MEMORANDUM

Project No.: 110207-006-02

October 14, 2016

To: Andy Kallus, Washington State Department of Ecology

cc: Cindy Jernigan and Bryan Lust, Kimberly-Clark

From:

Steve Germiat, LHG
Principal Hydrogeologist

Re: **RI/FS Work Plan Addendum: Additional Evaluation of Quality of Seep Water Discharging Along Shoreline**
Kimberly-Clark Worldwide Site Upland Area RI/FS, Everett, Washington

As an outcome from an August 16, 2016 meeting between Kimberly-Clark Worldwide Inc. (K-C) and Washington State Department of Ecology (Ecology), and a follow up phone call on September 8, 2016, this Addendum to the *Remedial Investigation/Feasibility Study (RI/FS) Work Plan for the Kimberly-Clark Worldwide Site Upland Area* (Aspect, 2013) proposes additional data collection to further evaluate the quality of seep water discharging at lower low tide to the East Waterway along the shoreline of the K-C Upland Area.

Existing Data

The draft RI/FS for the Upland Area (Aspect, 2016) describes the data collected at lower low tide from 28 shoreline monitoring wells and five intertidal porewater/seep sampling locations, and contaminant transport modeling analyses conducted, to assess the upland groundwater-to-surface water/sediment pathway.

The shoreline groundwater data are summarized briefly as follows:

- Dissolved metals concentrations exceed preliminary cleanup levels based on marine surface water quality criteria in some of the shoreline wells. Many of the metals exceedances in shoreline wells were detected only during the 2012 sampling when the laboratory was not conducting reductive precipitation pretreatment to mitigate salinity interferences; only 6 of 28 shoreline wells had metals exceedances detected after 2012. The majority of exceedances are downgradient of the historical boilers/baghouse and former log pond. Dissolved groundwater concentrations of arsenic, copper, mercury, and nickel were detected at 3 to 5 times the preliminary cleanup level at some shoreline groundwater well locations after 2012.

- Since 2013, low-level carcinogenic polycyclic aromative hydrocarbons (cPAHs) exceedances were detected in one of 28 shoreline wells, well BA-MW-7 located next to the wharf (up to 0.036 ug/L total cPAHs [TEQ[1]]).

- Concentrations of un-ionized ammonia exceed the 0.035 mg/L water quality criterion based on a 4-day average (chronic) exposure. Shoreline wells with un-ionized ammonia exceedances are limited to areas where wood chips and hog fuel were historically stored (i.e., at the former Log Pond and adjacent to the wharf) during mill operations (all removed by 2013). Un-ionized ammonia concentrations are greater than 3 times the chronic criteria (one well is greater than 5 times) in shoreline wells located within the former Log Pond.

- The dissolved sulfide detections from the 2012-2014 groundwater sampling, which may include some colloidal sulfide forms[2], commonly exceed the 0.002 mg/L chronic water quality criterion based on free sulfide toxicity (i.e., toxicity for undissociated hydrogen sulfide). The highest concentrations of dissolved sulfides (greater than 5 times the chronic criteria) in shoreline wells occur at and north of the former Log Pond, and adjacent to the cove located on the southern end of the property.

The intertidal porewater and seepage data are summarized briefly as follows:

- Dissolved metals concentrations are below preliminary cleanup levels;

- Concentrations of un-ionized ammonia exceed the 0.035 mg/L chronic water quality criterion at 2 of 5 locations, but never exceed the 0.233 mg/L acute water quality criterion.

- The dissolved sulfide detections from the 2013-2014 porewater/seep sampling, which may include some colloidal sulfide forms, commonly exceed the 0.002 mg/L chronic water quality criterion by several orders of magnitude based on free sulfide toxicity (i.e., undissociated hydrogen sulfide). However, the February 2015 supplemental porewater sampling and analysis, conducted using passive *in situ* diffusive gradient thin (DGT) film gels to specifically measure free sulfide forms, detected free sulfide only in the northernmost sample location (0.47 mg/L at PW-7). It is noted that wood waste is present in shallow sediment next to a timber bulkhead in this area (Anchor QEA, 2015). It is also noted that the other porewater locations south of PW-7 had elevated reporting limits (0.06 mg/L) for free sulfide, which are 30 times the chronic criterion. Likewise, the reporting limit for dissolved sulfide in upland groundwater and intertidal porewater samples was 0.05 mg/L[3], indicating the 0.002 mg/L chronic criterion for free sulfide is below the practical quantitation limit (PQL) by conventional analytical techniques.

Contaminant transport modeling (using the Reible model) conducted as part of the RI indicates that detected metals and un-ionized ammonia concentrations will attenuate to below respective

[1] Toxicicity equivalent concentration calculated in accordance with MTCA.
[2] Some colloids may pass through the 0.45-micron filter used for field filtering.
[3] Confirmed at both ALS-Kelso and ARI in Seattle.

preliminary cleanup levels after it reaches the nearshore transitional zone where mixing of groundwater and surface water occurs.

Background

During the August 16, 2016 meeting, Ecology expressed concerns that pipes and holes/discontinuities in the Upland Area shoreline bulkhead may represent uncharacterized preferred pathways for upland groundwater to reach the East Waterway. In response to that concern, on August 31, 2016, representatives of K-C and Ecology conducted a reconnaissance of the shoreline intertidal area during lower low tide stage. The reconnaissance included visual observation and documentation[4] of pipes and discontinuities within the bulkhead and diffuse seepage emanating from the intertidal beach, as well as measurement of the water quality field parameters (electrical conductance [EC], pH, and temperature) for some of the observed water discharges using a hand-held multiparameter meter (YSI Pro 1030). Multiple field parameter measurements were collected from select discharge locations during outgoing (ebb) and incoming (flood) tidal stages. For reference, one set of field parameters was also measured for East Waterway surface water just offshore of shoreline Segment 1 (described below) during the outgoing tide. Table 1 presents the water quality field parameter data collected during the shoreline reconniassance.

Figure 1 displays observed shoreline features of note, and color codes features where water discharge was observed or not during the August 31, 2016 reconnaissance. Figure 1 also presents the field measurements collected during an incoming tidal cycle when the EC values are lowest (see Table 1). For purposes of this Addendum, the shoreline is divided into five Segments (1 through 5, from north to south) based on differing shoreline characteristics (e.g., rip rap versus beach exposed at low tide, under the wharf); Figure 1 depicts the boundaries of the five shoreline segments. The shoreline conditions observed in the five Segments during the August 31, 2016 reconniassance are summarized as follows:

Shoreline Segment 1

Segment 1 contains a narrow intertidal beach west of a vertical wooden bulkhead; angled timber piles support the bulkhead. Observed water discharges include:

- A substantial discharge of water from a hole in the vertical wooden bulkhead (location 1A on Figure 1), which was saline (EC ranging from 26.20 to 27.32 millisiemens/centimeter [mS/cm]). The EC data indicate that the discharge is predominantly tidal water draining back out during lower tidal stages.

- A small discharge of water visible at the base of the wooden bulkhead (location 1B on Figure 1) was brackish (EC ranging from 10.35 to 17.12 mS/cm) indicating a mixture of groundwater and tidal water. The 1B discharge is within approximately 10 feet of intertidal porewater sample location PW-7 (Figure 1), which was sampled three times during the RI (Aspect, 2016).

[4] Photographs and documenting location by global position system (GPS) except under the K-C pier where satellites for GPS are obscured.

Shoreline Segment 2
The Segment 2 shoreline is entirely armored with rip rap. No intertidal beach is exposed in this segment at low tides, which is why no intertidal porewater samples have been collected from it. No water discharge or pipes were visible in this segment during the August 31, 2016 reconnaissance.

Shoreline Segment 3
Segment 3, in the area of the former barge unloading dock, contains a narrow intertidal beach west of rip rap. During the previous RI intertidal porewater sampling events, limited surface seepage was observed in that area, but the seepage largely disappeared at the lowest tidal stages. Porewater sample PW-5 was collected on the north edge of this segment where somewhat greater seepage occurred (Figure 1). During the August 31, 2016 reconnaissance, several small seeps were observed in this segment, within the vicinity of a capped 12-inch green PVC pipe (not flowing) and several vertical pilings cut off at beach level.

Shoreline Segment 4
Segment 4, beneath K-C's wharf, contains a relatively wide intertidal beach west of a vertical concrete bulkhead structure. The wharf is supported by numerous wood pilings driven into the beach.

Near the north end of the segment, a small seep and a 15-inch open steel pipe discharging water were observed. Water discharging from the 15-inch pipe (4A location on Figure 1) was saline (30.07 to 31.87 mS/cm; Table 1) indicating it is tidal water draining back out during lower tidal stages.

The City of Everett's (City) combined sewer overflow (CSO) line and outfall PS04, and the wood stave pipe leading to K-C's decommissioned Outfall 003 (diffuser), are also present beneath the wharf (Figure 1). The wood pipe to Outfall 003 is dilapidated and no longer connected to the diffuser structure; no substantive water discharge was observed from the Outfall 003 pipe. Water was observed leaking from disconnected pipe joints in the City's PS04 pipe, and that water was brackish (EC of 12.93) indicating mixed freshwater and tidal water. Ecology also observed water flowing in one of the City CSO manholes on the east (upstream) side of the Upland Area; a lateral K-C pipe was observed entering that manhole, but it was not discharging water. Under the wharf, some water was also observed discharging from the concrete bulkhead adjacent to the CSO line's penetration, but field parameters were not collected for that water.

Also under the wharf, several open pipes (4- to 12-inch diameter) were observed penetrating the concrete bulkhead, but no water was observed discharging from them. Evaluating potential contaminant contributions from upland groundwater via pipes on the K-C property is not included in this Work Plan Addendum and will be addressed separately within the upland cleanup Agreed Order.

Shoreline Segment 5
Segment 5 is the northern shoreline of the slip ("Cozy Cove") on the south end of the Upland Area (Figure 1). This shoreline segment is entirely armored with rip rap, and no intertidal beach is present beneath the rip rap at low tides. Consequently, no intertidal porewater samples have been collected in Segment 5. However, one larger seep discharging from the rip rap (Seep 1; Figure 1) was sampled twice during the RI. Field parameters were not measured at Seep 1 during the August 31, 2016 reconnaissance, but prior measurements (EC ranging from 27.57 to 30.60 mS/cm) indicate

the discharge is tidal water draining during lower tidal stages. Note that water discharging from Seep 1 was not sampled directly, but as sediment porewater located directly upgradient of this location.

Goal of Additional Investigation

The goal of the additional sampling and analysis outlined in this Addendum is to assess the quality of upland groundwater discharging to the East Waterway in locations not previously sampled. Based on discussion with Ecology, seepage water with field-measured electrical conductance (EC) less than 25.0 millisiemens per centimeter (mS/cm), indicating a substantive freshwater contribution, will be sampled. The data will supplement the existing shoreline groundwater and intertidal porewater data as summarized in Section 6.4.6 of the draft RI/FS.

Evaluating potential contaminant contributions from upland groundwater discharging via pipes on the K-C property will be addressed separately within the upland cleanup Agreed Order.

The potential for sediment recontamination by ongoing sources apart from K-C Upland Area groundwater, including CSOs and stormwater discharges, will be evaluated as part of the East Waterway RI/FS, as has been discussed by K-C, the Port of Everett, and Ecology during scoping of that RI/FS. Because the City of Everett's CSO line (outfall PS04) running beneath K-C property drains an industrial watershed upstream of K-C's property, any sampling of water in the CSO line will include measurements at the upstream and downstream ends of K-C's property to document and differentiate potential contaminant contributions from upstream stormwater versus Upland Area groundwater. It is recognized that, if groundwater is entering the CSO line via leaky joints, then upstream stormwater can exit the pipe via those joints into Upland Area groundwater during storm events.

The following sections describe the water sampling methods and chemical analyses to be conducted.

Field Sampling Methods

Based on the shoreline groundwater data and the findings from the August 31, 2016 reconnaissance, samples of water discharge will be collected from the seepage areas with field-measured EC less than 25.0 mS/cm along the base of the timber bulkhead in Segment 1, near the 12-inch green PVC pipe in Segment 3 (estimated to be two areas unless others are identified), within Segment 4 (anticipated to be within the northern half unless others are identified), and the Seep-1 location in Segment 5 (unless other are identified).

The water sampling program will be conducted at lower low tidal stages over two nights during the week of October 17, 2016, which are the lowest tides of the month[5]. Based on input from Ecology, the water sampling will be conducted within a 3-hour window (if needed) around the lower low water slack tide as follows:

- Night 1, October 17 at 11:15 PM through October 18 at 2:15 AM: Take EC measurements of visible water discharges in Segments 1, 3, 4, and 5 and stake discharge locations with EC less than 25.0 mS/cm for sampling. To account for the range of

[5] Attachment A provides the predicted tides in Everett for the week of October 17, 2016, with the lower low tides targeted for sampling highlighted.

variability that may be experienced within the EC field measurements, a minimum of three will be taken, If any of the EC measurements are below 25 mS/cm, then that location will be included for sampling. At those locations, deploy DGT samplers to measure free sulfide concentations in the sediment bioactive zone (methods described below). Based on the number and locations of seeps identified for sampling during Night 1, and accounting for seep elevations, K-C will provide Ecology a plan that details the order and timing of sampling the seeps on Night 2.

- Night 2, October 20 at 1:00 AM through 4:00 AM: Retrieve the DGT samplers after approximately 48 hours of equilibration time, and conduct sampling of visible seepage at those locations in accordance with the plan developed based on the Night 1 results.

In the event that the DGT gel samplers are not obtained from the supplier by October 17 as expected, we will consult with Ecology regarding shifting the sampling program back one day.

Where there appears to be an adequate volume of seepage to allow sampling, EC will initially be measured using a hand-held YSI Professional Plus multi-parameter probe. Water samples will be collected from those locations where the seepage EC is 25.0 mS/cm or less as discussed above. The number and locations of seeps to be sampled will be determined as part of the Night 1 survey in coordination with Ecology. Seeps within 5 feet of visible creosote treated timber pilings/bulkhead structures may not be included for cPAH analysis. Decisions with regards to sampling and analysis of seeps will be made in coordination with Ecology as part of the Night 1 survey.

For each such seepage location, we will attempt to sample the seepage water present at the surface, as recommended by Ecology. To do so, we will lay a piece of new aluminum sheet metal, folded into a V, within the visible seepage if possible; care will be taken to minimize disturbance of the sedment substrate to avoid creating turbidity. Water will be pumped from on top of the aluminum V at a low flow rate of less than 0.25 liter per minute using a peristaltic pump with dedicated polyethylene and silicon tubing. During purging prior to sample collection, water quality field parameters (EC, pH, temperature, oxidation-reduction potential, and dissolved oxygen) will be measured and recorded three times at 1- to 3-minute intervals using a YSI Professional Plus multiparameter meter with flow-through cell.

The method of sampling described above will be tested in the field as part of the Night 1 survey. If this method is determined in the field to be impractical to collect an adequate volume of surface seepage for the required chemical analyses, other approaches will be discussed with Ecology prior to the Night 2 sampling effort. One approach may be to push a PushPoint™ stainless steel sampler[6] generally horizontally into the sloped beach to submerge its 4-cm stainless steel mesh screen within the upper 10 cm of sediment, and then conduct the purging and sampling procedures described above. If water yield from the upper 10 cm of sediment is insufficient to sustain a pumping rate of at least 0.1 liter per minute, another approach may be to drive the sampler approximately 10 cm deeper and the process repeated once; if yield is again insufficient, a sample may not be able to be collected at that seep location.

[6] Use of the PushPoint™ sampler for sediment porewater sampling is described in Ecology (2009) and EPA (2013).

Water samples for dissolved metals analysis will be field filtered using an in-line 0.45 μm filter into the appropriate sample containers containing nitric acid preservative. Water samples will not be field filtered for ammonia analysis (sulfuric acid preservative in containers) or cPAH analysis (no preservative in containers).

For analyses of free sulfide at each field-identified seep sampling location, the DGT will be advanced into intertidal sediments targeting a depth interval of 1 to 10 cm below mudline. If realtively soft sediment substrate is observed at a target location and extra DGTs are available, the field crew may deploy a second DGT approximately 30 cm below mudline. The sampling assemblies will be inserted into the sediment by hand at low tide, and will equilibrate in the field for approximately 48 hours, after which they will then be retrieved also by hand at low tide. Upon retrieval, the sampling assembly will be extracted from the sediment, and the DGT apparatus will be removed and flushed with deionized water, sealed in a clean plastic bag, and shipped to the laboratory in an iced cooler for analysis.

The location of each sample collected will be photographed and documented using GPS or other means if overhead visibility (to satellites) is obscured by structures.

Chemical Analysis of Water Samples

The water samples will be placed in a cooler with ice/blue ice and transmitted under chain of custody protocol for overnight delivery to the ALS analytical laboratory in Kelso, Washington. The water samples from the various shoreline segments will be analyzed for the following analytes:

- Segment 1: Dissolved metals (arsenic, copper, lead, mercury, nickel, and zinc), ammonia, and free sulfide;
- Segment 3: Dissolved metals (arsenic, copper, lead, mercury, nickel, and zinc), cPAHs, ammonia, and free sulfide;
- Segment 4: Dissolved metals (arsenic, copper, lead, mercury, nickel, and zinc), cPAHs, ammonia, and free sulfide; and
- Segment 5: Dissolved metals (arsenic, copper, lead, mercury, nickel, and zinc), ammonia, and free sulfide.

The accumulated sulfide in the DGT gel will be measured using purge-and-trap followed by the colorimetric method (methylene blue) in accordance with Aspect and Anchor QEA (2015). The accumulated sulfide measured in the DGT will be used to calculate porewater concentrations based on diffusive flux relationships presented in Anchor QEA (2015). In addition to the field samples, laboratory testing of DGTs will be conducted to evaluate the accuracy of the DGT technique. The laboratory testing, conducted at Analytical Resources Inc. (ARI), will include the preparation of a dissolved sulfide solution and two dilutions (solution and dilution concentrations to be determined in coordination with ARI). The DGTs will be immersed in the solutions, in an inert atmosphere, for a 48-hour period. The DGTs will then be handled and analyzed in the same manner as the field-deployed units. The laboratory test range of results will be used inform the accuracy of free sulfide results from the field DGTs.

The other analytical methods will be those specified in the Quality Assurance Project Plan (QAPP) of the *RI/FS Work Plan* (Aspect, 2013). This includes sample preparation techniques, including reductive precipitation (EPA Method 1640) as needed to mitigate salinity interferences for trace metals analysis as described in Section A3.3.2 of the QAPP, and centrifuging all samples for cPAH analysis as discussed with Ecology to minimize turbidity bias. One blind field duplicate sample of surface seepage will be collected from either Segment 3 or 4 for analysis of the full suite of analytes. Laboratory QC (laboratory spikes etc.) will be in accordance with the QAPP.

Once validated (Level 2b per the QAPP), the new analytical data will be integrated into the draft final RI/FS Report for the Upland Area and uploaded to Ecology's Environmental Information Management (EIM) system. All of the Upland Area shoreline-related data are also available for use as part of the East Waterway RI/FS, as appropriate.

References

Anchor QEA, 2015, Supplemental Porewater Sulfide Sampling and Analysis, K-C Worldwide Upland Area in Everett, Washington, April 1, 2015.

Aspect Consulting, 2013, Work Plan for Remedial Investigation/Feasibility Study, Kimberly-Clark Worldwide Site Upland Area, Everett, Washington, November 22, 2013, Final.

Aspect Consulting and Anchor QEA, 2015, Plan for Supplemental Sampling and Analysis of Sulfide in Intertidal Porewater, Kimberly-Clark Worldwide Site Upland Area, Everett, Washington, February 13, 2015.

Aspect Consulting, 2016, Draft Remedial Investigation and Feasibility Study, Kimberly-Clark Worldwide Site Upland Area, Everett, Washington, Chapters 1-7 (Remedial Investigation) dated March 16, 2016, and Chapters 8-12 (Feasibility Study) dated April 18, 2016.

Washington State Department of Ecology (Ecology), 2009, High-Resolution Porewater Sampling Near the Groundwater/Surface Water Interface, Ecology publication no. 09-03-017, April 2009. https://fortress.wa.gov/ecy/publications/documents/0903017.pdf

United States Environmental Protection Agency (EPA), 2013, Science and Ecosystem Support Division Operating Procedure: Pore Water Sampling, EPA publication no. SESDPROC-513-R2, February 28, 2013. https://www.epa.gov/sites/production/files/2015-06/documents/Porewater-Sampling.pdf

Attachments

Table 1 – Water Quality Field Parameter Data from from August 31, 2016 Shoreline Reconniassance

Figure 1 – Observations from August 31, 2016 Shoreline Reconniassance

Attachment A – NOAA Tide Predictions for Everett, Washington, October 16-22, 2016

Table 1 - Water Quality Field Parameter Data from August 31, 2016 Shoreline Reconnaissance

Shoreline Segment	Map ID #	Description of Location with Water Discharge Observed	pH	EC (mS/cm)	Salinity (ppt)	Temp (Celsius)	Notes
1	1A	Larger discharge from bulkhead	7.25	26.95	19.8	17.10	outgoing tide
			7.26	27.32	20.2	17.00	outgoing tide
			7.26	27.11	20.0	17.00	outgoing tide
			7.47	26.31	19.2	17.30	incoming tide
			7.40	26.20	19.2	17.20	incoming tide
1	1B	Low flow bulkhead discharge near PW-7	7.47	10.35	7.1	16.20	outgoing tide
			7.35	17.12	12.5	15.70	outgoing tide
			7.18	11.15	7.8	16.20	incoming tide
1	-	Seawater adjacent to 1A and 1B locations (for reference)	7.29	32.11	25.0	NM	outgoing tide
4	4A	15-Inch pipe	7.73	31.87	23.5	17.80	outgoing tide
			7.73	31.62	23.6	17.30	outgoing tide
			7.70	31.56	23.5	17.20	outgoing tide
			7.64	30.66	22.5	17.18	incoming tide
			7.65	30.07	22.3	17.19	incoming tide
4	PS04	City CSO PS04	8.18	12.93	0.8	15.00	outgoing tide

EC: electrical conductance
ppt: part per thousand
NM: no measurement collected

PS-04
pH: 8.18
EC: 12.93
Temp: 15.0

Small Seep

4A: 15" Pipe
pH: 7.65
EC: 30.07
Temp: 17.19

4" Steel Pipe

Outfall 003

8" PVC Capped

12" green PVC pipe, capped

Wood Stave Pipe
(Outfall 002)

8' Steel Pipe

Small Seeps

1A: Bulkhead Discharge
pH: 7.40
EC: 26.20
Temp: 19.20

1B: Low-flow Discharge near PW-7
pH: 7.18
EC: 11.15
Temp: 16.20

SEGMENT 5
SEGMENT 4
SEGMENT 3
SEGMENT 2
SEGMENT 1

PIER

SITE UNIT A
SITE UNIT B
SITE UNIT C
SITE UNIT D
SITE UNIT E

EWW-1
PW-3
PW-4
PW-5
PW-7
SEEP-1
REC7-MW-3
PM-MW-7
PM-MW-8
REC3-MW-1R
UST70-MW-2
BA-MW-7
RCD-MW-101
SHB-MW-2
LP-MW-2
MW-6
REC6-MW-2
TM-MW-6
REC7-MW-2
OMS-MW-2
OMS-MW-1
MW-1
MW-2
REC7-MW-4
REC1-MW-9
NRS-MW-102
NRS-MW-101
NRU-MW-101
NRP-MW-2
NRU-MW-102
MW-5
NRP-MW-3
REC7-MW-1
CN-MW-1

PULP STORAGE BUILDING
HOG FUEL PILE
REPULPER STORAGE BUILDING
SLUDGE DEWATERING
PULP DRYING BUILDING
OLD MACHINE SHOP
STORES & PAINT RECEIVING SHOP
BAGHOUSE
FLASH CLARIFIER
WOOD CHIPS PILE
EXISTING PUD ELECTRICAL SUBSTATION
SOUTH OFFICE BUILDING AND ANNEX
SCREEN AND BLEACH 1
NO. 10 BOILER/ASH HANDLING BUILDING
NO. 14 BOILER
CHIP SCREEN BUILDING
BLOW PIT BUILDING
TURBINE GENERATOR BUILDING
ENGINEERING MAINTENANCE BUILDING
BROKE STORAGE BUILDING
CHEMICAL STORAGE BUILDING
EXISTING DISTRIBUTION WAREHOUSE
SCREEN AND BLEACH 2
WASHER BUILDING
BULK PREP
SECONDARY TREATMENT PUMP BUILDING
EXISTING CLARIFIER
TISSUE MANUFACTURING
PARENT ROLL STORAGE
HYDRAULIC PRESS BUILDING
CONVERTING/FINISHING

0 150 300
Feet

- Shoreline Feature Observed 8/31/16
- Flow Visible
- Flow Not Visible
- Shoreline Well
- Intertidal Porewater
- Surface Water Sample
- Shoreline Segment Divider
- Site Unit Divider
- Pier
- Interim Action Excavation Extent
- Existing Structure/Feature
- Historical Site Features
- Former Log Pond

Observations from August 31, 2016 Shoreline Reconnaissance

RI/FS Work Plan Addendum for Evaluating Shoreline Water Discharges
K-C Worldwide Site Upland Area
Everett, Washington

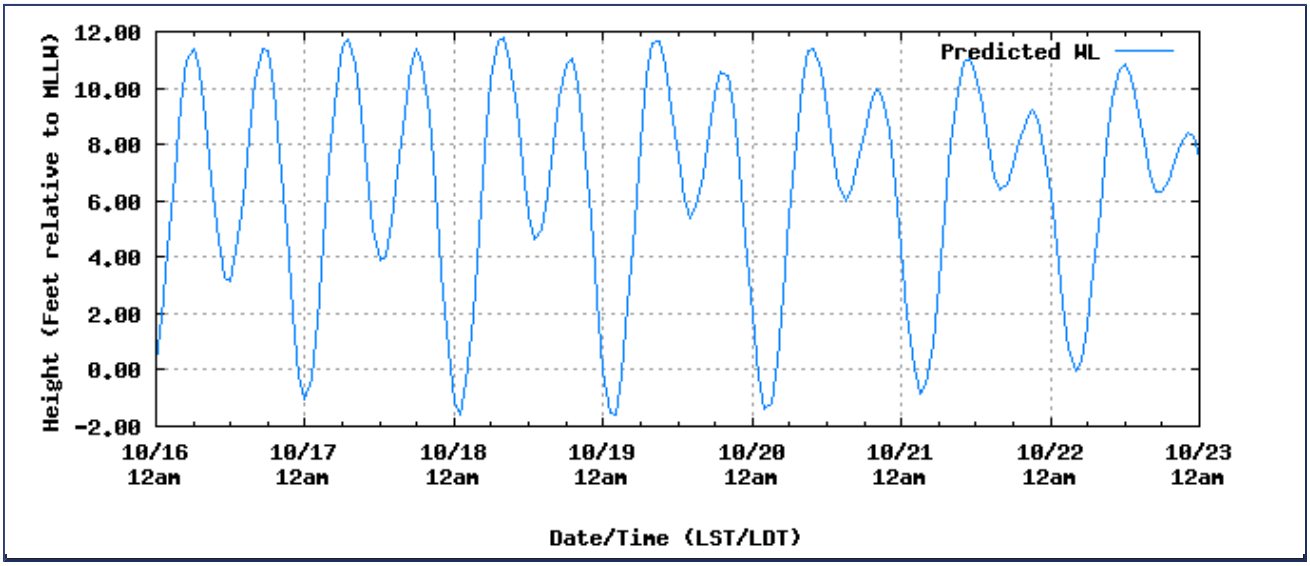
Aspect CONSULTING	SEP-2016	BY: SJG / PPW	FIGURE NO. 1
	PROJECT NO. 110207	REVISED BY: RRH / RAP	

GIS Path: T:\projects_8\Kimberly-Clark\Env_Support_110207\Deliverables\BulkheadSampling\Addendum_Aug2016\Observations from 08312016 Shoreline Recon.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 9/13/2016 || User: rpergin || Print Date: 9/13/2016

Attachment A

Help Print

NOAA/NOS/CO-OPS
Weekly Tide Prediction for Everett,WA
StationId 9447659
From: 2016/10/16 - 2016/10/22
Units: Feet Time Zone: LST/LDT Datum: MLLW



Disclaimer: These data are based upon the latest information available as of the date of your request, and may differ from the published tide tables.

High/Low Tide Predictions

Station Name: Everett,WA
Parameter: Weekly
Product: Tide Prediction
Start Date & Time: 2016/10/16 12:00AM
End Date & Time: 2016/10/22 11:59PM

Source: NOAA/NOS/CO-OPS
Prediction Type: Harmonic
Datum: MLLW
Height Units: Feet
Time Zone: LST/LDT

Date	Day	Time	Hgt	Time	Hgt	Time	Hgt	Time	Hgt
2016/10/16	Sun	05:47 AM	11.39 H	11:37 AM	3.02 L	05:26 PM	11.51 H		
2016/10/17	Mon	12:01 AM	-1.03 L	06:41 AM	11.79 H	12:25 PM	3.79 L	06:03 PM	11.41 H
2016/10/18	Tue	12:46 AM	-1.62 L	07:36 AM	11.91 H	01:14 PM	4.61 L	06:42 PM	11.13 H
2016/10/19	Wed	01:32 AM	-1.77 L	08:34 AM	11.77 H	02:07 PM	5.39 L	07:24 PM	10.65 H
2016/10/20	Thu	02:22 AM	-1.51 L	09:34 AM	11.47 H	03:05 PM	6.01 L	08:11 PM	10.0 H
2016/10/21	Fri	03:15 AM	-0.89 L	10:40 AM	11.12 H	04:10 PM	6.34 L	09:06 PM	9.22 H
2016/10/22	Sat	04:12 AM	-0.05 L	11:49 AM	10.87 H	05:29 PM	6.27 L	10:14 PM	8.45 H