BASELINE SURFACE WATER COLLECTION AND CHEMICAL ANALYSES – QUALITY ASSURANCE PROJECT PLAN – ADDENDUM

FINAL

Prepared for

Lower Duwamish Waterway Group

For submittal to

US Environmental Protection Agency

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<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOC</td>
<td>Administrative Order on Consent</td>
</tr>
<tr>
<td>BEHP</td>
<td>bis(2-ethylhexyl)phthalate</td>
</tr>
<tr>
<td>Cfs</td>
<td>cubic feet per second</td>
</tr>
<tr>
<td>DQO</td>
<td>data quality objective</td>
</tr>
<tr>
<td>EPA</td>
<td>US Environmental Protection Agency</td>
</tr>
<tr>
<td>ID</td>
<td>identification</td>
</tr>
<tr>
<td>LDW</td>
<td>Lower Duwamish Waterway</td>
</tr>
<tr>
<td>NOAA</td>
<td>National Oceanic and Atmospheric Administration</td>
</tr>
<tr>
<td>PAH</td>
<td>polycyclic aromatic hydrocarbon</td>
</tr>
<tr>
<td>PCB</td>
<td>polychlorinated biphenyl</td>
</tr>
<tr>
<td>QA</td>
<td>quality assurance</td>
</tr>
<tr>
<td>QAPP</td>
<td>quality assurance project plan</td>
</tr>
<tr>
<td>TBT</td>
<td>tributyltin</td>
</tr>
<tr>
<td>USGS</td>
<td>US Geological Survey</td>
</tr>
</tbody>
</table>
1 Introduction

This quality assurance project plan (QAPP) addendum describes changes to the EPA-approved surface water QAPP (Windward 2017), which describes quality assurance (QA) objectives, methods, and procedures for collecting surface water from the Lower Duwamish Waterway (LDW) for chemical analyses. These changes are being made based on a comment letter from the US Environmental Protection Agency (EPA) dated January 11, 2018 and on comments received from EPA on February 28, 2018.

As described in the Pre-Design Studies Work Plan (Windward and Integral 2017), hereafter referred to as the Work Plan, and the surface water QAPP (Windward 2017), baseline surface water data are being collected and analyzed to address the third amendment to the Administrative Order on Consent (AOC) (EPA 2016). The Work Plan presented the data quality objectives (DQOs) and conceptual study design for surface water collection and associated chemical analyses (Windward and Integral 2017). The QAPP included these DQOs and presented the detailed surface water study design, including details on project organization, field data collection, laboratory analyses, and data management (Windward 2017). This addendum describes the changes to the QAPP, which are associated only with storm sampling event 3 (Storm 3). In addition, this addendum documents changes to the analyte list, as were approved by EPA and documented in the Surface Water Analyte Evaluation memorandum dated January 25, 2018 (Windward 2018). All other elements of the QAPP remain unchanged.
2 Changes Associated with Data Generation and Acquisition

Changes to the collection conditions of surface water composite-grab samples are described in this section. There are no changes to sampling locations, depths, compositing procedures, processing practices, or analysis methods for any of the sampling events. The only change to the QAPP is a change in targeted conditions for Storm 3; these conditions were described in QAPP Section 4.1.1.3 and summarized in QAPP Table 4-3.

2.1 Changes to Storm 3 Sampling Conditions

Key sampling conditions for the revised Storm 3 are summarized as follows:

- **Targeted storm rainfall** – Sampling will target a storm with $\geq 0.25$ in. of rain forecasted in a 24-hour period with a 48-hour antecedent period without heavy rainfall (i.e., $< 0.2$ in.).

- **Timing of sampling** – Sampling will be timed to be initiated and completed within a 12-hour window that includes the period of peak intensity predicted during the identified 24-hour storm period. National Oceanic and Atmospheric Administration (NOAA) forecasts and real-time information from the Doppler radar system (also available on the NOAA website) as the storm approaches will be considered in sample collection timing, which, for safety reasons, must take place during daylight hours.

- **Dam release conditions** – Sampling will be conducted during a period without significant dam releases (i.e., $< 2,000$ cubic feet per second [cfs]).

Table 2-1 presents an update of the relevant row of Table 4-3 in QAPP, to reflect changes to the Storm 3 sampling event.
Table 2-1. Revised Storm 3 sampling conditions

<table>
<thead>
<tr>
<th>Sampling Event</th>
<th>Event (ID)</th>
<th>Forecasted Precipitationa</th>
<th>Targeted Dam Release Conditionsb</th>
<th>Target Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Storm 3 (old definition)</td>
<td>ST3</td>
<td>≥ 0.25 in. in 24-hour period Samples will generally be collected within 12 hours of the period during a storm that is predicted to have the greatest amount of rainfall.</td>
<td>with significant dam release (&gt; 2,000 cfs)</td>
<td>November 2017 to January 2018</td>
</tr>
<tr>
<td>Revised Storm 3c (new definition)</td>
<td>Revised ST3</td>
<td>≥ 0.25 in. in 24-hour period with 48-hour antecedent period (immediately preceding the 24-hour storm period) without heavy rainfalld</td>
<td>without significant dam release (&lt; 2,000 cfs)</td>
<td>February to June 2018</td>
</tr>
</tbody>
</table>

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a Forecasted precipitation will be based on local rainfall projections from the NOAA weather website. The Doppler radar system (also available on the NOAA website) will also be used to help inform sample timing. Rainfall during the 48-hour antecedent period (immediately preceding the 24-hour storm period) will be based on measurements taken at the Hamm Creek gage (HAU2).

b Dam releases will be as measured at the USGS gage just below the Howard Hanson Dam (Gauge 12105900).

c Sampling shall be started and completed during the targeted 24-hour storm and during the forecasted 12-hour window that includes the predicted period of peak rainfall intensity. Sample collection takes approximately four hours. To capture initial runoff, sample collection will, to the extent possible, overlap with or encompass the forecasted period of peak rainfall intensity, rather than starting after it has passed.

d During the antecedent 48-hour period, up to approximately 0.2 in. of precipitation will be considered acceptable.

cfs – cubic feet per second
NOAA – National Oceanic and Atmospheric Administration
ID – identification
USGS – US Geological Survey

2.2 SAMPLE ANALYSIS AND PROCESSING

Analytes for the remaining surface water sampling events (i.e., ST3, ST4, WB1, WB2, and DB2) have been modified (as defined in Table 2-2), consistent with the approved Surface Water Analyte Evaluation memorandum (Windward 2018). Samples will be processed, analyzed, and validated according to the methods described in the QAPP, and the data will be reported consistently with the reporting requirements specified in the QAPP.

Table 2-2. Summary of analytes for surface water sampling events

<table>
<thead>
<tr>
<th>Analyte</th>
<th>DB1</th>
<th>ST1</th>
<th>ST2</th>
<th>ST3</th>
<th>ST4</th>
<th>WB1</th>
<th>WB2</th>
<th>DB2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metals and organometals</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>all metals (including mercury)</td>
<td>all metals (including mercury)</td>
<td>copper, inorganic arsenic</td>
<td>copper, inorganic arsenic</td>
<td>copper, inorganic arsenic</td>
</tr>
<tr>
<td>PAHs</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Phthalates</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>BEHP</td>
<td>BEHP</td>
<td>BEHP</td>
<td>BEHP</td>
<td>BEHP</td>
</tr>
<tr>
<td>Other SVOCs</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PCBs</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Organochlorine pesticides</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dioxins/furans</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Analyte</td>
<td>DB1</td>
<td>ST1</td>
<td>ST2</td>
<td>ST3</td>
<td>ST4</td>
<td>WB1</td>
<td>WB2</td>
<td>DB2</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----</td>
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<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Organophosphate pesticides and carbaryl</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: An X indicates that an analyte will be analyzed in samples for a given baseline surface water sampling event.

- BEHP – bis(2-ethylhexyl)phthalate
- DB – dry baseflow
- PAH – polycyclic aromatic hydrocarbon
- PCB – polychlorinated biphenyl
- QAPP – quality assurance project plan
- ST – storm
- SVOC – semivolatile organic compound
- WB – wet baseflow
3 References

EPA. 2016. Third Amendment to the Administrative Order on Consent for remedial investigation/feasibility study (AOC) for the Lower Duwamish Waterway (LDW), CERCLA-10-2001-0055. US Environmental Protection Agency, Region 10, Olympia, WA.


Windward. 2018. Surface water analyte evaluation. Windward Environmental LLC, Seattle, WA.