the client, prime contractor, federal, state, or local government establish more restrictive measures, in which case the more restrictive measures will be followed.
2. For projects that do not have an established daily screening, the WorkCare screening portal is to be used.
3. Updated information can be found at the U.S. Centers for Disease Control and Prevention (CDC) website (https://www.cdc.gov/), as well as state and local health agency websites.
4. Staff traveling to certain locations may need to comply with specific testing or vaccination requirements. The company will coordinate with staff as appropriate to meet these requirements, realizing that staff selection for a specific project may be determined by these factors.
5. Nationwide, our community defense is to slow the spread of COVID-19, which may include not traveling between impacted areas and less impacted areas. Therefore, we will evaluate limiting

travel for field work on a case-by-case basis consistent with this community defense approach and following appropriate national, state, and local guidance. We expect that this situation will be fluid as conditions change in the country.

6. Field project schedules, modifications, and regulatory requirements will be discussed with the client representatives.

The objective of this Plan is to provide additional operational guidelines to the team that address the challenges presented by COVID-19 and ensure consistency in our response actions across the project team. These guidelines are consistent with and based on recommendations from the CDC, with multiple links provided throughout. All personnel have Stop Work Authority. If you should have questions or concerns, please direct those to your Field Lead, Staff Manager, or Project Manager.

Some site owners or prime contractors may conduct temperature screening prior to entering a site, which is in accordance with some current guidance. Some site owners or prime contractors may want to record actual temperature readings, test results, or information other than general yes or no questions related to travel, symptoms, vaccination status, etc. If you choose not to participate in the recording of screening information, the site owner or prime contractor may not allow you to access the site. You should immediately contact your Field Lead, Staff Manager, or your Project Manager to discuss alternative work and available options.

The following describes minimum measures to be followed by the project team:

## Prior to Coming to the Site

- Travel is allowed.
- Understand the community exposure and travel history of all staff. If a staff member has traveled to an affected country outside the United States or has had close contact with an infected individual within the United States, we require that they be cleared by WorkCare.
  - The following link provides the CDC list of countries with Travel Health Notices in Place: https://wwwnc.cdc.gov/travel/notices
  - The following link provides CDC information on cases within the United States: https://www.cdc.gov/coronavirus/2019-ncov/cases-in-us.html
- If masks (i.e., N 95) are used, they should be used in accordance with OSHA 1910.120, stating, in part, that the user must be fit-tested and in a surveillance program.
- Prior to departing for the site, the Site Safety Officer should obtain enough supply of U.S. Environmental Protection Agency (EPA)-registered disinfectants, wipes, hand sanitizers, and gloves.
- Some projects may require temperature readings prior to entry to a project site. Anchor QEA supports privacy concerns, and if a temperature reading or vaccination status is recorded

(vs. a green light/red light approach based on a temperature threshold) we will take steps to document the confidentiality of that information. However, in some cases Anchor QEA cannot control the procedure nor document confidentiality. In these situations, Anchor QEA staff will need to acknowledge that if they choose to not comply in the future that is their right. If a staff member chooses to not comply, the Project Manager, Regional Lead, and Human Resources should be consulted.

- Some projects may require procedures to document a 14-day look-back period that is absent of symptoms consistent with COVID-19.
- Staff should be self-isolated, as necessary, prior to coming to the site in accordance with current federal, state, and local orders. Any staff member who has been exposed to any household member (including healthcare professionals) exhibiting COVID-19 symptoms or has tested positive for COVID-19 will not report to the site for work unless they have met the guidelines contained in this Plan.
- Exposure to, or close contact with, means being within 6 feet of an individual for 15 minutes or greater in a 24-hour period or being exposed to their cough or sneeze.
- If you meet the criteria listed for Primary or Secondary Exposure, listed below, do not report to work; contact your Manager, contact the Health and Safety representatives, and stay home until the appropriate return to work criteria are met.
- ***Regardless of vaccination status, if staff feel that they are sick or showing symptoms, they are required to stay home and not report to work (office or field).*** They should call their Manager immediately and notify them that they are sick. Showing up to work with symptoms will result in the staff being asked to leave to avoid potentially exposing others to the virus.
- If staff are showing symptoms, they are to contact WorkCare and their healthcare provider for medical advice. If staff feel the need to visit a medical professional, it is recommended that the medical office be contacted first to determine when it is appropriate to visit.
- If staff show any symptoms while on site, they will be asked to leave and not return until they have been cleared by WorkCare. They may be requested submit a physician's note, by WorkCare, releasing them back to work. The exception to this would be if their primary physician recommends more restrictive measures.
  - https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-business-response.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fspecific-groups%2Fguidance-business-response.html

## Fully Vaccinated

The CDC defines "fully vaccinated" as greater than or equal to 2 weeks following the final dose in a two-dose series or following the initial dose in a single-dose vaccine.

Anchor QEA will follow CDC and Occupational Safety and Health Administration (OSHA) recommendations regarding fully vaccinated staff being able to forgo the face covering and social distancing requirements both in the office and field. For field work, reference the latest version of this Plan. Fully vaccinated staff must comply with the following guidelines:

- Complete an acknowledgement in Bamboo regarding the updated requirements as well as consent to share with Project Managers, Field Leads, Office Leads, and Staff Managers (who have a need to know) information related to being fully vaccinated if that information has been in accordance with the updated requirements.
- Vaccination information is uploaded into the WorkCare portal. This is to help us meet various state requirements for the employer to determine if the staff member is fully vaccinated.
- Staff who are fully vaccinated, even if information is uploaded to WorkCare, may still use face coverings and follow social distancing if they desire.
- Out of respect, all staff will have face coverings available and fully vaccinated staff will use face coverings if requested by others in close contact situations.
- Fully vaccinated staff are not required to use face coverings or follow social distancing during meetings, meals, or other close contact situations unless requested.
- All staff will still be required to complete the WorkCare daily screening or other project-specific screening.
- All laws, regulations, client requirements, field work requirements, building requirements, and other company requirements apply to all staff (e.g., air travel requirements).
- Fully vaccinated staff that have notified the company may sit together without social distancing or face coverings for meals.
- Food and beverages are allowed to be brought to the project site for sharing, if they are individually packaged.
- Travel is allowed to include sharing vehicles with others who are fully vaccinated.
- Staff must be considerate of others.
- If asymptomatic following close contact with a Primary Exposure, staff do not need to isolate but do need to follow up with WorkCare.

Staff are not required to obtain the vaccination or to notify the company if they have been vaccinated unless they wish to follow the above process. Fully vaccinated staff who have had close contact with a Primary Exposure or who have symptoms consistent with COVID-19 must be cleared to return to work following the processes outlined in the Case Response section below.

## Not Fully Vaccinated

The CDC defines "fully vaccinated" as greater than or equal to 2 weeks following the final dose in a two-dose series or following the initial dose in a single-dose vaccine.

Anchor QEA will follow CDC and OSHA recommendations for staff who are not fully vaccinated regarding face covering and social distancing requirements both in the office and field. For field work, reference the latest version of this Plan. Staff who are not fully vaccinated must comply with the following guidelines:

- All staff will still be required to complete the WorkCare daily screening or project-specific screening.
- All laws, regulations, client requirements, field work requirements, building requirements, and other company requirements apply to all staff (e.g., air travel requirements).
- Avoid close contact (i.e., handshakes or other physical contact) and practice social distancing (stay at least 6 feet away from others).
- Meetings are allowed; however, those who are not fully vaccinated must adhere to social distancing requirements.
- If there is a chance that an unvaccinated staff member might have close contact with someone, such as being within 6 feet of an individual for 15 minutes or greater in a 24-hour period, or being exposed to their cough or sneeze, the staff member must wear a face covering in accordance with CDC guidance.
- Common areas (i.e., kitchens, break areas, conference rooms, entryways, restrooms, and copier and printer stations) are to be avoided to the greatest extent possible and social distancing must be observed by those not fully vaccinated.
- The use of communal coffee pots, microwaves, refrigerators, and similar items are allowed.
- Food and beverages are allowed to be brought to the project site for sharing, if they are individually packaged.
- Travel is allowed.
- Travel is preferred to be in individual vehicles.
- Staff should wear cloth face coverings in public settings, in addition to social distancing measures, including travel to the site or office, grocery stores, and picking up to-go food.
- Avoid restaurants if open; use drive-in or take-out services.
- The CDC recommends wearing cloth face coverings in public settings where other social distancing measures are difficult to maintain (e.g., grocery stores and pharmacies) especially in areas of significant community-based transmission.
- Staff must be considerate of others.

Staff are not required to obtain the vaccination or to notify the company if they have been vaccinated unless they wish to follow the process for fully vaccinated staff.

## Visitors

- Visitors are allowed but must complete a WorkCare visitor screening or project-specific screening. They additionally must sign an affirmation statement if they wish to forgo the face covering and social distancing requirements.
- Meetings with outside parties should take place virtually, when possible.
- Delivery personnel should not remain in indoor settings for longer than 15 minutes without completing the visitor screening.
- For visitors to forgo the face covering and social distancing requirement, they must attest that they are fully vaccinated when signing in.
- All laws, regulations, client requirements, field work requirements, building requirements, and other company requirements apply to all visitors (e.g., air travel requirements).

## On-Site Preventative Measures and Cleaning Requirements

- All staff who work on the site will be required to undergo a site safety orientation (tailgate meeting), which will include information on specific measures to be followed to address efforts to prevent the spread of COVID-19. All field staff are required to vocalize concerns and ensure that protective measures that will slow the spread of COVID-19 are employed.
- Follow the site-specific HASP Personal Protective Equipment (PPE) requirements.
- One step to control spread of the virus at the project job site is focused on hygiene. All staff and management staff will follow CDC guidance regarding hand washing.
  - https://www.cdc.gov/handwashing/index.html
  - Hand wash stations and/or sanitizing wipes/sanitizing gel will be made readily available around the job site and within project office trailers. If these supplies are insufficient, work should be stopped until additional supplies are procured.
- Office trailers will also be cleaned at least twice a day using disinfectant to wipe all surfaces that may be touched by hand including desk and table surfaces. In addition, office trailer personnel (as directed by the Field Lead) will be responsible for multiple daily cleaning of the various field offices and related workspaces.
- Smart phones and radios should be wiped down frequently throughout the day and should not be shared to the greatest extent possible. If these items are shared, they are to be wiped down prior to handing off to another individual or placing in storage for the day.
- Field support areas, boats/vessels, and equipment cabs will be cleaned throughout the day and at every shift change. All "touch" surfaces will be thoroughly wiped clean using a disinfectant.
- Staff should follow published guidance to limit transmission at home and outside of work: https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-prevent-spread.html

- The following links provide a list of U.S. Environmental Protection Agency recommended cleaning products able to kill the virus, as well as some initial guidance with alternatives if supplies run out. ***"Note: Inclusion on this list does not constitute an endorsement by EPA. Additional disinfectants may meet the criteria for use against SARS-CoV-2. EPA will update this list with additional products as needed."***
  - https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2
  - If these products are not available, then either a diluted bleach solution or 70% alcohol solution will work.
  - https://www.cdc.gov/coronavirus/2019-ncov/community/home/cleaning-disinfection.html
- If a staff member becomes ill while on site, they should return to their hotel room or local home, contact their healthcare provider, and follow their guidance. The staff member's Manager should be contacted immediately. Our Health and Safety representatives will follow up with the staff member. If the staff member has a confirmed or presumed case as determined by a healthcare provider, we will follow our procedures as outlined in this document. If the staff member is not able to transport themselves, local emergency responders will be called as per company protocol.

## Case Response, and Equipment and Facility Decontamination

According to the CDC, symptoms can appear 2 to 14 days after exposure. Symptoms or combinations of symptoms that may be consistent with COVID-19 include cough, shortness of breath, difficulty breathing, fever (100.4°F [37.8°C] or greater), chills, repeated shaking with chills, muscle pain or body aches, headache, sore throat, congestion or runny nose, nausea or vomiting, diarrhea, or new loss of taste or smell.

If you have symptoms that are consistent with COVID-19 but have not tested positive, regardless of what your primary physician concludes, you are to self-isolate until you have been released to return to work by WorkCare. Immediately contact your Regional Lead and Project Manager. WorkCare may ask you to submit a physician's note releasing you back to work. The exception to this would be if your primary physician recommends more restrictive measures. In this case there is no need to alert or self-isolate any other staff.

Regarding COVID-19 exposures, there are three general scenarios:

- **Primary Exposure:** These are staff who have tested positive for the virus. If you have tested positive for COVID-19, you must be in self-isolation and an effort will be made to contact those people you had direct contact with in the last 14 days. You must not return to the work site until you have been released to return by WorkCare. The exception to this would be if your primary physician recommends more restrictive measures.

- **Secondary Exposure:** These are staff who, within the last 14 days, have had direct contact with someone who has tested positive for COVID-19. You must self-isolate until released by WorkCare to return. You are encouraged to seek medical care. If you start to have symptoms or test positive, follow the appropriate guidance for Primary Exposure noted above.
- **Tertiary Exposure:** These are staff who have had direct contact with someone that meets Secondary Exposure criteria or have been in the same general area. In this scenario, there is no requirement to isolate; however, the staff should self-monitor for the development of symptoms.

In the event there is a documented case of a staff member becoming infected with COVID-19 (Primary Exposure) the field management team will take immediate action as follows:

- The staff member should immediately self-isolate until they have been released to return by WorkCare.
- Notify the Project Manager, Human Resources, and Regional Lead immediately.
- The staff member's work steps will be traced back 14 days to identify work areas the individual may have contacted. All identified areas will be isolated and marked off limits to all site personnel, until a decontamination process can be implemented.
- All identified areas will be disinfected by qualified individuals following CDC guidelines.
- Staff who came in direct contact with the individual will be notified. The Regional Lead will work with the Project Manager and Human Resources to notify the Anchor QEA staff who were identified.
- The Project Manager, in coordination with the client, will notify subcontractors and vendors on the site who had direct contact with the individual.
- The Project Manager should notify the client immediately and inform them of our backup staffing plan as well as our notification plan.
- Confidentiality for the staff member should be maintained.

If a staff member, within the last 14 days, has had direct contact with someone diagnosed with COVID-19 (Secondary Exposure), the field management team will take immediate action as follows:

- Send staff home immediately and have them coordinate with WorkCare for their return.
- Let the Regional Lead and Project Manager know immediately.
- Continue cleaning of common touch areas with recommended disinfectants.
- If staff tests positive, this becomes a Primary Exposure scenario, and that guidance should then be followed.

Situations where a staff member may have had Tertiary Exposure are more difficult to manage. This involves having direct contact with someone who has had Secondary Exposure. In the event of Tertiary Exposure, the field management team will take immediate action as follows:

- Let the Regional Lead and Project Manager know immediately.
- No further notifications are necessary with this scenario.
- Continue cleaning of common touch areas with recommended disinfectants.
- This becomes a Secondary Exposure scenario if the acquaintance is confirmed to be infected, and that guidance should then be followed.

When staff are in self-isolation, their Manager or designee will follow up with them two times per week.

## General Measures / Guidance

- Staff must follow the same prevention guidelines off site, which includes travel, hotel, and other activities, in order to address potential exposures outside the workplace.
- Travel, whether by train or plane, will be reviewed on a case-by-case basis. Mass transit should be avoided where social distancing is difficult.
- The virus may live on a variety of surfaces for some period of time; closely follow the cleaner/disinfectant contact time. Avoid combining products that are incompatible and may create toxic byproducts.
- When at hotels, disinfect your own room with EPA-registered cleaners or alternatives, and use the NO HOUSEKEEPING sign to minimize the people coming into your room.
- Catch coughs and sneezes with a disposable tissue, etc. and throw away, then wash hands. If tissues are not available, direct coughs and sneezes into elbow.
- Avoid touching your own mouth, nose, or eyes.
- Hand washing stations with soap and water will be available at all restroom facilities. Frequent hand washing is recommended throughout the day. Washing hands thoroughly for a minimum of 20 seconds with soap and water is one of the most effective ways to prevent the spread of germs. Personnel should wash their hands regularly, before and after going to the bathroom, before and after eating, and after coughing, sneezing, or blowing their nose.
- If soap and water are not available, use hand sanitizer with a minimum of 60% alcohol content.
- Anchor QEA will provide staff with face coverings that can be used for field projects and staff may also use their own face covering if they choose.
- Some projects, municipalities, counties, and states may implement additional requirements for the use of face coverings, gloves, or other items. Those requirements should be followed.

- Time spent in large groups in enclosed spaces will be avoided. Potential alternatives could include phone conferences or holding meetings outside (i.e., field crew safety meetings). Field activities, whether inside or outside, should be planned to minimize staff density in that location.
- Avoid use of shared beverage containers (e.g., coffee pots, water coolers) or food setups (e.g., pizza, buffets). For instance, bring an individual water bottle.
- Work requiring several or more staff will need to be evaluated and a determination will need to be made on how the work can be done safely with a few staff, if at all. If the work cannot be conducted safely, then it may have to be rescheduled for a later time.
- Disinfecting wipes will be located throughout the site for wiping down hard surfaces as required. Alternatives, such as bleach/water solutions, may be used in addition to or in place of disinfecting wipes.
- The frequency and scope of the cleaning program for project facilities (office trailers, bathrooms, other buildings, and work areas) will be reviewed and increased, as necessary.
- Areas where staff eat should be a focus of cleaning efforts.
- Field team equipment operators, vessel operators, and vehicle drivers (whether Anchor QEA equipment or subconsultant equipment) will be provided with disinfecting wipes to clean the enclosed spaces daily. Emphasis should be on hard surfaces that are commonly touched (steering wheel, door handles, levers, buttons).
- Alternates for critical job functions should be available.
- All staff will have their own PPE and will not share with others. Respirators and PPE will be cleaned/disinfected when doffing, along with a thorough arm, hand, and face washing when exiting.
- All staff need to be vigilant regarding potential exposure and transmission of COVID-19. Avoiding any complications related to this outbreak will be a team effort as much as any safety or production concerns related to the project.

## COVID-19 Management Plan Acknowledgement

Project Number: _____

Project Name: _____

My signature below certifies that I have read and understand the policies and procedures specified in this Field Program COVID-19 Management Plan.

| Date | Name (print) | Signature | Company |
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**DOSH DIRECTIVE**
**Department of Labor and Industries**
**Division of Occupational Safety and Health**
*Keeping Washington Safe and Working*

# 1.70 General Coronavirus Prevention Under Stay Safe - Stay Healthy Order

## Updated: December 22, 2020

### I. Purpose

This Directive provides enforcement policy when evaluating workplace implementation of social distancing, facial coverings and respiratory protection, sanitation and sick employee practices as required under the Governor's Stay Home – Stay Healthy Order. On December 10, 2020, the Governor amended this order to "Stay Safe-Stay Healthy" (Proclamation 20-25.9).

Under the Order, people are required to stay home except where the Governor has authorized regional or industry specific permission to restart operations or operate essential businesses. Employers who continue operations under the Order are required to maintain coronavirus prevention practices consistent with DOSH, OSHA and Department of Health guidance. **Coronavirus is recognized as a very serious workplace hazard.**

### II. Scope and Application

**A.** Under the WISH Act and existing DOSH rules, employers are required to protect workers from hazards and implement programs to address known hazards in the workplace.

**B.** DOSH staff will limit actions related to infectious disease only when there is an aspect of exposure that is specific to the relationship between employers and workers. DOSH will do so in a manner consistent with public health orders and issued guidance.

**C.** There are extensive recommendations for healthcare workplaces with specific guidance related to treatment of COVID-19 patients and the related infectious disease control measures. This Directive will not normally be used by DOSH staff in specific healthcare delivery work task settings for hospital and clinic workers who are delivering care directly with COVID-19 patients. All other hospital and clinic work, such as maintenance, food preparation and delivery, administrative support, and supplies, are covered by this Directive.

**D.** This Directive does cover workers providing healthcare services for people not known or suspected of having COVID-19. This work must follow procedures for Universal or Standard Precautions, or equivalent programs, as recommended by the CDC. This includes current recommendations to address COVID-19 as a community transmission hazard and potential for transmission by asymptomatic people in specific healthcare specialties.

**E.** DOSH has updated this Directive to be consistent with current CDC guidance regarding quarantine and isolation. The guidance on workplace safety practices remains consistent with the Governor's Executive Orders regarding COVID-19. This updated Directive supersedes DD 1.70, dated September 25, 2020.

## III. References

- Chapter 296-800 WAC, Safety and Health Core Rules
  - WAC 296-800-11005, Provide a workplace free from recognized hazards
  - WAC 296-800-140, Accident Prevention Program
  - WAC 296-800-22005, Keep your workplace clean
  - WAC 296-800-23025, Provide convenient and clean washing facilities
- Chapter 296-842 WAC, Respirators
- WAC 296-155-040, Safe Place Standards
- WAC 296-307-045, What are the requirements of the safe place standard?
- WAC 296-307-16102, Additional requirements to protect occupants in temporary worker housing from 2019 novel coronavirus (COVID-19) exposure.
- Annual Fit-Testing, Respiratory Protection and Face Coverings during COVID-19 Pandemic (DOSH Directive 11.80, issued 5/22/2020)
- Governor's Proclamation "Stay Safe-Stay Healthy" Order, issued December 10, 2020
- Governor's COVID-19 Reopening Guidance for Businesses and Workers
- CDC Guidance: Infection Control in Healthcare Personnel
- CDC Coronavirus (COVID-19) Page
- Washington State Coronavirus Response (COVID-19) Page
- OSHA Publication 3990: Guidance on Preparing Workplaces for COVID-19.pdf (English)
- OSHA Publication 3992: Guidance on Preparing Workplaces for COVID-19.pdf (Spanish)
- Washington State Department of Health Recommendations for Temporary Worker Housing Facilities
- COVID-19 Guidance for Legionella and Building Water System Closures
- BOMA Guide "Getting Back to Work: Preparing Buildings for Re-Entry Amid COVID-19"
- COVID-19 Critical Infrastructure Sector Response Planning

## IV. Background

Staff shall learn and consider the baseline expectations for employers to provide workers a safe workplace during the coronavirus (COVID-19) virus outbreak. Overt workplace specific practices by the employer must be continued in accordance with the Governor's Executive Order.

There are four basic categories of prevention elements that must be addressed during the inspection/investigation. Employers must:

1. Educate workers about coronavirus and how to prevent transmission in the language they understand best;
2. Maintain social distancing (at least 6 feet of distance) or effective engineering/administrative controls;
3. Increased regular cleaning and sanitization of common-touch surfaces;
4. Ensure frequent and adequate employee handwashing and facilities; and

5. Make sure sick employees stay home (or are isolated) or go home and have procedures for workers to report a suspected or confirmed case of COVID-19.

Employers must also provide basic workplace hazard education about coronavirus and how to prevent transmission in the language best understood by the employee. DOSH staff will need to be thoughtful on how these four elements are addressed based on the challenges that the specific worksite tasks present, but all four elements must be addressed in each operating workplace.

DOSH Staff shall ensure that employers and employees are made aware that it is against the law for any employer to take any adverse action (such as firing, demotion, or otherwise retaliate) against a worker they suspect for exercising safety and health rights such as raising safety and health concerns to their employer, participating in union activities concerning safety and health matters, filing a safety and health complaint or participating in a DOSH investigation. DOSH Staff will ensure workers are informed they have 30 days to file their complaint with L&I DOSH and/or with Federal OSHA.

Employers must institute these prevention program elements or equivalent protections to limit the spread of the disease within the workplace under DOSH rules and in connection to the Governor's Order. These procedures are specific to COVID-19 prevention and the related virus. If a workplace has a concern about exposures to another pathogen, Technical Services must be consulted on procedures specific to that pathogen.

**A. Basic Program Elements.**

The following **bold program elements are essential** to the program whenever applicable. Employers who can establish work rules consistent with this section are not required to have further active monitoring or ongoing assessment of their workplace unless required by a separate requirement. (See applicable Safe Start guidelines and Chapter 296-307 WAC, Part L, *Temporary Worker Housing (TWH)*.)

1. **Educate workers (and customers) about COVID-19 and how to prevent virus spread**.
    a. Post posters/information from the local health department, state Department of Health, Center for Disease Control and Prevention, and other authorities.
    b. Inform workers about the steps being taken in the workplace to establish social distancing, increased handwashing, and to prevent the spread of the virus.
    c. Make information for workers available in the language they understand best.
2. **Maintain at least 6 feet of spacing at all times**.
    a. Occupied workstations are separated by 6 feet or have physical barriers between human breathing zones.
    b. Only infrequent intermittent passing within 6 feet is allowed between employees without wearing coverings, masks or respiratory protection in accordance with DOSH Directive 11.80, *Annual Fit-Testing, Respiratory Protection and Face Coverings during COVID-19 Pandemic*.
    c. Provide personal protective equipment (PPE) such as gloves, goggles, face shields and face masks as appropriate or required, to employees for the activity being performed.
    d. Materials, product, or work items are transported between workers by mechanical means or by using staging points.

- Workers may be along a conveyor or production system carrying product.
- Workers may go to a central point one-at-a-time to drop off or pick up items that transfer between workers.
- Workers may have mailboxes, bins, or other surfaces at the periphery of their workspace where materials are left for them by other workers.
- Provisions must be made to clean objects handled by more than one worker when the items are transferred. Physically wiping the object with a disinfectant wipe or soap and water so it is visibly clean (no obvious soiling, smearing, or streaks) is sufficient.
- Social distancing must be maintained during breaks and at shift start and end, while workers are at the employer's worksite.
- Meetings with workers are limited by the maximum occupancy specified by the Safe Start guidelines for the business and phase the county is currently in, and are to maintain 6 foot spacing of all in attendance. If there are no Safe Start guidelines applicable to an establishment, the limits are: 10% occupancy for Phase 1; 30% occupancy for Phase 2; 50% occupancy for Phase 3; and limited by social distancing for Phase 4.

3. **Regular cleaning of area, frequent cleaning of common-touch surfaces.**

   a. A cleaning schedule must be kept to maintain general housekeeping to prevent buildup of dirt and clutter.

   b. The first step in cleaning is to remove buildups of dirt and other materials on surfaces. Water and soap or other cleaning fluids are used with wipes, clothes, brushes or other physical means of removing these materials so that there is no visible build-up, smears, or streaks on the surface. Disinfecting is the second step and is primarily needed for high touch surfaces. Effective diluted bleach solutions or an EPA approved disinfectant **must be used** to make sure this is effective. (See the list of approved disinfectants at https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2).

      Surfaces that are commonly touched with the hands but difficult to clean (fabric, rough surfaces, and so forth) may need to be covered to make sure the environment is hygienic.

   c. Cleaning supplies need to be available to workers to do spot cleaning when necessary.

   d. Surfaces that are regularly touched by workers must be cleaned regularly to maintain a visibly clean state (no obvious soiling, smearing, or streaks).
      - For surfaces touched by multiple workers, this can be on a frequent schedule, or between workers.
      - For surfaces touched by a single worker, this needs to be done periodically, at least once per shift or when unclean, as a minimum.

4. **Workers must have facilities for frequent handwashing readily available**, including hot and cold (or tepid) running water and soap.

   a. DOSH staff must pay particular attention to transient outdoor work, delivery workers and non-fixed worksites where there are no exceptions being granted. Portable wash stations are readily available.

   b. To facilitate more frequent cleaning, secondary handwashing or sanitizing stations can be provided with either hand sanitizer, or wipes/towelettes.

   c. Gloves may be used to enhance hand hygiene and reduce spread of the COVID-19 virus, but must also be changed or cleaned frequently to be effective for this purpose. (Bare hand contact with the virus is not the concern. The concern is transferring the virus to the face or other surfaces with the hands. Gloved hands will transfer the virus as effectively as bare hands.)

   d. Workers must be able to wash their hands after touching any surface/tool suspected of being contaminated, before and after eating and using the restroom, and before touching their face.

5. **Sick employee and post- employee illness procedures**.

   DOSH staff will ensure employers have a program to prevent sick employees from entering the workplace and when recognized, that ill employees are sent home.

   a. Ensure a system for preventing sick employees to be present at work.
   b. Establish a process for deep cleaning after any worker leaves the workplace reporting a suspected or confirmed case of COVID-19.
   c. Thoroughly clean areas where the worker worked or would have stayed more than 10 minutes.
      - Wipe all accessible surfaces.
      - Clean up any visible soiling including any smears or streaks.
      - Sanitize common touch surfaces in the vicinity.

   d. Do not allow other workers into these areas until the cleaning is complete.

6. **Reopening closed facilities.**

   a. The COVID-19 virus is not persistent, so cleaning is only recommended prior to re-occupancy if there were confirmed cases at the time of closure, or if occasional visits by people were made without provisions for cleaning. Enhanced cleaning per this Directive must commence at the time of re-occupancy.

   b. Additional information on procedures for opening buildings can be found in the Department of Health and BOMA guidelines in the reference section.

**B. Consider Possible Alternate Strategies.**

Some industries may have challenges with basic elements, so one or more of the following alternatives may be used to provide protection for workers.

1. Engineering controls can be established and maintained to provide an effective distancing of employees when it is not feasible to fully separate them.
    a. Barriers must block direct pathways from face to face between individuals, and make it so any indirect air pathways are greater than 6 feet. Sneezes and coughs should not be directed into the air above someone within 6 feet.
    b. Covers can be used on common touch surfaces that cannot be easily cleaned. The covers may create a cleanable surface, or be something that can be changed out between individuals.
    c. Ventilation that provides a cleaned air supply to a worker's breathing zone.
2. Job modifications may be necessary to facilitate appropriate social distancing. Although an operation may be overall part of an essential industry or service, there may be portions of the work which can be deferred until a later time. In some cases, reorganizing the work may be necessary to break up tasks in a manner that facilitates social distancing or other protective measures.
3. Health surveillance can be done to identify early signs of infection, and separate workers who may present a risk to others.
    a. There will usually be an initial screening and then periodic review (probably daily with COVID-19).
    b. Initial screening will involve some review of the worker's history that may be relevant to their risk of contracting the disease. This may also include review of the worker's susceptibility to the disease and an education element on the disease and prevention.
    c. Periodic screening will involve tracking symptoms and ongoing risks for contracting the disease.
    d. The employer should set up surveillance in consultation with a physician or occupational health nurse and consider having ongoing participation or review by the healthcare professional.
    e. The employer needs to consult with health professionals and determine whether the program relies on self-reporting by workers or if someone will be actively reviewing worker health on a regular basis.
4. Personal protective equipment is helpful to prevent transmission of the disease.
5. Face shields can prevent direct exposure to expelled droplets and provide protection from disinfectants, in addition to coverings, masks and respirators.
6. Respirators require care in use and management under a program covered by the Respirator rule, Chapter 296-842 WAC. Respirators are not to be used in lieu of social distancing, but may be appropriate where workers must have close proximity to others for extended periods to accomplish work tasks that can be done no other way.

7. Surgical face masks (loose fitting cloth covers over the mouth and nose) do not prevent respiration of fine aerosols and are not protective in close proximity. The primary purpose for these devices are to prevent exposures to others and may have a use when individuals enter the workplace with a cough or sneeze.

**C. Evaluate Special Circumstances.**

There are situations where strict social distancing may not be generally feasible for employer provided housing and businesses with extensive public interaction. There are also exceptional situations where an essential activity worker may be permitted to continue work following potential exposure to COVID-19, to ensure continuity of operations of essential functions, such as when cessation of operation of a facility may cause serious harm or danger to public health or safety. The following sections provide additional considerations which are applicable in these specific situations.

1. **Employer provided worker housing** is provided by the employer in some circumstances such as agricultural workers, firefighters, and remote work areas. (An emergency rule for temporary worker housing in agriculture has been adopted in WAC 296-307-16102.)

   a. Workers may have limited control over their environment in some worker housing situations and to the extent that the employer controls conditions, the basic program elements should be maintained as feasible during non-working time.

   b. Social distancing **must be supported** for occupants during the time workers are housed, which may require additional resources. This includes accommodation of social distancing during cooking, sleeping, and in transportation.

   c. If strict social distancing is not feasible (including options for dedicated individual or family rooms or offsite accommodations) then health surveillance should be instituted (see above) prior to and during the housing period.

   d. Housing occupants **must be provided** cleaners and equipment to maintain a hygienic living space.

   e. **Plans for ill employees must be in place**. If a housing occupant becomes sick:

      - **Employers must provide them with accommodations that are separate from others.**
        - A separate building or room if available, or use barriers or distance to separate them from others.
        - Separate food and bathroom access is also necessary.
      - **Arrangement for medical access.**
        - Telemedicine resources should be utilized first to determine appropriate care.
        - **Provide for transportation**, if necessary in a manner that does not expose others.
        - The employer needs to consult with a physician or public health authority to monitor the situation and provide guidance on treatment and continued housing of all workers.

2. **Frequent customer/public interaction** may be necessary in some places of employment.
   a. To the extent feasible, establish social distancing with physical systems.
      - Set up tables that position people away from workers.
      - Place pay stations at a safe distance.
      - Install barriers between people.
      - Place markers and lane dividers to encourage appropriate distancing.
   b. Have managers or floor leads observing individuals in the workplace and prepared to address behaviors that may put workers at risk.
   c. Provide supplemental washing facilities to allow additional handwashing when workers handle objects after others, such as:
      - Hand sanitizer stations
      - Wipes or towelettes
      - Tepid water and soap in portable containers.

   *NOTE: Gloves may be provided, but also must be washed regularly to prevent the spread of the virus. This may help for workers whose hands are bothered by frequent washing.*

3. **Quarantine and isolation.** The requirements for people to quarantine or isolate are set by local health jurisdictions and apply to the individual. DOSH does not enforce these orders for individuals, but does expect employers to set rules to prevent people with known or potential COVID-19 virus infection, from entering the workplace. (Note that healthcare facilities may follow the CDC guidance specific to these settings--Interim U.S. Guidance for Risk Assessment and Work Restrictions for Healthcare Personnel with Potential Exposure to COVID-19.)

   **Definitions**

   - **Quarantine** refers to sequestering after contact with a suspected or known COVID-19 case. The safest quarantine period ends 14 days after the last close contact with someone who has COVID-19.
   - **Isolation** refers to sequestering when the individual is believed to be infected with SARS-CoV-2 (the virus that causes COVID-19) such as when someone has symptoms of COVID-19, or when someone tests positive for infection with SARS-CoV-2.

   CDC guidance on quarantine and isolation, including specifics of contact requiring quarantine and ending the quarantine or isolation are given here: https://www.cdc.gov/coronavirus/2019-ncov/if-you-are-sick/quarantine.html

   **Essential activities workers with potential exposure to a suspected or confirmed COVID-19 case, coming to common workplaces.**

   These workers may have an infection, but not be symptomatic. There is a risk that they could spread the infection to other workers

   a. No worker who should be in isolation may be allowed into a common workplace with other workers.

b. People who have been in close contact with someone else with COVID-19 must not be allowed into the common workplace with other workers within 14 days of their last contact, except under the following circumstances.

- When allowed by the local health jurisdiction, quarantine may be reduced to:
  - 10 days, **or**
  - No less than 7 days if the quarantined individual has a negative test result taken no more than 48 hours before ending quarantine.
- When a worker is vital for continuation of a critical infrastructure operation. **This option should be used as a last resort and only in limited circumstances, such as when cessation of operation of a facility may cause serious harm or danger to public health or safety.** Employers must determine whether it is appropriate for the worker to come to the workplace. Other alternatives, such as teleworking or reassigning duties should be considered. If the worker returns to the workplace during quarantine, there is a potential for exposing other workers in the critical operation. When no alternatives exist, employers must work with public health officials to manage the continuation of the work in a way that best protects the health of their workers and the general public, including the determination of quarantine options.

c. Employers of workers who have had contact but come to the workplace within 14 days of exposure must adhere to the following practices prior to and during each work shift:

- Pre-Screen: Determine the employee's temperature and assess symptoms prior to their starting work. Workers should be asked to pre-screen at home before travelling to work (including measuring temperature), and should not be permitted to enter the workplace if they have symptoms of COVID-19; temperature equal to or higher than 100.4 degrees Fahrenheit; or are waiting for the results of a viral test ordered because they are symptomatic or had close contact to a person known or suspected to have COVID-19 symptoms. Temperature checks must happen before the individual enters the facility.
- Screen at the workplace: Employers should conduct an on-site symptom assessment, including temperature screening, prior to each work shift. Screening should happen before the employee enters the facility.
- Regular Monitoring: As long as the employee doesn't have a temperature or symptoms, they should self-monitor. The employer's occupational health program or workplace COVID-19 coordinator or team must supervise self-monitoring. **Employers must consult with an occupational health provider and state and/or local health officials to ensure the medical monitoring is conducted appropriately**.

- Wear a Mask: The worker must wear a face mask while in the workplace unless there is a medical reason prohibiting its use. Employers can issue facemasks or can approve worker supplied cloth face coverings in the event of shortages. If required, respirators must still be used according to the requirements of Chapter 296-842 WAC.
- Social Distance: The worker must maintain 6 foot separation and practice social distancing as work duties permit in the workplace. Where duties do not permit social distancing, the employer must institute other controls as practicable to protect other workers. Barriers or fans may be effective in many circumstances.
- Disinfect and Clean Work Spaces: Clean and disinfect all areas such as offices, bathrooms, common areas, and shared electronic equipment routinely.

d. If the worker becomes sick during the shift, they should be sent home immediately. Surfaces in their workspace should be cleaned and disinfected. Information on persons who had contact with the ill employee during the time the employee had symptoms, and 2 days prior to symptoms, should be compiled. Others at the facility with close contact within 6 feet of the employee during this time would be considered exposed.

e. Employers considering allowing potentially exposed workers to remain at the workplace during quarantine should consider the following preparatory actions. (For further information consult the CDC guideline document COVID-19 Critical Infrastructure Sector Response Planning)

- Workers must not share headsets or other objects that are near the mouth or nose.
- Employers must increase the frequency of cleaning commonly touched surfaces.
- Employers should work with facility maintenance staff to increase air exchanges in room.
- Workers must physically distance themselves when they take breaks together. Stagger breaks and don't congregate in the break room, and don't share food or utensils.

4. **Working with people in non-healthcare (human) settings who have suspect or confirmed COVID-19**. Generally, this situation should be avoided, using remote services or delaying work until the COVID-19 case is resolved. However, some cases such as emergency repairs in the residence of the patient, emergency pet veterinary services, or delivery of essential goods to the residence may require workers to be in the presence of an ill individual.

   a. Workers must be informed of the individual's health status.

   b. When practicable, the ill individual must wear a medical procedure mask.

   c. Workers must be provided and required to wear a respirator. A half-face elastomeric respirator with N-95 cartridges, or other respirator with the same or higher protection must be used. Fit-testing and other respirator program elements must be complied with. See chapter 296-842 WAC, *Respirators*.

d. Other personal protective equipment such as gloves, aprons, gowns, and head coverings should be considered to prevent contamination of the worker's body or street clothes. Handwashing and other hygiene resources must be available to the worker as needed during the work and at the conclusion.

**D. Evaluation of respiratory protection for COVID-19 protection in healthcare when not treating suspect or known COVID-19 patients.**

Healthcare facilities must follow social distancing guidelines including general provisions and any specific requirements set by the Governor. It is expected that all healthcare practitioners will follow Universal or Standard Precautions, or equivalent protocols to address infection control for all infectious diseases. The following specific requirements may be evaluated by DOSH staff when considering COVID-19 hazards:

1. **Patient rules and masking.**
   a. Evaluate patients at the time appointments are made and when arriving for signs and symptoms of COVID-19. If a patient is determined to have suspected or confirmed COVID-19, they should be asked to postpone medical treatment when appropriate and referred to healthcare providers for evaluation and treatment of their COVID-19.

   b. Patients and visitors to the medical facility must be required to wear cloth face coverings or other appropriate masks in the facility as practicable. Exceptions may be allowed for patients with conditions that may be aggravated by mask use or patients who have difficulty remaining masked due to mental acuity or youth.

   c. Masks may be removed briefly to facilitate specific examination elements for which they interfere. The procedures for the exam must minimize the period without the mask and time the medical workers must be in close proximity of the patient without a mask. In particular, face-to-face positioning of the patient and medical worker must be limited as practicable.

2. **Worker masking and respiratory protection.**
   a. Workers must wear, at minimum, cloth face coverings or procedure masks whenever working with others.

   b. Workers within 3 feet of a patient or equipment during an aerosol generating procedure must wear a fit-tested N95 filtering facepiece respirator or more protective respirator. (Particulate filters with any N, R, or P and 95, 99, or 100 rating are protective against the COVID-19 virus.) Examples of aerosol generating procedures include:

      - Dental work with an ultrasonic scaler, air/water syringe, or hand piece
      - Administering medicines with a nebulizer
      - Spirometry
      - Deep or forced breathing exercises

c. Employers must evaluate other procedures workers conduct involving close proximity to the patient breathing zone. Where workers have limited time of exposure (less than half hour per day), and patients are effectively masked during the procedures, and room conditions include effective ventilation and hygiene, then respirators may not be required. A surgical mask must be used when a respirator is not required. Examples of procedures that must be evaluated include:

- Tonometry during eye exams
- Visual examination of the oral and nasal cavities
- Visual examination of the eyes
- Swab sampling in the mouth or nose

3. **Evaluation of PPE other than respirators.**

a. Other personal protective equipment, such as gloves, gowns, face shields, and head covers, generally will be determined based on general clinical guidelines.

b. When there is a procedure which could predictably result in coughing or sneezing by the patient which could directly expose the worker, DOSH staff will review PPE to ensure it covers the workers body and street clothes and prevent soaking through. Scrubs may be worn as PPE if the employer allows workers to change out at the end of shift and launders the clothing.

c. Medical establishments may be required to meet health department or FDA standards for PPE. Compliance with these standards is not addressed by DOSH staff.

## V. Enforcement Policy

Inspection findings will be reviewed on a case by case basis. Conditions related to COVID-19 and the virus are still emerging. Public health recommendations and orders are being regularly revised, and so any compliance action must take into consideration current understanding of the situation and current rules and guides. The following sections identify codes from chapter 296-800 WAC (Core Rules). When working in chapters 296-155 WAC (Construction) and 296-307 WAC (Agriculture), please use the comparable codes from those vertical standards.

### A. Accident Prevention Programs.

1. Employers are not expected to have comprehensive COVID-19 prevention programs at this point. In conducting program reviews, DOSH staff must look at all documents used by the employer to communicate with workers to determine their overall program.

2. Where the employer is clearly implementing recommendations of the public health authorities, they do not need additional documentation of their program, except for program documentation specified in public health orders or the Governor's "Safe Start" phased guidelines for industries or general requirements. Any variation from strict social distancing, the Governor's programs, or health department guidelines must be clearly communicated in a written program. (Note that participating in early phases of the restart may be dependent on strictly following the industry specific requirements and guidance. Activities that cannot do so, must wait for a later phase to resume.)

3. Violations of the sections of WAC 296-800-140, *Accident Prevention Program*, should be considered where the employer does not communicate workplace specific expectations to workers or is not effective in implementing those expectations.
4. Serious violations should specifically be considered in cases where the employer adopts practices or policies that clearly contradict the goals of coronavirus prevention practices published by DOSH, OSHA or public health recommendations.
5. Accident prevention program violations must follow instructions in the Compliance Manual.

**B. Housekeeping.**

Where a workplace is not being cleaned and kept sanitary per public health guidance, a violation of WAC 296-800-22005, *Keep your workplace clean*, may be considered. A serious classification should be strongly considered.

**C. Handwashing.**

1. There is a requirement for handwashing facilities that applies to all workplaces at all times. A serious and potential willful violation of WAC 296-800-23025, *Provide convenient and clean washing facilities*, will be considered whenever workers do not have basic handwashing facilities available at all, or they are grossly inadequate in either number or maintenance.
2. Where employers cannot provide unlimited access to full handwashing facilities at all times, they **must provide alternate means** for frequent hand cleaning. A serious classification should be strongly considered if not adequate to achieve prevention. This is specifically necessary where workers regularly handle or touch objects or surfaces touched by others. Alternate hand cleaning may include:
   a. Portable wash stations with tepid water and soap.
   b. Wipes or towelettes with water and soap.
   c. Hand sanitizer stations.

**D. Safe Place Violations.**

1. Workplace conditions which have a direct potential for worker exposure to the COVID-19 virus may be cited under WAC 296-800-11005, *Provide a workplace free from recognized hazards*. This is the primary code to use for social distancing practice violations. This may include situations such as ineffective barrier or ventilation systems, or specifically allowing workers to be in close proximity, but where there is no written record of a policy or management decision. Masking violations requiring devices not normally considered respirators may be cited under this section (cloth face coverings or medical procedure masks).
2. Violations of this section are safe place violations in that they must be serious in classification and must follow the Compliance Manual instructions for safe place.
3. For construction inspections, use WAC 296-155-040 (1). For agriculture inspections, use WAC 296 307-045 (1).

**E. Respirator Violations.**

Violations involving proper use of respirators, including N95 filtering facepieces, PAPRs, and elastomeric facepiece respirators will normally be cited from chapter 296-842 WAC, *Respirators.* When these devices are used in place of a cloth face covering or medical procedure mask due to social distancing rules from public health authorities or the governor, the use will be considered voluntary use for compliance purposes. Protection from contaminated aerosols is required use.

**F. Temporary Farmworker Housing.**

Temporary worker housing in agriculture is covered under Chapter 296-307 WAC, Part L, *Temporary Worker Housing and Cherry Harvest Camps*. This rule has specific requirements for hygiene facilities and housekeeping. Employers must in general achieve adequate social distancing; frequent handwashing during work; sanitation practices during work; sufficient disinfection supplies in housing; and sick employee practices outlined above. Consult with Technical Services and Compliance Operations on application of these rules when there is a COVID-19 concern.

## VI. Point of Contact

DOSH staff should contact Compliance Operations if there are questions about applicability of WISHA rules to an infectious disease in the workplace. Technical Services may be contacted with technical questions about workplace practices.

## VII. Review and Expiration

DOSH will review this Directive, and it will remain effective until superseded or canceled.

Approved: 

Anne F. Soiza, L&I Assistant Director
Division of Occupational Safety and Health