Technical Memorandum

To:	Frank Winslow, LHG	**From:**	Eric Rapp
Company:	Department of Ecology		JELD-WEN, Inc.
cc:	Scott Miller, P.E., SLR	**Date:**	March 8, 2024
	Chris Kramer, SLR	**Project No.**	108.00228.00065

RE: Formal Response to Ecology Revised Comments on Pre-Remedial Design Investigation Work Plan, Upland Areas of Jeld Wen Site

JELD-WEN received revised comments on the draft Pre-Remedial Design Investigation (PRDI) Work Plan – Upland Areas of the Jeld Wen Site from the Washington Department of Ecology (Ecology) on February 21, 2024. In addition, Jeld-Wen received a formal deferral letter from Ecology regarding the selected BIO remedy on February 23, 2024. Ecology suggested the PRDI Work Plan be modified to elect installation and pilot testing of air sparge (AS) and soil vapor extraction (SVE) as the remedial action for the Creosote/Fuel Oil Area following hotspot excavation and disposal, while deferring various components of BIO testing activities that were presented in the 2023 Cleanup Action Plan (including Nitrate, Nutrients, and Surfactant [NNS] injection and recovery).

Per Ecology's request, this document has been prepared with responses to each comment below summarizing the revisions to be made and their proposed location in the final work plan, a notice of "comment acknowledged", or reasonable justification against making the requested change(s). As mentioned above, universal changes reflecting the BIO deferral letter will be made to the final Work Plan and all those individual changes are not detailed in this response letter.

Comments – Woodlife Area Proposed Investigation

A1 - Woodlife Area – Section 3.3.1 - Basis for depth of borings

The report refers to Figure 5, which shows estimated depth of contamination, but not boring depths, though the SAP discusses boring depths in greater detail. **Please add reference to the SAP for more detail on this subject in this section.**

Jeld-Wen Team Response:

Reference to the SAP to be included in text of Section 3.3.1.

Note that Ecology expects that the total depth of the boring should allow for soil samples that clearly demonstrate that all remaining soils following excavation have DF concentrations below the selected cleanup level (CUL). This means that soils should be excavated to a depth where concentrations are below the CUL based on data rather than based on interpolation. Ecology understands that there will apparently be no opportunity to collect confirmation soil samples and conduct additional excavation if those confirmation soil samples had DF concentrations exceeding CULs. **Hence, interpolation-based excavation total depths are not considered**

appropriate to demonstrate sufficiency of cleanup. The collection of sufficient reserve samples (and analyzing them, as needed) is anticipated to address this concern.

Jeld-Wen Team Response:

Section 3.3.1 does not propose interpolation-based excavation depths. Post-excavation confirmation sampling will be completed during remedial action activities. PRDI data will be used to establish the excavation depths. Interpolation, if any, may be used with Ecology approval and that will be presented in the PRDI data report. As shown on Figures 6a to 6c, a system of reserve sampling is proposed for the Woodlife Area. The terminus of these borings will be based on field observations and findings from historical adjacent borings.

No change to the Work Plan text is proposed.

A2 - Woodlife Area – Section 3.3.1 - Basis for selection of samples for analysis

Preliminary sampling depths shown on cross sections (Figures 6 a, b, and c). The SAP discusses sampling depths and field screening in greater detail. **Please add reference to the SAP for more detail on the subject in this section.**

Jeld-Wen Team Response:

Reference to the SAP to be included in text of Section 3.3.1.

To ensure that all locations have a bottom sample that will be below CULs, **Ecology recommends that additional soil samples should be collected and held in reserve pending results from other depths.** This approach is anticipated to reduce laboratory analyses while ensuring that the bottom depth of the excavation is well delineated.

Jeld-Wen Team Response:

Comment acknowledged. It should be noted that laboratory analysis for high resolution methods such as method 1613 for dioxins can take as long as 2 months to receive results, and also require additional data review and validation than standard methods. The method recommended holding time is 1 year for method 1613. While we recognize the benefits of archiving and reserving sample aliquots, we anticipate a maximum of 2 rounds of follow-up analysis for dioxins will be completed during the PRDI activities in order to remain within laboratory method holding time requirements and to stay on schedule for production of the PRDI Data Report and subsequent remedial design.

Section 3.3.1 of the Work Plan and Section 2.3 of the SAP will be revised to reflect this.

A3 - Woodlife Area – Section 3.3.1 - Anomalous PID Reading Location at GP-501

During previous investigations, anomalous PID readings of 1,620 ppm at 4.5 ft bgs and 1,202 ppm at 5.5 ft bgs were found at location GP-501. The soil exhibited “strong chemical like odor”. Soil from this depth was not analyzed for VOCs (a sample from a depth of 3 ft bgs with a PID reading of 2.1 ppm was). The cause of these very high PID readings at 4.5-5.5 ft bgs were not identified, although CPAHs, diesel, and heavy oil range petroleum, and PCP were detected at a depth of 3.0 ft bgs. This is also the location where DFs were detected in groundwater and a very high concentration of DFs was found in soil at 1.0 ft bgs.

Ecology requests that an offset boring close to GP-501 be conducted, and a sample from the 4.5 to 5.5 ft bgs interval be analyzed for VOCs. Understanding this contamination concern is important since a volatile solvent could potentially be a carrying agent for other site contaminants (e.g. DFs).

SLR Response:

A deeper boring will be completed at GP-501 area. This boring location is shown on Figure 5. This is discussed with the response to Comment A2 and A3 above. The boring will be completed to a depth of at least 15 feet bgs and may extend deeper if field observations show lithology or field instrumentation measurements inconsistent with surrounding borings.

Soil sampling for VOCs will be completed from 4.5 to 5.5 feet bgs at this boring location and from the depth interval with the highest PID reading from the recovered soil core in the Geoprobe. Anomalous elevated PID readings from the Woodlife Area may also be submitted for laboratory analysis of VOCs, pending discussion with Ecology (if conversations are delayed, field samples will be collected and held by the laboratory). Section 2.3 of the SAP will be revised to include potential VOC analysis in the Sample Analyses and Methods section.

Ecology requests that the boring offsetting GP-501 be drilled to a sufficient depth to define the maximum vertical extent of contamination. Boring GP-501 was drilled to 7.0 ft bgs, and still had evidence of contamination at 7.0 ft (PID reading of 41.6 ppm). The targeted depth of 10 ft bgs for borings in this area within the work plan may not be sufficient to define the vertical extent of contamination. We suggest that the offset boring at GP-501 be drilled to a greater depth to provide for better understanding of the maximum vertical extent of contamination prior to drilling other locations in the Woodlife Area. Care should be taken during drilling at this location to ensure that a conduit for downward contamination migration is not created.

Jeld-Wen Team Response:

A deeper boring is warranted and will be completed at GP-501 area. As presented in the Work Plan cross-section figures (6A, 6B, 6C) soil assessment greater than 10 feet bgs in the other areas of the Woodlife Area does not appear to be warranted. The sampling design presented in Section 3.3.1 includes depth intervals to be collected and held in reserve.

The language in Section 3.3.1 will be updated with:

"… Sampling in the Woodlife Area will include 27 soil boring locations with most borings completed to 10 feet bgs. The boring completed near the former sampling location GP-501 will be completed to a depth of at least 15 feet bgs and may extend deeper if field observations show lithology or field instrumentation measurements inconsistent with surrounding borings."

Borings will be completed using direct push methods; recovering the soil core, and the boreholes will be backfilled with bentonite. Dioxins & furans tend to partition onto soil; the proposed drilling methods, boring backfilling techniques, and relatively shallow investigation depth significantly reduce potential for creating a conduit for downward contaminant migration. The soil lithology throughout the fill area of the site is consistent (dredge sands) and a significant confining layer has not been encountered.

Ecology notes that PID readings should be taken and recorded at all Wood Life boring locations unless a case can be made that the readings at GP-501 were in error.

Jeld-Wen Team Response:

PID readings will be collected at all boring locations. Section 2.3 of the SAP will be revised to include PID screening protocol in the Sample Procedures section.

A4 - Woodlife Area – Section 3.3 - Water Levels

Please discuss the depth to groundwater data from the Woodlife Area within the work plan. Depth to water data from MW-7 and MW-9A/B data from 2015 to 2019 ranged from 1.6 to 5.7 feet below top of casing (ft btoc) in these monitoring wells. Hence, a significant amount of water could seep into the excavation, planned for up to about 7.0 feet below ground surface [ft bgs] at GP-501, and a significant amount of dewatering may be needed. Testing may be

warranted to assess potential water production in this excavation in this area to appropriately design dewatering measures.

Jeld-Wen Team Response:

In the PRDI Data Report, the PRDI data will be reviewed with the groundwater data and survey data (Section 3.2) to assess the need for aquifer testing in this area. More specifically, the PRDI data and the elevation survey will be used to assess the area, depth, and volume of soil below the groundwater table (if any) that will be removed. The lithology from the Woodlife area and location of the aquifer pump test (Section 3.4.5) will be reviewed to assess if the lithology is adequately similar to use the aquifer pump test data to assess dewatering in the Woodlife Area, or if alternate methods would achieve data quality objectives (i.e., slug test at existing monitoring well MW-7). This assessment of the lithology, the soil sampling data from the Woodlife Area, and the survey data will be discussed with Ecology prior to the performance of the aquifer pump test. Appropriate adjustment to the scope and location(s) of the aquifer pump test will be made from this consultation with Ecology.

A5 - Woodlife Area – Section 3.3 - Stormwater Management

We understand that currently, stormwater from West Marine View Drive flows into the area of the planned Woodlife excavation. **Please discuss within the workplan this stormwater concern**, and if information will be needed during Step 2 investigations to design appropriate mitigation measures for this concern.

Jeld-Wen Team Response:

Portions of the Woodlife Area are the main access driveway for the asphalt batch plant located on the west end of the property. It has been repeatedly documented that stormwater runoff from West Marine View Drive flows onto the former Nord Door facility property at this access driveway. Survey data (Section 3.2) and the soil removal delineation assessment data (Section 3.3.1) will be used to design the soil removal plan for this area that will include re-routing of traffic and redirecting potential surface water flow during the soil removal. Additionally, during the engineering design, JELD-WEN will work with the property owner regarding the backfilling, grading/recontouring, and surface paving of the Woodlife Area excavation.

The language in Section 3.3 will be updated to include the following:

This section describes the soil removal delineation assessment scope for the Woodlife Area. The data from this scope along with the data from the Survey (Section 3.2) will allow for the design of the Woodlife Area soil removal; design of traffic/pedestrian controls during the soil excavation, design of dewatering systems to be used during the soil excavation (if needed), design of surface run-on/run-off controls and erosion control BMPs, and the design of a backfilling and surface grading/paving plan. It is anticipated that the backfilling and surface grading/paving plan will involve the property owner and may involve the City of Everett for changes to the driveway access that would redirect surface water run-on.

A6 - Woodlife Area – General Comment - Health and Safety

The DFs in soil in this area are a significant health & safety concern. Ecology notes that meticulous adherence to health and safety plan requirements to prevent dermal contact, incidental ingestion, and dust inhalation are critical for these highly carcinogenic substances.

Jeld-Wen Team Response:

Comment acknowledged. The HASP (Appendix B) is being revised and the HASP is provided to and acknowledged by contractors performing invasive work.

Comments – Creosote Area Proposed Investigation

B1 - Creosote Area – General Comment - Cross Sections

No cross sections were provided for the Creosote Area within the work plan. **A minimum of two cross Sections (E-W and N-S) would appear to be warranted** and appropriate to support the work planning. Such cross Sections should include lithologies, existing borings and monitoring well screened intervals, and the estimated area of “hot spot” contamination.

Jeld-Wen Team Response:

Comment acknowledged. Cross sections of the Creosote/Fuel Oil Area will be included in the final PRDI Work Plan.

B2 - Creosote Area – General Comment - Field Screening

Ecology understands that the Creosote Area excavation is targeting hot spots where contamination is clearly apparent in the field, both during borehole sampling and during excavation work. We understand that such clearly apparent hot spots are based on visual free product and such soils are expected to have very strong odors.

Ecology recommends that recording of field observations including product observations be reported on borehole logs and then compiled in a tabular format since such observational data may be more valuable for defining the excavation than laboratory analytical data. The descriptions of product should include descriptors such as “product saturated”, “some product present”, “significant grain staining”, “some grain staining”.

The CAP included RELs for “hot spots” in the Creosote Area as follows:

- Soil – visible NAPL and PID readings > 100 ppm
- Groundwater – mobile NAPL and > 500 ug/L naphthalene in shallow groundwater

It is appropriate to more clearly define what constitutes the presence of visible NAPL in soil and mobile NAPL in groundwater to define a hot spot. Please add discussion within the work plan that includes definitions of free and residual NAPL, and the distinction between product saturation and product staining. **The discussion should propose what constitutes visible NAPL in soil and mobile NAPL in groundwater.**

Ecology notes that previous data suggest that the PID threshold of 100 ppm may only have relevance in selected areas, since high contaminant concentrations were apparently commonly found with PID readings significantly lower than 100 ppm. However, PID reading should be taken and recorded at all boring locations in the creosote area.

Jeld-Wen Team Response:

Recording of field observations will be reported on borehole logs and then compiled in tabular format. Section 3.3.6, Data Management, of the SAP/QAPP will be revised to reflect this.

The presence, saturation, or staining of NAPL will be defined as follows. Descriptions of product in soil matrix from the recovered Geoprobe cores will be described: Product Saturated Soil – Interval (i.e., 3-3.5'); Some Product Present in Soil Matrix (e.g., blebs) - Interval; Significant Grain Staining (e.g., >50% soil particles coated with product) - Interval; Some Grain Staining (e.g., <50% soil particles coated with product) - Interval. Mobile NAPL will be defined as the discovery of NAPL in new sentry wells or in existing wells that previously had not had product present. Additionally, PID readings will be recorded at all boring locations in the Creosote Area per Section 2.4 of the SAP.

B3 - Creosote Area – General Comment - Health and Safety

It will be critical to prevent inhalation exposure to such contamination both during investigations and during excavation work. Use of institutional controls such as large fans and staying upwind are important, as well as appropriate PPE and health and safety monitoring. Keeping non-project personnel out of the work area will also be important. Ecology wishes to emphasize the importance of health and safety to all personnel during this work.

Jeld-Wen Team Response:

Comment acknowledged. The HASP (Appendix B) is being revised and options for institutional controls (exclusion zones) and engineering controls (large fans) are being considered.

B4 - Creosote Area – Section 2.2.2 - Reference to "CPOC" on Page 12

The text in this section states:

> *Conceptually, excavation of contaminated soil will proceed after completion of the PRDI and engineering design. Site conditions could easily lead to flowing sands that could quickly destabilize a shored excavation and additional data will be collected during the*

PRDI to support a detailed design of the shoring system necessary for soil removal to the CPOC of 9 feet bgs.

The reference to 9 ft bgs (the target excavation depth) in this section as a CPOC is not correct and should be corrected. The CAP states:

A CPOC for the surface water protection COCs (cPAH is used here as IHS) in the Creosote/Fuel Oil Area of the Site may be allowed at the downgradient edge of the applicable COC plume within the upland area as determined from the RI after active remedy has been completed and the performing PLPs have demonstrated through a study that it would not be practicable to meet CUL throughout the plume area.

Therefore, the only potential CPOC for the creosote area is for monitoring wells, after completion of the cleanup work.

Jeld-Wen Team Response:

Section 2.2.2 will be revised to match language of the CAP (use of term alternate POC instead of CPOC in this case).

B5 - Creosote Area – Section 3.4 - Water Levels and Dewatering Assessment

Please discuss depth to groundwater data from the creosote area within the work plan. Depth to water data from MW-8A/B and MW-10A/B data from 2015 to 2019 ranged from 1.3 to 4.2 ft btoc in these monitoring wells. Hence a significant amount of water may seep into the excavation and a significant amount of dewatering may be required.

We understand that free product floating on water within the excavation is not currently anticipated; however, if free product is generated within the excavation, then it should be properly removed and disposed of. Ecology notes that the area of pump testing is to the west of the area where product may be found, hence boring data within the product area are anticipated to be more pertinent to assess the potential for product floating on water generation during excavation.

Jeld-Wen Team Response:

Historical groundwater level measurements will be included as an attachment to the revised PRDI Work Plan. Precautions will be taken for all groundwater-generating activities during the PRDI activities, including containment (via Baker Tanks, or similar) with oil-water separation chambers, solids filtering, and contaminant filter (i.e., activated carbon vessels) prior to discharge, pending approved permitting and requirements. Section 2.13, Residuals Management, of the SAP/QAPP will be revised to reflect this.

B6 - Creosote Area – Section 3.4.5 - Aquifer Pump Test

Ecology notes that the proposed pumping tests will be performed in part to assess dewatering needs during excavation. **Ecology suggests that the proposed shallow pumping well and monitoring wells screened interval be consistent with the anticipated depth of excavation to better assess dewatering needs.**

The representativeness of the pumping test on contaminated areas to the east is dependent on how laterally consistent the lithologies are in this area. The inclusion of boring logs from this area within the work plan as well as the cross Sections discussed above, would be appropriate to allow for assessing the amount of lateral heterogeneity in subsurface media.

Jeld-Wen Team Response:

The shallow pumping well will be installed deeper than the anticipated depth of excavation to account for the expected cone of depression created in the vicinity of the pumping well during the pump test. This is also the likely configuration needed during the excavation dewatering during remedial action.

Boring logs and the cross sections will be included as attachments to the Final PRDI Work Plan.

Shallow groundwater monitoring wells will be installed to approximately 13' bgs to allow for the shallow groundwater surface to contact the 10' section of screen for the majority of the time and allows for monitoring of LNAPL, as well as characterization of the shallow groundwater zone.

B7 - Creosote Area – Section 3.4 - Resilience to Climate Change

The new MTCA rule includes a requirement that cleanup alternatives be sufficiently resilient to potential climate change. We understand that a portion of the peninsula that the Property is on currently gets flooded under very high tides (i.e. king tides). As previously evaluated for the Site, climate change may bring rising sea levels. Ecology is concerned that if flooded, the proposed remedial system within the creosote area could be damaged or put out of operation. Hence, an assessment of potential flooding with high tides and potential sea level rise within the planned period of operation is warranted. **Please add discussion to the work plan regarding assessing this potential concern**. Elevation of land surface data in the creosote area, historical king tide elevations, and potential elevation rises should be included in this analysis. **This should also include presenting a preliminary map of the peninsula within the work plan showing the extent of current ~~and potential future~~ inundation, based on this analysis.** We understand that a detailed survey will be conducted at a later date, and hence the anticipated area of inundation will be refined following the surveying work (i.e. within the Step 2

PRDI report). An analysis of potential future inundation should be included within the Step 2 PRDI report.

Jeld-Wen Team Response:

Survey elevation data that will be obtained as part of PRDI activities is needed to perform this assessment and a summary of the findings will be included in the PRDI Data Report. A preliminary map of the peninsula with the extent of current inundation will be provided in the final PRDI Work Plan.

B10 - Creosote Area – Section 3.4.6.3 SSD Pilot Testing – Vadose zone lithologies

As discussed above, the vadose zone thickness in the creosote area historically ranged from 1.3 to 4.2 ft btoc. Hence, there appears to be limited thickness available for installing and testing horizontal piping for assessing sub-slab depressurization (SSD)system. Ecology notes that typical building construction would include placing an aggregate layer underneath the slab of a building. Also, due to potential flooding concerns and an expectation that a new structure would likely have additional fill materials brought it, it would appear that an SSD system would likely be constructed within such new materials (as opposed to within the existing vadose zone). Hence, Ecology is not clear on the rationale for installing and testing for SSD within the current vadose zone materials. **Please clarify the specific data needs that are anticipated to result from the proposed SSD testing.**

Ecology notes that a sub-slab depressurization system (SSDS) is typically installed for the purpose of protection of human health within structures by blocking the vapor intrusion pathway. By creating a negative pressure beneath the slab, no pressure gradient exists that could result in vapor intrusion.

Soil vapor extraction (SVE), on the other hand, can have multiple purposes. When coupled with air sparging (AS), SVE can be an effective alternative to removing volatile contaminant mass from groundwater and the vadose zone. An SVE system can also provide for protection of the vapor intrusion pathway, although an SVE system is commonly installed more deeply than an SSDS.

The Cleanup Action Plan (CAP) dated August 2023 includes AS coupled with SVE within the selected alternative (Alternative 7). According to the CAP, the SVE “will reduce potential exposures through vapor intrusion.” This coupling of AS with SVE is particularly important in proximity to buildings, since AS systems can result in significant mass transfer of volatile contaminants to the vadose zone. But removal of this contaminant mass within the vadose zone is a significant portion of the effectiveness of AS as a remedy.

Ecology suggests that reference to “SSD” within the work plan should be changed to “SVE”, consistent with the CAP. Testing is commonly needed for SVE design, but is not commonly done for SSDS design, since the permeability of the sub-slab aggregate in a new building would

be known, and the effectiveness of an SSDS should generally be assured. SVE, on the other hand, can have success limited by insufficient permeability within the vadose zone.

Ecology has not concluded that SVE is not warranted, but rather that an SVE system must be installed within vadose zone soil and there is a significant concern that the depth to groundwater within the creosote area is currently very limited (as shallow as 1.3 ft btoc). Hence, an SVE system may not be practicable prior to first bringing in additional fill. Another concern would be too shallow an SVE system with no concrete or asphalt “cap” may result in short circuiting tot eh surface. Hence Ecology is skeptical regarding conducting SVE testing at this time prior to additional fill being brought into this area. An SSD system installed within sub-slab aggregate may have potential to meet the needs of the project for an SVE system (removing vadose zone mass and protection from vapor intrusion) without testing, but of course, such a system would generally be installed as part of a new building slab construction.

Another possibility is to install a SVE system at a depth that may become occasionally saturated—presumably, a SVE system could be shut down if the perforated PVC used for vapor collection was under the water table, and the system brought back online after water levels dropped. I am not aware of any SVE systems operating in this manner, but I would assume that this approach would not be desirable.

Ecology requests the installation of a pressure transducer/data logger in a monitoring well within the Creosote area as soon as possible to start collecting long-term monitoring data to assess the depth to groundwater that could affect the success of a SVE system.

Jeld-Wen Team Response:

Use of the term SVE will be employed throughout the report to be consistent with the CAP. The SVE test methodology (horizontal extraction wells) was selected due to the notable shallow groundwater table in this area on occasion. The test method along with lower than usual induced vacuum during the pilot test should allow for proper assessment of this technology for the current site conditions. As the future configuration of the building or Site in general is unknown, the only feasible design consideration is that of current site conditions.

Pressure transducers will be installed in select monitoring wells in advance of the PRDI activities to build a database of long-term monitoring data to assess depth to groundwater in the proposed SVE system area.

B11 - Creosote Area – Section 3.4.6.3 Air Injection Testing – ROI Testing

A key element for the air injection testing is defining the radius of influence (ROI) and thus appropriate design spacing for air sparge wells. In addition to the measurements proposed to define the ROI, **Ecology recommends use of pressure transducer/data loggers during such testing.** Such loggers typically also record temperature, which in addition to pressure can provide valuable data for estimating ROIs.

Jeld-Wen Team Response:

Comment acknowledged. Section 3.4.6.3 of the work plan will be revised and associated sections of the SAP will be revised to include transducer assessments during ROI testing.

Sections related to the Air Injection Testing will also be universally revised to account for the deferral of full BIO System pilot testing, and the proposed PRDI activities will be represented as traditional Air Sparging methodology.

B10 – Creosote Area – Section 2.2.3 Remediation Levels

The cleanup levels (CULs) and remediation levels (RELs) presented in the Work Plan Section 2.2.3, including the tables on page 13, are not consistent with the remediation levels presented within the final Cleanup Action Plan (CAP) dated August 2023. **Please revise this section and the tables on page 13 to be consistent with the tables in the CAP (page 23).** This includes, but is not limited to:

- Addition of the CUL of 0.015 ug/L cPAHs in groundwater which was included within the CAP.
- Deletion of the REL of 4,900 ug/L for naphthalene (4,900 ug/L for naphthalene in shallow groundwater with IC and EC or no structures) which was not included within the CAP.

We suggest copying the text in these tables verbatim from the CAP to avoid potential confusion.

Jeld-Wen Team Response:

Comment acknowledged. Section 2.2.3 and other text will be revised to match language from the CAP.

Comments – Permitting and Reporting

C1 - Permitting – Section 3.5.1 Archeology

As discussed in a Site meeting, Ecology's new rule requires development of a Tribal Engagement Plan as well as requirements for consultation with the tribes. Ecology plans to submit a request for a tribal consultation for the proposed work. Other requirements for cultural resource compliance could follow. **Please mention tribal consultation within the work plan.**

Jeld-Wen Team Response:

Comment acknowledged. Section 3.5 will be revised to reflect this.

C2 - Permitting – Section 3.5.2 Air Emissions

As discussed above, Ecology is questioning the need for SSD testing at this time, although we note that the design and operation of an SSD should include meeting all air emission requirements. **Noting the highly noxious nature of the contamination in the creosote area, treatment of an SSD discharge may be warranted and appropriate.**

Jeld-Wen Team Response:

Comment acknowledged. Section 3.5.2 will be revised to remove the assumption that an air emissions permit will not be required, and instead will state that permitting will be dependent upon discussions with the regional clean air agency.

C3 - Permitting – Section 3.5.3 Water Quality

Ecology notes that all water discharges must comply with state and local requirements. Pretreatment of dewatering water and pumping test water prior to discharge (e.g. to the sanitary sewer may be necessary) and potentially required. Use of an oil/water separator may be needed if there is sheen or product on top of the excavation water. Ecology requests to be copied on all correspondences related to water discharges. No discharge of investigation-derived waters to the surface, stormwater features, or the marine environment should occur.

Jeld-Wen Team Response:

Comment acknowledged. See response to Comment B5. Section 3.5.3 will be revised to indicate that Ecology will be included on correspondence related to water discharges.

C4 - Permitting – Section 3.5.4 Waste Management

Ecology requests documentation of disposal of investigation derived wastes (IDW) within the report to be prepared documenting the PRDI Step 2 Upland work (see following comment regarding reporting).

Jeld-Wen Team Response:

Comment acknowledged. Section 3.5.4 will be revised to reflect this.

C5- Reporting – Section 4

As discussed in the Agreed Order, Second Amendment, Task C1 is the preparation and submittal of a draft PRDI data report. **Ecology requests addition of Section 4, Reporting, to the work plan.** We anticipate it may facilitate both preparation and review to separate the uplands from the sediments PRDI work into two separate reports.

The uplands report should include maps showing sampling locations, tables presenting data, and analysis of the data (e.g. delineated excavation lateral extent and depth, and the derived radius of influence for later use in design). Appendices should include, but not be limited to boring logs, laboratory analytical reports, data quality review, field data forms, and disposal documentation for IDW.

When presenting tables with results for soil and groundwater sampling, please include all historical and current results. As discussed above, for the creosote area, please also include tabulation of field observations used to delineate the “hot spot” area(s).

The data quality review appendix should discuss any laboratory qualified data, review field and laboratory quality controls samples (e.g. blanks, duplicates, laboratory control samples [LCS], matrix spikes [MS], and discuss the overall usability of the acquired data.

For the investigations in the Woodlife area, we anticipate that stormwater controls will be needed to prevent runoff from West Marine View Drive. Please include within the report, documentation of the mitigation measures employed to prevent runoff from entering the investigation area during the Step 2 investigations.

For the resiliency to climate change requirement in the new rule, please include in the report an aerial map showing the current inundation area under king tides, and the anticipated future inundation area taking into account anticipated sea level rise from the previously provided sea level rise analyses.

Jeld-Wen Team Response:

Comment acknowledged. Section 4, Reporting, will be added to the work plan that details the abovementioned elements of the PRDI Report.

C6 - Professional License Stamp

Please include appropriate professional license stamps and signatures on the revised work plan.

Jeld-Wen Team Response:

Comment acknowledged. Professional license stamp will be applied to the final Work Plan.

Comments – Appendix A – SAP and QAPP

D1 - General Comment

Please adjust the language within the SAP and QAP, as appropriate, to be consistent with the above work plan comments.

Jeld-Wen Team Response:

Comment acknowledged.

D2 - SAP Section 2.1

Please adjust the language as follows (inserted text in bold):

> *Groundwater and soils will be analyzed by* ***Washington State-*** *accredited laboratories using ~~U.S. Environmental Protection Agency (EPA)~~* ***Ecology*** *approved analytical methods with appropriate detection limits.* ***Detection limits must be lower than cleanup levels defined in the Cleanup Action Plan (CAP).*** *Laboratory quality objectives are shown in Table 2.*

Jeld-Wen Team Response:

Comment acknowledged. Text edits will be made as suggested.

D3 - SAP Section 2.1

The document states:

> *Final specifications of soil borings and well constructions will be dependent upon conversations with the drilling subcontractors and field observations.*

Ecology notes that depths are commonly adjusted by field geologists based on field observations.

Drilling subcontractors should generally not be adjusting installation specifications outside of ensuring compliance with well construction regulations. Any adjustments beyond those that are typically done by field geologists (e.g. adjustments in monitoring well screened intervals) should be communicated to Ecology prior to implementation.

Jeld-Wen Team Response:

SAP Section 2.1 will be revised to remove ambiguity that drilling subcontractors will be making investigation-related decisions. Text in the SAP will also be revised to indicate procedure for communication with Ecology on field alterations to the sampling plan.

D4 - SAP Page 5, Sample Procedures (Woodlife)

Please adjust the language as follows (inserted text in bold):

> *1.Soil borings will be advanced with a direct push (i.e. Geoprobe) drilling rig operated by a Washington-licensed drilling subcontractor to an initial depth of 10 feet bgs. The soil cores are typically completed as 5-foot intervals* ***(continuous soil sampling)****. Areas with concrete surface will be cored prior to Geoprobe drilling and areas with asphalt pavement will be driven through the asphalt with the Geoprobe drilling rig.*

Jeld-Wen Team Response:

Comment acknowledged. Text will be revised as suggested.

D5 - SAP Page 5, Sample Procedures (Woodlife)

The document states:

> *4.Sample intervals for laboratory analysis will be based on the CSM presented in the Upland PRDI WP, field observations, and previous investigation findings, and per the following procedure as shown on SAP Figure 4a to 4c.*

Please note Ecology's above comments A1 and A2. Soil sample results below CULs must define the base of the excavation, not by interpolation. Reserve samples should be collected and run to ensure that the deepest soil sample at each location is below CULs for DFs (noting the anticipated constructability limit of 9 ft bgs stated in the SAP). Note that field screening may be of limited utility for assessing the potential presence of DFs at concentrations above the CUL.

Jeld-Wen Team Response:

Comment acknowledged. See previous responses to comments A1 and A2.

D6 - SAP Page 5, Sample Procedures (Woodlife)

The very high PID readings at GP-501 may drive field screening for excavation and offsite disposal for a separate contaminant release in this area. Please add PID screening to the sample procedures for the Woodlife area borings. If the requested boring offset at GP-501 does not show elevated PID readings (demonstrating that the report PID readings at this location were in error), then there may be potential for discontinuing PID measurements in this area.

Jeld-Wen Team Response:

Comment acknowledged. See previous response to comment A3.

D7 - SAP Page 6, Sample Procedures (Woodlife)

The document states:

> *5.Soil borings will be backfilled with bentonite chips to the approximate ground surface and hydrated and the surrounding surface material will be patched with like material.*

Ecology anticipates that the stormwater concern discussed above will be addressed such that no ponding occurs in the Woodlife area. However, if there is any potential for ponding to occur subsequent to drilling and before excavation work, then asphalt patch should be applied to the surface at each boring location.

Jeld-Wen Team Response:

Comment acknowledged.

D8 - SAP Page 9, Sample Procedures, Shallow Zone Groundwater Assessment

The document states:

> *1. Following completion of the Geoprobe drilling, the soil boring will be overdrilled with an auger using a hollow-stem auger drilling rig (or auger attachment for the Geoprobe rig) to approximately 15' bgs. No split spoons or soil sampling/screening will be performed; however, the soil cuttings will be visually observed for significant field impacts not observed in the Geoprobe cores.*
>
> *2. A 2-inch diameter 10-foot Section of slotted well screen will be installed with blank PVC risers to above the ground surface. The annulus of the well screen interval will be backfilled with a silica sand filter pack to approximately one-foot above the well screen, followed by a hydrated bentonite seal to approximately one-foot bgs. A concrete surface seal and traffic-rated flush mount well box will be installed at the surface and allowed to set for a minimum of 48 hours.*

As discussed above, to assess the zone where excavation and dewatering will take place, Ecology recommends that the shallow monitoring wells be installed to a depth no greater than 10 ft bgs. Drilling to 15 feet and backfilling to 10 ft bgs with bentonite would be acceptable such that additional characterization of the soils immediately below the excavation bottom is done. We recognize that the shallow pumping well may need to be screened deeper so that it does not dry up during pumping.

Jeld-Wen Team Response:

Comment acknowledged. See previous responses to comments B5 and B6.

D9 - SAP Page 9, Sample Procedures, Shallow Zone Groundwater Assessment

No well screen slot size was specified in the SAP. In Ecology's experience, a 0.010 slot size can be a barrier to product entering a monitoring well, whereas a 0.020 slot size can more easily allow product to enter. However, minimizing turbidity can be important, if characterizing dissolved phase contamination is the primary objective. Ecology also notes that the potential presence of LNAPL also necessitates the top of the well screen to extend above the water table. In some cases, it can be challenging to install a shallow enough well screen and meet well construction regulations. Hence, one option, if groundwater is very shallow, is to complete some wells to a depth of less than 10 feet, which is less than the limit required for registration of wells in Washington State (and thus the surface seal minimum thickness requirement is not invoked. If there is any potential for product within in the excavation, the installation of one or more shallower point to assess this concern may be warranted. An added benefit of this would be not needing to file well decommissioning paperwork for wells less than 10 feet deep within the excavation area, as well as not needing to install a surface installation (other than to temporarily protect the PVC point).

Jeld-Wen Team Response:

Due to concerns with NAPL, screen sizes will be 0.020 slot. References to screen slot size will be revised throughout the document. Text in the SAP will be revised with protocol for product measurements, including no recording of measurements if groundwater level is above top of screen (which is expected to be infrequent, even if well is screened at 5 feet bgs).

D10 - SAP Page 10, Section 2.6 Deep Zone Groundwater Assessment

The document states:

> *Five deep groundwater monitoring wells will be co-located with soil borings completed as part of the Hot Spot delineation assessment and their location will be based on an estimate of whether they will remain outside of the excavation footprint, but still within the deep groundwater zone area of impacts (see proposed locations on SAP Figure 5). As opposed to the shallow monitoring well installations, it is not feasible to advance every soil boring that is part of the Hot Spot soil delineation to the deep zone.*

Ecology notes that in order to characterize worst-case conditions, one of the deep zone monitoring wells may need to be within the anticipated excavation area. Although Ecology concurs with the goals of the preservation of the monitoring wells to the extent possible, this should not be done to the degree that results could be inappropriately biased. If a location is installed within the excavation area, then such a well would need to be properly decommissioned by a licensed well driller prior to excavation.

Jeld-Wen Team Response:

As shown on Figure 5, there is a deep zone well proposed for within the excavation area.

D11 - SAP Page 10, Section 2.6 Deep Zone Groundwater Assessment

Similar to shallow zone monitoring wells, no proposed well slot size was given in the work plan for deep monitoring wells. A 0.010 slot well screen will likely impede entry of DNAPL into the wells. Even a 0.020 slot could potentially impede entry of a highly viscous DNAPL product. Hence, proper design of monitoring wells to characterize DNAPL should be closely examined.

If any measurable thickness of LNAPL or DNAPL is found in any site monitoring wells, Ecology recommends collecting a product sample(s) for laboratory analysis for chemical composition as well as density.

Ecology also notes that an interface probe should be used for water level and depth to product measurements if any LNAPL or DNAPL is encountered.

Jeld-Wen Team Response:

Comment acknowledged. See previous response to comment D9.

If sufficient product for sample collection is encountered, a sample will be collected for chemical composition and density. Sections in the SAP will be revised to include potential analysis of NAPL, if encountered.

D12 - SAP Page 12, Section 2.7 Geotechnical Assessment

The document states:

> *If very loose sands are encountered, an alternate drilling method (i.e., mud rotary drilling) may be needed.*

Ecology highly recommends sonic drilling in case of heaving sand problems rather than mud rotary drilling. Unlike mud rotary drilling, sonic drilling generally results in excellent and continuous soil sample recovery.

Jeld-Wen Team Response:

Comment acknowledged.

D13 - SAP Page 14, Section 2.8 Aquifer Pumping Test

Please note Ecology's above comments regarding shallow pumping and monitoring well screened intervals. These wells should be designed to provide data targeting the excavation maximum depth of 9.0 ft bgs. Therefore, a shallow pumping well screened from 15 to 20 ft bgs does not make sense to Ecology (a screened interval from 5 to 15 feet would make better sense). Although a permanent water supply well typically has a pump set above the well screen (or installed with shroud), it is not uncommon for pumping tests to be conducted with the pump set within the well screened interval.

For the deep pumping wells, a well screen longer than 5.0 feet may be advisable, since aquifer materials may not have sufficient yield. Ecology recommends a significantly larger screened interval (e.g. 35-50 ft bgs) to ensure that target pumping rates can be achieved.

Jeld-Wen Team Response:

Comment acknowledged. This section will be revised in light of the deferral of full BIO System pilot testing and will be presented as focused on obtaining excavation dewatering data.

D14 - SAP Page 15, Aquifer Testing Procedures

The document includes:

a. Background data will be collected for approximately two weeks.

b. Manual soundings will be made when the pressure transducers are installed and before the aquifer test begins. Data from the pressure transducers will be downloaded before every test to ensure that data is being recorded properly.

c. The background data will be used if correcting water levels for tidal or barometric effects is warranted. Tidal fluctuations in the estuary will be monitored by installing a temporary well that extends into the adjacent surface water at the end of the property.

Manual water level readings should also be taken prior to pulling the pressure transducer/data loggers and are suggested for several points in between. This allows for corrections to be applied to the pressure transducer data, if stray occurs, or even rejection of the data, if failure occurs.

In addition to tidal effects, Ecology requests that the heads in the monitored wells be compared with the marine head measurements in order to assess gradients during the course of the background monitoring. This means that pressure transducer data be transformed to elevation data from all locations, including the temporary well installed in surface water. The top of casing of the temporary surface water well and all new monitoring wells therefore need to be surveyed. This gradient data can be assessed by overlaying the groundwater head data with the marine head data within the report prepared for the Step 2 PRDI. These data are anticipated to allow significantly better understanding of the interconnectivity of the groundwater system with the adjacent marine system.

Monitoring wells MW-4, MW-5, MW-6, MW-7, MW-8A/8B, MW-9A/9B, MW-10A/10B, MW-11A/11B, the new shallow and deep monitoring wells to be installed as part of the Upland PRDI activities, and the new pumping wells are proposed for installation of pressure transducer/data loggers during the background monitoring. Ecology concurs with the selection of these monitoring wells and appreciates that this proposed background monitoring will be a thorough assessment.

Jeld-Wen Team Response:

Comment acknowledged.

D15 - SAP Page 16, Aquifer Testing Procedures

The document includes:

> *6. Groundwater pumped during the testing will be containerized pending disposal or discharge.*

Please add additional discussion regarding the capacity of water container(s) that will be needed, and anticipated pretreatment and discharge requirements.

Jeld-Wen Team Response:

Comment acknowledged. See previous response to comment B5.

D16 – SAP Section 2.13 Residuals Management

Ecology highly recommends keeping soils and water potentially contaminated with DFs separate from the Creosote Area contaminated soil and groundwater. In addition, properly separating potentially contaminated soil, water, and other wastes (e.g. PPE and disposable investigation materials) is advised.

Jeld-Wen Team Response:

Comment acknowledged. Section 3.5.4 will be revised to reflect this.