BUNKER C TANK INTERIM ACTION REPORT

Georgia-Pacific West Site
Bellingham, Washington

Prepared for: Port of Bellingham

Project No. 070188-001-17 • February 24, 2012 Final

Aspect CONSULTING

earth + water

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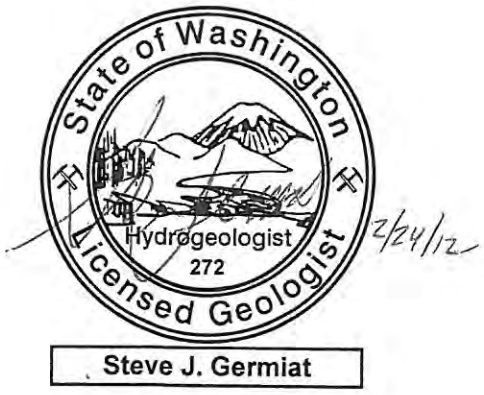

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1 Introduction

This report documents the interim action conducted within the Bunker C Tank Subarea of the Georgia-Pacific West Site (Site) in Bellingham, Washington (Figure 1). The interim action successfully removed petroleum-contaminated soil that served as a source of contaminant migration to groundwater and air (via soil vapor).

The interim action was conducted by the Port of Bellingham (Port) in accordance with the Interim Action Work Plan (Aspect, 2011b), which is Exhibit C to the 2011 Amendment to Agreed Order No. 6834 between the Port and Washington State Department of Ecology (Ecology).

1.1 Interim Action Area Information and Background

The Bunker C Tank Interim Action Area includes the footprint of the former Bunker C Tank, a 375,000-gallon tank formerly located near the northeast corner of the GP West Site[1]. The Bunker C tank reportedly did not have a bottom. Consequently, Bunker C oil-saturated soil existed beneath the former tank, with concentrations of total petroleum hydrocarbons (TPH) in soil up to 88,000 milligrams per kilogram (mg/kg) (well above residual saturation), which represented a potential source of petroleum mobile non-aqueous phase liquid (NAPL) (aka "free product"). As evidence of this, there was a thin accumulation of NAPL floating on the water table in a monitoring well located next to the former tank containment structure.

2 Interim Action Goal

The goal of the Bunker C Tank interim action was to achieve permanent control of a substantial TPH contaminant source to groundwater and air through removal and off-site disposal of contaminated soil. This interim action was not intended as final cleanup for TPH soil contamination throughout the Bunker C Tank Subarea. Rather, it was intended to remove a known source containing the highest TPH soil concentrations detected on Site. As described in Section 2.2 of the Interim Action Work Plan, there is additional TPH contamination outside of the interim action area within the Bunker C Tank Subarea. The additional contamination will be addressed within the ongoing Site RI/FS and Cleanup Action Plan process being conducted in accordance with the Agreed Order.

The source control was achieved by removing contaminated soil to meet interim action soil remediation levels outlined in Section 2.1.

[1] Note: Consistent with other Site documents, this report contains directional references relative to "Mill north" as established by GP, with the "Mill north" axis approximately 45 degrees west of true north (see North arrows on figures).

2.1 Soil Remediation Levels

In accordance with the Interim Action Work Plan, the Bunker C Tank interim action excavation was adjusted laterally as necessary to remove soil with contaminant concentrations exceeding a lateral remediation level of 10,000 mg/kg TPH, as determined from excavation sidewall verification soil sampling and analysis. This concentration is anticipated to be protective of indoor air via soil vapor intrusion, and of groundwater via dissolved-phase leachability and NAPL mobility.

To help ensure against the need for additional excavation within the interim action excavation area, for the purpose of final cleanup, the entire vertical soil profile within each lateral area (to a maximum depth of 15 feet)[2] was excavated to a vertical remediation level of 3,100 mg/kg TPH, as determined from excavation bottom verification soil sampling and analysis. This concentration is anticipated to be protective of all exposure pathways, including direct contact exposure, under unrestricted land use.

Final soil cleanup levels will be defined as part of the final Cleanup Action Plan (CAP) issued by Ecology and will address each exposure pathway defined in the RI/FS (e.g., direct contact, leaching to groundwater, generation of NAPL, vapor generation etc.).

2.1.1 Excavation Adjacent to Existing Structures

An important consideration for this interim action was the Bunker C Tank subarea proximity to the former primary clarifier, a large, pile-supported structure located east-northeast of the excavation (Figure 2). The project Construction Specifications (Specifications) required that certain existing structures, including the clarifier, be protected from damage during construction activities. Other structures required by Specifications to be protected from damage were a 36"-inch-diameter fiberglass pipeline, which leads from the overflow structure of the clarifier to the Aerated Stabilization Basin (ASB) pump station, and the shoreline bulkhead that forms the subarea's northern boundary with the Whatcom Waterway.

In accordance with the Interim Action Work Plan, the Specifications required that the Contractor design, and be prepared to implement, excavation stabilization measures (i.e., temporary shoring) to protect the existing structures if the soil excavation would possibly cause their undermining, settlement, or movement. However, stabilization measures were not required because the excavation did not extend close enough to the structures to threaten their stability. Structure settlement monitoring procedures are described in Section 3.2 below.

No soil exceeding remediation levels needed to be left in place due to proximity to existing structures.

[2] The depth for compliance with soil cleanup levels based on direct contact exposure is 15 feet (WAC 173-340-740(6)(d)).

3 Interim Action Activities and Methodology

Soil excavation, dewatering, handling, loading, and disposal activities were conducted by Strider Construction Co., Inc, of Bellingham, Washington, the cleanup contractor (Contractor) selected by the Port through a publicly advertised competitive bid process. Aspect served as the Port's Engineer, providing oversight of the Contractor and conducting monitoring to ensure compliance with the interim action goals.

The interim action included the following field activities:

- Mobilization and site preparation, including temporary removal of utilities as needed, monitoring well decommissioning, and establishment of temporary erosion and sediment controls;
- Excavation, segregation, and stockpiling of soil;
- Overburden soil sampling and analysis to designate overburden soils as contaminated soil or not;
- Excavation sidewall and bottom soil sampling and analysis to verify that soil remediation levels are achieved (interim action goal achieved);
- Settlement monitoring for the existing clarifier structure;
- Dewatering followed by treatment and disposal of the water;
- Loading and off-site disposal of contaminated soils and debris; and
- Excavation backfill and compaction.

These activities are briefly described in this section.

3.1 Mobilization and Site Preparation

In early November 2011, the Contractor mobilized construction equipment and materials to the Site and began to prepare the Site for the interim action.

The Contractor implemented temporary erosion and sedimentation controls (TESC) to help prevent runoff transport of soil or other materials from the Site.

The Contractor moved an overhead power line and its associated utility pole, in accordance with Paragraph 2-01.3(5) in the Specifications. Underground utilities mentioned in the Specifications were not moved during site preparation but were selectively removed during excavation, as described below.

The Contractor constructed a bermed, lined soil stockpile area to the east of the anticipated excavation area (Figure 2). In an approved variance from paragraph 2-03.2(2) in the Specifications, the stockpile area was not underlain with 10-mil-thick geomembrane. Instead, the visible cracks and holes in the asphaltic pavement underlying the stockpile area were sealed or patched to prevent infiltration of water from the stockpile area into the underlying soil. The Contractor then constructed a berm around the western, northern, and eastern perimeter of the stockpile area to prevent runoff from

leaving the area. The berm was constructed of concrete ecology blocks, with the joint between the ecology blocks and the underlying pavement sealed with an asphalt wedge. Finally, a 9 inch-deep concrete sump was constructed at the lowest part of the stockpile area, and equipped with a pump with a float-activated switch (Figure 2). The sump pump was tightlined to the Contractor's water treatment system.

The Contractor mobilized and installed a water treatment system for removing settleable solids and separate-phase oil from excavation dewatering water and water accumulating in the soil stockpile area. The Contractor also installed conveyance piping to deliver water from the stockpile area and the planned excavation area to the treatment system inlet, and from the treatment system outlet to the Port's pump station that discharges to the Port's permitted ASB wastewater treatment system.

Aspect supervised the decommissioning of existing monitoring well BC-MW01, located within the northern edge of the planned excavation (Figure 2), in accordance with requirements of Chapter 173-160 WAC. The other subarea monitoring wells remain in place and usable (shown on Figure 2).

3.2 Settlement Monitoring for Clarifier

In compliance with Paragraph 2-02.3(5) of the Specifications, the clarifier was monitored for settlement prior to and throughout excavation and backfilling activities for this interim action. Before the start of excavation, licensed surveyors from Wilson Engineering, LLC of Bellingham, Washington (Wilson) established four settlement-survey points on the western side of the clarifier (TBM-A, TBM-B, TBM-C, and TBM-D), and one on the western side of the former phosphoric acid tank next to the clarifier (TBM-E), and conducted a baseline survey (horizontal and vertical accuracy of 0.01 foot). Twice each week during excavation and backfilling activities, Wilson surveyed the points. The final survey was conducted following completion of excavation backfill.

After each day's surveying, Wilson verbally provided the results of the survey to Aspect field personnel. Survey results were also provided in a written report to Aspect's project manager after each day's surveying. Appendix B includes Wilson's final report summarizing the survey results from the entire project.

The settlement monitoring indicated less than 0.03 foot net movement for each of the five settlement-survey points on the clarifier and adjacent acid tank. Therefore, in accordance with the Specifications, no corrective measures were necessary or recommended.

3.3 Excavation Dewatering and Management of Water

Before beginning excavation, the Contractor installed nine dewatering well points approximately 50 feet north of the former concrete containment structure (Figure 2). The well points were pumped for the first day following their installation, but they collectively produced a negligible quantity of water. Conditions were such that the well points were not needed to dewater the excavation, and were thus not used. The Contractor decommissioned them at the end of construction.

During excavation, the Contractor pumped water from sumps within the excavation in order to achieve unsaturated conditions, in accordance with Sections 3.4 and 3.5 of the Interim Action Work Plan. Dewatering water was pumped from the excavation sumps to

the water treatment system. The Contractor did not make use of the dewatering test well BC-DW1, installed by Aspect to provide remedial design information (Figure 2).

The Contractor also built a sump at the lowest elevation in the stockpile area as described above. Runoff from the stockpile area drained to the sump from where it was pumped to the water treatment system.

A total of 188,300 gallons of water were pumped from the excavation and the stockpile area sump, through the Contractor's water treatment system, and to the ASB pump station during the Bunker C Tank interim action. The water treatment system included two 18,100-gallon settlement tanks with weirs, one 10,000-gallon settlement tank with weirs, and two oil-water separators (one rated at 100 gallons per minute (gpm) and one rated at 200 gpm). The settlement tanks were operated in series or in parallel, depending on pumping rates and water quality. The 200-gpm oil-water separator was operated for less than a week, when flow rates through the water treatment system required it. Otherwise, the 100-gpm oil-water system was operated exclusively. Figure 2 shows the approximate locations of the water treatment system components.

Aspect monitored the discharge from the water treatment system for compliance with the Specifications' project water quality performance standards for discharge to the ASB (total settleable solids below 100 ml/L and no visible separate-phase oil). No exceedance of the performance standards was observed.

3.4 Soil Excavation and Segregation

During excavation, Aspect used visual and olfactory field screening to differentiate soils that appeared to be contaminated (TPH concentrations above remediation levels) from potentially clean overburden (TPH concentrations below remediation levels). Presumed-clean overburden soils were further segregated based on whether they appeared to be geotechnically suitable for reuse as excavation backfill (i.e., granular soils with low silt, organic, and debris content) or not. Soils determined to be contaminated based on field screening were not sampled. Soils determined to potentially be not contaminated based on field screening were sampled to confirm whether it met remediation levels.

Contaminated soil was stockpiled in a paved, bermed area as described above. The stockpile was covered with a geomembrane when not in use.

Presumed-clean overburden soil was stockpiled on site pending chemical testing to confirm whether or not it met remediation levels. The overburden soil was stockpiled in a paved, bermed area in the event that it needed to be managed as contaminated soil based on sampling results. The overburden stockpiles were covered with a geomembrane when not in use.

After the soil was removed from the stockpile area, the Contractor steam cleaned the asphaltic pavement that underlain the area. The wastewater that was generated by the steam cleaning was collected in the stockpile area sump and pumped to the Contractor's water treatment system.

During excavation, 49 separate pipes were uncovered. Of these, five were found to contain oil. The Contractor cut four of these oil-containing pipes at the edge of the excavation and capped the remaining pipe ends to prevent the flow of liquids; the pipe

ends were surveyed for future reference. The Contractor removed the entire length of one oil-containing pipe that had ends visible at the surface (identified in Paragraph 2-01.3(4) of the Project Specifications). The Contractor drained the oil from each of the oil-containing pipes into drums and disposed of the oil at the Thermo Fluids oil recycling facility in Sumner, Washington.

One pipeline partially exposed during excavation was a 30-inch-diameter fiberglass pipe that conveys storm water from a concrete sump near the clarifier to a collector pipe that leads to the ASB pump station. This 30-inch pipe was found to have at least two holes in it from which storm water drained into the excavation. To help keep the soil in the excavation unsaturated, the Contractor temporarily plugged the 30-inch pipe with two inflatable plugs, one on either side of the excavation. When soil removal was complete and the excavation was backfilled to an elevation above that of groundwater, the temporary plugs were removed and the 30-inch pipe was restored to its pre-interim action status.

3.5 Performance Monitoring and Over-Excavation

When field screening indicated that soils had been removed from a portion of the excavation to meet lateral and vertical remediation levels, verification soil samples were collected from excavation sidewall and bottom for laboratory analysis to confirm compliance with interim action remediation levels. In accordance with the project-specific Cleanup Construction Management Plan (CCMP; Aspect, 2011b), the verification soil samples were collected within a 15-foot by 15-foot grid. Figure 2 shows the as-built excavation footprint with the verification sampling grid, with grid cells denoted by a letter-number combination (e.g., G7). Within each grid cell, one excavation bottom sample was collected, while excavation sidewall samples were collected at 3-foot depth intervals (e.g., 0 to 3 feet, 3 to 6 feet, 6 to 9 feet, etc.) across the depth of excavation sidewall.

One excavation bottom sample was collected from each grid cell to document that the 3,100 mg/kg TPH vertical remediation level was met at depth.

Excavation sidewall sampling was conducted to document that the 10,000 mg/kg lateral remediation level had been met. Within each grid cell, sidewall samples were collected at 3-foot depth intervals (e.g., 0 to 3 feet, 3 to 6 feet, 6 to 9 feet, etc.) across the full depth of excavation sidewall.

Each verification soil sample was analyzed for TPH using the NWTPH-Dx method with silica gel pretreatment, including using a Bunker C oil analytical standard to allow quantification of the TPH specifically as Bunker C. Libby Environmental of Olympia, Washington, performed the laboratory analyses using an on-site mobile laboratory, providing rapid turnaround of results to guide the excavation effort. Libby's mobile lab is accredited by Ecology to conduct the NWTPH-Dx analysis.

In all but two bottom samples, performance monitoring results indicated that remediation levels had been achieved vertically. In the cases of the two samples that exceeded remediation levels, soils represented by the exceeding sample were over-excavated by one or two feet vertically. A new bottom verification sample was then collected at those

locations. Analyses of these new samples indicated that remediation levels had been reached.

In all but three sidewall samples, performance monitoring results indicated that remediation levels had been achieved laterally. In the cases of the three samples that exceeded remediation levels, the sidewalls represented by the sample were over-excavated laterally. A new sidewall verification sample was then collected at that location. In each case, analysis of the new sample indicated that remediation levels had been achieved.

Aspect's review of the analytical quality control information (method blank and surrogate recovery data) indicates that the NWTPH-Dx analytical data are of suitable quality for their intended use.

Table 1 presents the excavation performance monitoring results, grouped by sidewall samples and then bottom samples. Sample results exceeding respective remediation levels are highlighted in the table.

3.6 Overburden Stockpile Sampling and Disposition

The Contractor stockpiled on site about 880 cubic yards of overburden soil that Aspect's visual and olfactory field screening indicated was not contaminated (i.e., TPH concentrations below remediation levels). Aspect collected three discrete soil samples from each 100 cubic yards of stockpiled overburden, consistent with the CCMP. Each overburden soil sample was analyzed for TPH using the NWTPH-Dx method with silica gel pretreatment, including quantification of the TPH as Bunker C. Aspect's review of the analytical quality control information (method blank and surrogate recovery data) indicates that the NWTPH-Dx analytical data are of suitable quality for their intended use.

None of the samples of overburden soil contained a TPH concentration above the soil remediation level (Table 2). An estimated 633 cubic yards of the soil was retained for backfilling the interim action excavation ("Reusable Soil" in the Specifications). The remainder of the overburden soil (377 tons) was deemed to be geotechnically unsuitable, as defined in the Specifications.

3.7 Off-Site Disposal of Excavated Material

In the Interim Action Work Plan, it was estimated that a total of 8,000 tons of soil and debris (contaminated and not contaminated) would require removal from the Bunker C Tank interim action area. During construction, approximately 5,978 tons of soil and debris were actually removed. This is in addition to the concrete secondary containment structure that surrounded the former fuel storage tank, for which tonnage was not reported.

A total of 4,333 tons of petroleum-contaminated soil was removed and transported to the permitted disposal facility operated by CEMEX USA in Everett, Washington, where it was thermally treated and landfilled. The volume of contaminated soil was smaller than had been estimated during remedial design because the extent of contamination was not as great as had been estimated (with contingency). Figure 2 shows the as-built footprint of the excavation.

An estimated 633 cubic yards (roughly 950 tons) of granular overburden was confirmed to contain TPH concentrations below soil remediation levels, and was therefore reused as excavation backfill. In addition, 377 tons of overburden tested below remediation levels but, due to silt and organic content, was deemed geotechnically unsuitable for backfill; this material was properly disposed of at the CEMEX facility.

In addition, approximately 318 tons of debris (concrete, metal piping, etc.) required removal during the interim action.

Appendix C includes CEMEX's certificate of disposal and a tabulation of the individual scale tickets for soils disposed of at the CEMEX facility. Note that the certificate of disposal specifies 4,710 tons, which includes the combined quantities of contaminated soil (4,333 tons) and goetechnically unsuitable overburden (377 tons), since both waste streams were disposed of there.

3.8 Excavation Backfill

The excavation was backfilled to the pre-construction grade with approximately 633 cubic yards reusable overburden soil, 200 tons of quarry spalls from Aggregates West Inc., of Everson, Washington, and 6,936 tons gravel borrow from Ferndale Ready Mix and Gravel, Inc., Lynden, Washington. All the imported fill was non-contaminated native materials from WSDOT-approved sources, in accordance with the Specifications.

Backfill soil was placed in lifts of approximately 12 inches and compacted with dozer and vibratory roller compactor to greater than 90% of maximum dry density. Materials Testing and Consulting, Inc., (MTC) of Bellingham, Washington, provided third-party testing of the in-place density of backfill lifts using a nuclear density gauge. MTC's backfill density test and proctor results are included in Appendix D.

4 Bunker C Tank Interim Action Results

In November and December 2011, the Bunker C Tank interim action successfully removed 4,333 tons of petroleum-contaminated soil from the Site, including removal of the highest TPH soil concentrations detected to date on Site. Performance monitoring data, collected during the interim action in accordance with the CCMP, confirm that soil remediation levels have been met for this interim action area. As such, the interim action objectives for source control have been met.

References

Aspect, 2009, RI/FS Work Plan, Georgia-Pacific West Site, Bellingham, Washington, September 10, 2009.

Aspect, 2010, Remedial Investigation, Georgia-Pacific West Site, Bellingham, Washington, September 29, 2010, Draft.

Aspect, 2011a, Interim Action Work Plan, Georgia-Pacific West Site, Bellingham, Washington, August 22, 2011, Final.

Aspect, 2011b, Cleanup Construction Management Plan, Bunker C Tank Interim Action, GP West Site, Bellingham, Washington, August 24, 2011, Final

Limitations

Work for this project was performed and this report prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of Port of Bellingham for specific application to the referenced property. This report does not represent a legal opinion. No other warranty, expressed or implied, is made.

Table 1 - Soil Excavation Performance Monitoring Analytical Data

Bunker C Tank Interim Action

Sample ID	Date Analyzed	Sample Depth Below Existing Grade (ft)	Bunker C TPH Concentration (mg/kg)	Comments
Excavation Sidewall Samples (compared against 10,000 mg/kg TPH lateral remediation level)				
F9-S-3-6	11/19/2011	3-6	nd	
F9-S-6-9	11/19/2011	6-9	nd	
F9-S-9-12	11/19/2011	9-12	nd	
F10-S-3-6	11/19/2011	3-6	nd	
F10-S-6-9	11/19/2011	6-9	nd	
F10-S-9-12	11/19/2011	9-12	nd	
G7-S-6-9	11/30/2011	6-9	nd	
G7-S-9-12	11/30/2011	9-12	nd	
G8-S-6-9	11/19/2011	6-9	nd	
G8-S-9-12	11/19/2011	9-12	nd	
G11-S-6-9	11/19/2011	6-9	nd	
G11-S-9-12	11/19/2011	9-12	nd	
H6-S-6-9	12/1/2011	6-9	nd	
H6-S-9-12	12/1/2011	9-12	83	
H12-S-6-9	11/19/2011	6-9	nd	
H12-S-9-12	11/19/2011	9-12	nd	
I6-S-6-9	12/2/2011	6-9	120	
I6-S-9-12	12/2/2011	9-12	180	
I12-S-6-9	11/19/2011	6-9	14,500	Soil represented by this sample was excavated. Subsequent verification sample is I13-S-6-9
I12-S-9-12	11/19/2011	9-12	616	
I13-S-3-6	11/30/2011	3-6	560	
I13-S-6-9	11/30/2011	6-9	nd	
J6-S-6-9	12/2/2011	6-9	nd	
J6-S-9-12	12/2/2011	9-12	nd	
J12-S-6-9	11/19/2011	6-9	4,200	
30-IN-S-6-9	11/30/2011	6-9	2,570	This was the pipe bedding in cell J12.
J12-S-9-12	11/19/2011	9-12	977	

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Bunker C Tank Interim Action

Sample ID	Date Analyzed	Sample Depth Below Existing Grade (ft)	Bunker C TPH Concentration (mg/kg)	Comments
Excavation Sidewall Samples (compared against 10,000 mg/kg TPH lateral remediation level) (continued)				
K6-S-6-9	12/2/2011	6-9	nd	
K6-S-9-12	12/2/2011	9-12	nd	
K7-S-6-9	12/6/2011	6-9	317	
K7-S-9-12	12/6/2011	9-12	237	
K12-S-6-9	11/19/2011	6-9	nd	
K12-S-9-12	11/19/2011	9-12	nd	
L8-S-6-9	12/7/2011	6-9	224	
L8-S-9-12	12/7/2011	9-12	236	
L12-S-6-9	11/19/2011	6-9	nd	
L12-S-9-12	11/19/2011	9-12	nd	
M8-S-6-9	12/7/2011	6-9	634	
M8-S-9-12	12/7/2011	9-12	514	
M10-S-6-9	12/7/2011	6-9	519	
M10-S-9-12	12/7/2011	9-12	473	
M11-S-6-9	12/2/2011	6-9	nd	
M11-S-9-12	12/2/2011	9-12	nd	
N9-S-6-9	12/7/2011	6-9	444	
N9-S-6-9B	12/7/2011	6-9	540	
N9-S-9-12	12/7/2011	9-12	340	
N10-S-6-9	12/7/2011	6-9	22,800	Soil represented by this sample was excavated. Subsequent verification sample is N10-S-6-9B
N10-S-6-9B	12/7/2011	6-9	774	
N10-S-9-12	12/7/2011	9-12	415	
N11-S-6-9	12/2/2011	6-9	85,000	Soil represented by this sample was excavated. Subsequent verification sample is N11-S-6-9B
N11-S-6-9B	12/7/2011	6-9	303	
N11-S-9-12	12/2/2011	9-12	290	

Table 1 - Soil Excavation Performance Monitoring Analytical Data

Bunker C Tank Interim Action

Sample ID	Date Analyzed	Sample Depth Below Existing Grade (ft)	Bunker C TPH Concentration (mg/kg)	Comments
Excavation Bottom Samples (compared against 3,100 mg/kg TPH vertical remediation level)				
F9-B-12	11/19/2011	12	nd	
F10-B-12	11/19/2011	12	nd	
G7-B-12	11/30/2011	12	nd	
G8-B-12	11/19/2011	12	nd	
G9-B-12	11/30/2011	12	290	
G10-B-12	11/30/2011	12	6,680	Soil represented by this sample was excavated. Subsequent verification sample is G10-B-14
G10-B-14	12/1/2011	14	190	
G11-B-12	11/19/2011	12	nd	
G11-B-13	11/30/2011	13	120	
H6-B-12	12/1/2011	12	nd	
H7-B-12	12/1/2011	12	nd	
H8-B-12	12/1/2011	12	nd	
H9-B-12	12/1/2011	12	nd	
H10-B-13	12/1/2011	13	100	
H11-B-13	12/1/2011	13	nd	
H12-B-12	11/19/2011	12	nd	
H12-B-13	11/30/2011	13	21,800	Soil represented by this sample was excavated. Subsequent verification sample is H12-B-15
H12-B-15	12/1/2011	15	210	
I6-B-12	12/2/2011	12	nd	
I7-B-12	12/5/2011	12	439	
I8-B-12	12/5/2011	12	nd	
I9-B-12	12/1/2011	12	nd	
I10-B-13	12/1/2011	13	360	
I11-B-13	12/1/2011	13	210	
I12-B-12	11/19/2011	12	nd	
J6-B-12	12/2/2011	12	nd	
J7-B-12	12/2/2011	12	nd	

Table 1 - Soil Excavation Performance Monitoring Analytical Data

Bunker C Tank Interim Action

Sample ID	Date Analyzed	Sample Depth Below Existing Grade (ft)	Bunker C TPH Concentration (mg/kg)	Comments
Excavation Bottom Samples (compared against 3,100 mg/kg TPH vertical remediation level)				
J8-B-13	12/5/2011	13	225	
J9-B-13	12/5/2011	13	nd	
J10-B-14	12/5/2011	14	488	
J11-B-12	12/1/2011	12	200	
J12-B-12	11/19/2011	12	2,022	
K6-B-12	12/2/2011	12	nd	
K7-B-12	12/6/2011	12	303	
K8-B-13	12/6/2011	13	872	
K9-B-12	12/6/2011	12	837	
K10-B-13	12/5/2011	13	388	
K11-B-12	12/2/2011	12	nd	
K12-B-12	11/19/2011	12	nd	
L8-B-12	12/7/2011	12	238	
L9-B-12	12/6/2011	12	259	
L10-B-12	12/6/2011	12	414	
L11-B-12	12/2/2011	12	nd	
M8-B-12	12/7/2011	12	490	
M9-B-12	12/7/2011	12	458	
M10-B-12	12/7/2011	12	329	
M11-B-12	12/2/2011	12	nd	
N9-B-12	12/7/2011	12	332	
N10-B-12	12/7/2011	12	469	
N11-B-12	12/2/2011	12	nd	

Notes:

nd = Not detected at analytical reporting limit of 40 mg/kg.

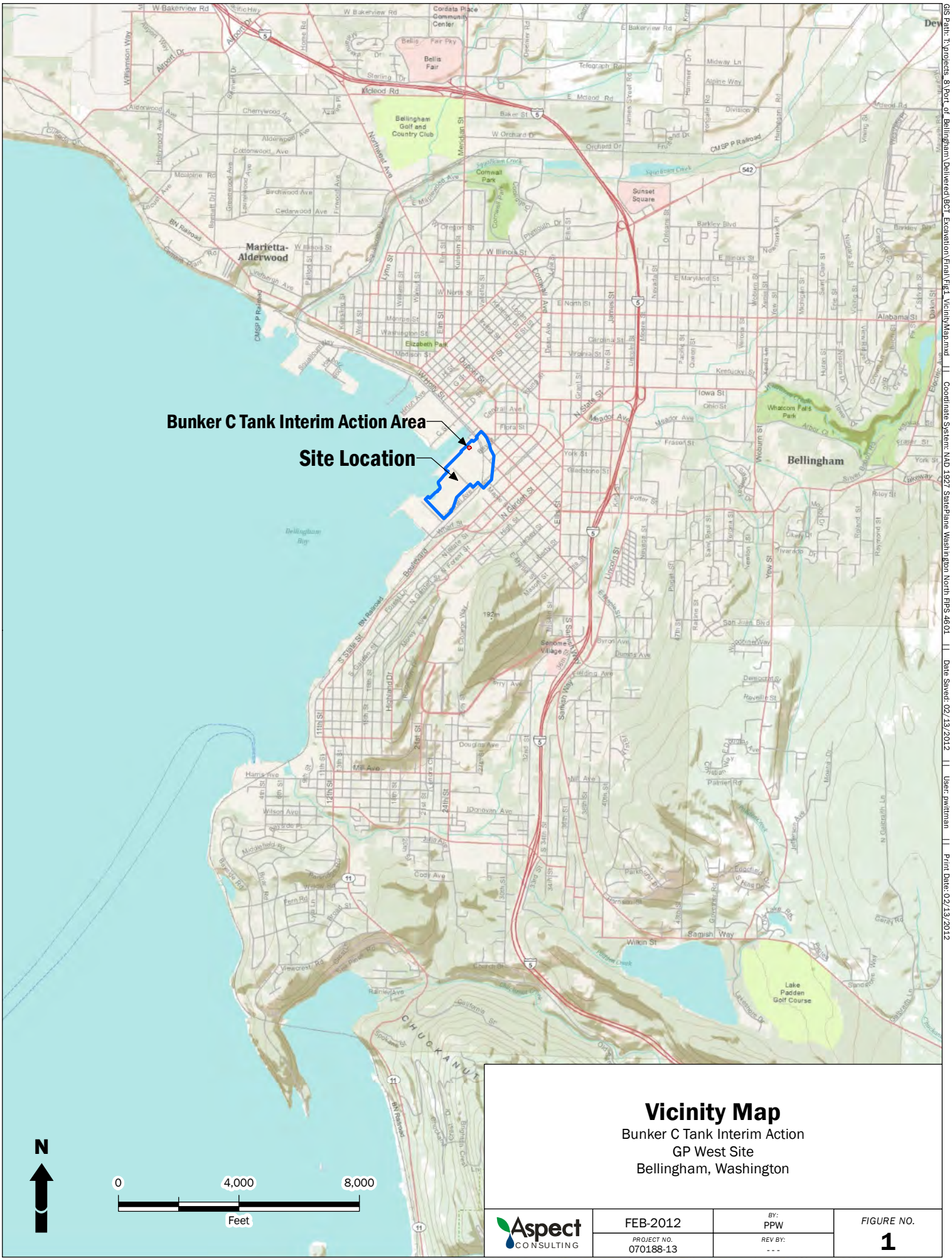
Shaded results exceed respective soil remediation level (10,000 mg/kg TPH for sidewall samples, and 3,100 mg/kg TPH for bottom samples).

Table 2 - Overburden Soil Stockpile Analytical Data

Bunker C Tank Interim Action

Sample ID	Date Analyzed	Bunker C TPH Concentration (mg/kg)
Noncontaminated geotechnically suitable stockpile 1		
NCGS-1-1	12/1/2011	270
NCGS-1-2	12/1/2011	370
NCGS-1-3	12/1/2011	190
Noncontaminated geotechnically suitable stockpile 2		
NCGS-2-1	12/1/2011	350
NCGS-2-2	12/1/2011	230
NCGS-2-3	12/1/2011	560
Noncontaminated geotechnically suitable stockpile 3		
NCGS-3-1	12/1/2011	nd
NCGS-3-2	12/1/2011	370
NCGS-3-3	12/1/2011	150
Noncontaminated geotechnically suitable stockpile 4		
NCGS-4-1	12/1/2011	280
NCGS-4-2	12/1/2011	nd
NCGS-4-3	12/1/2011	300
Noncontaminated geotechnically suitable stockpile 5		
NCGS-5-1	12/2/2011	nd
NCGS-5-2	12/2/2011	nd
NCGS-5-3	12/2/2011	86
Noncontaminated geotechnically suitable stockpile 6		
NCGS-6-1	12/2/2011	330
NCGS-6-2	12/2/2011	330
NCGS-6-3	12/2/2011	330
Noncontaminated geotechnically suitable stockpile 7		
NCGS-7-1	12/2/2011	470
NCGS-7-2	12/2/2011	420
NCGS-7-3	12/2/2011	530

nd = Not detected at analytical reporting limit of 40 mg/kg.

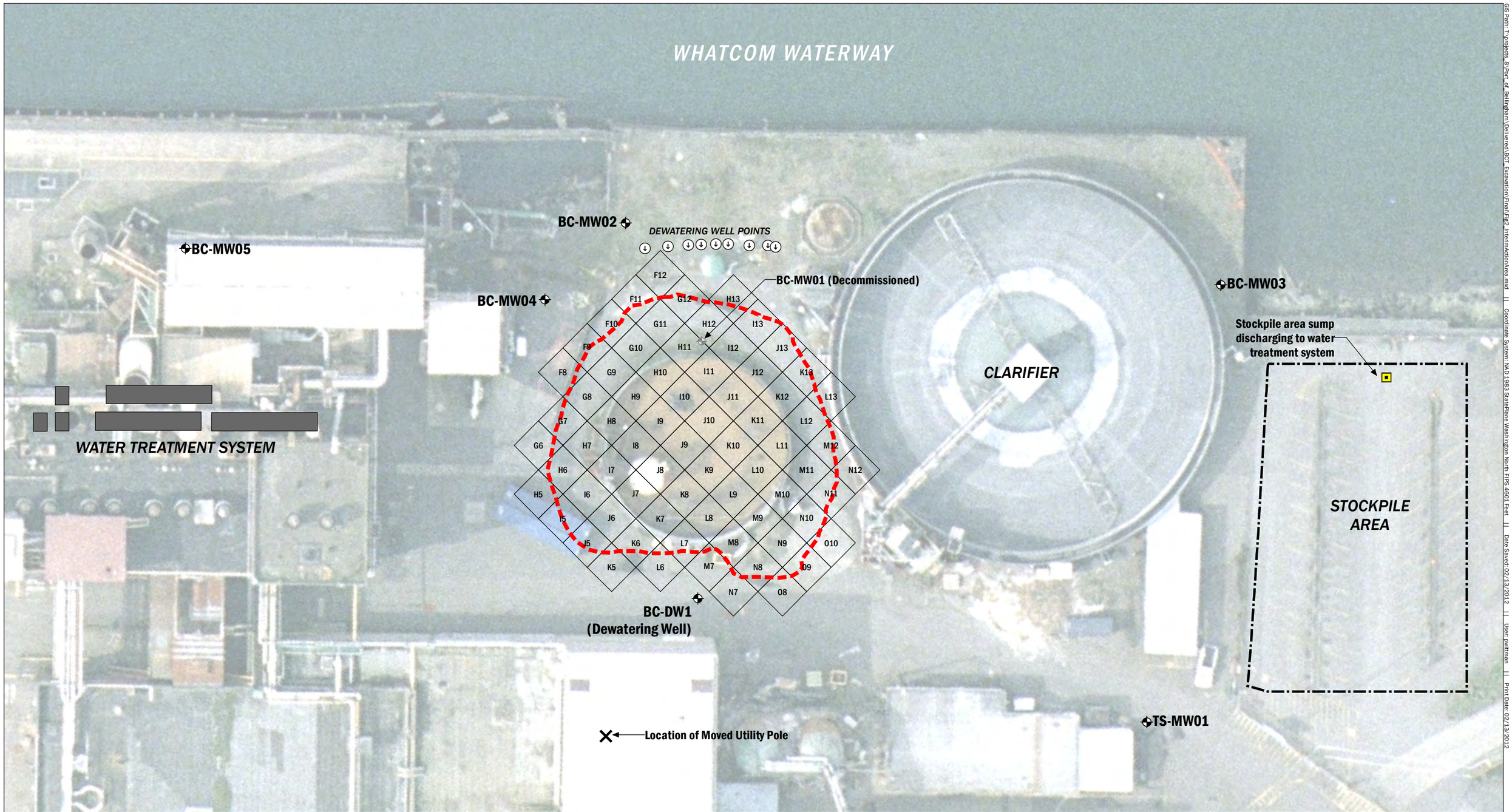


Vicinity Map

Bunker C Tank Interim Action
GP West Site
Bellingham, Washington

Aspect CONSULTING	FEB-2012	BY: PPW	FIGURE NO. 1
	PROJECT NO. 070188-13	REV BY: ---	

GIS Path: T:\projects_8\Port_of_Bellingham\Delivered\BCT_Excavation\Final\Fig1_VicinityMap.mxd || Coordinate System: NAD 1927 StatePlane Washington North FIPS 4601 || Date Saved: 02/13/2012 || User: pwittman || Print Date: 02/13/2012



As-Built Bunker-C Tank Excavation Outline

Dewatering Well Points

Monitoring Wells

Decommissioned Monitoring Well

Excavation Verification Soil Sample Grid Cells

Location of Moved Utility Pole

Stockpile Area Edges

Water Treatment System Features

Stockpile Area Sump

Aerial Photo from City of Bellingham (2008)

MILL NORTH

TRUE NORTH

45°

0 40 80

Feet

Bunker C Tank Interim Action Area

Bunker C Tank Interim Action
GP West Site
Bellingham, Washington

Aspect CONSULTING	FEB-2012	BY: MvdA / PPW	FIGURE NO. 2
	PROJECT NO. 070188-13	REV BY: ---	

GIS Path: T:\projects_8\Port_of_Bellingham\Delivered\BCT_Excavation\Final\Fig2_InterimActionArea.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 02/13/2012 || User: pwitman || Print Date: 02/13/2012

APPENDIX A

Laboratory Reports of Analysis for Performance Monitoring Analytical Data (Libby Environmental Inc.)

Libby Environmental, Inc.

4139 Libby Road NE • Olympia, WA 98506-2518

December 19, 2011

RECEIVED
DEC 21 2011

Steve Germiat
Aspect Consulting
401 2nd Avenue S, Suite 201
Seattle, WA 98104

Dear Mr. Germiat:

Please find enclosed the analytical data report for the GP Bunker C Project located in Bellingham, Washington. Soil samples were analyzed for Bunker C by NWTPH-Dx/Dx Extended with Silica Gel Clean Up from November 30, 2011 – December 7, 2011.

The results of the analyses are summarized in the attached tables. Applicable detection limits and QA/QC data are included. All soil samples are reported on a dry weight basis. An invoice for this analytical work is enclosed.

Libby Environmental, Inc. appreciates the opportunity to have provided analytical services for this project. If you have any further questions about the data report, please give me a call. It was a pleasure working with you on this project, and we are looking forward to the next opportunity to work together.

Sincerely,

Jamie L. Hart
President
Libby Environmental, Inc.

Phone (360) 352-2110 • Fax (360) 352-4154 • libbyenv@aol.com

LIBBY ENVIRONMENTAL CHEMISTRY LABORATORY

GP BUNKER C PROJECT
Bellingham, Washington
Aspect Consulting, LLC
Client Project # 70188
Libby Project No. L111130-20

Analyses of Bunker C (NWTPH-Dx/Dx Extended) in Soil with Silica Gel Cleanup

Sample Number	Date Analyzed	Surrogate Recovery (%)	Bunker C (mg/kg)
Method Blank	11/30/11	94	nd
I13-S-6-9	11/30/11	99	nd
30-IN-S-6-9	11/30/11	95	2570
H12-B-13	11/30/11	int	21800
G11-B-13	11/30/11	106	120
I13-S-3.6	11/30/11	93	560
I13-S-3-6 Dup	11/30/11	83	410
G9-B-12	11/30/11	104	290
G10-B-12	11/30/11	int	6680
G7-S-6-9	11/30/11	98	nd
G7-B-12	11/30/11	87	nd
G7-S-9-12	11/30/11	99	nd
G7-S-9-12 Dup	11/30/11	94	nd
Practical Quantitation Limit			80

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-F Biphenyl): 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

LIBBY ENVIRONMENTAL CHEMISTRY LABORATORY

GP BUNKER C PROJECT
Bellingham, Washington
Aspect Consulting, LLC
Client Project # 70188
Libby Project No. L111130-20

Analyses of Bunker C (NWTPH-Dx/Dx Extended) in Soil with Silica Gel Cleanup

Sample Number	Date Analyzed	Surrogate Recovery (%)	Bunker C (mg/kg)
Method Blank	12/1/11	104	nd
NCGS-1-1	12/1/11	101	270
NCGS-1-2	12/1/11	93	370
NCGS-1-3	12/1/11	95	190
NCGS-2-1	12/1/11	91	350
NCGS-2-2	12/1/11	97	230
NCGS-2-3	12/1/11	91	560
Practical Quantitation Limit			80

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-F Biphenyl): 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

LIBBY ENVIRONMENTAL CHEMISTRY LABORATORY

GP BUNKER C PROJECT
Bellingham, Washington
Aspect Consulting, LLC
Client Project # 70188
Libby Project No. L111130-20

Analyses of Bunker C (NWTPH-Dx/Dx Extended) in Soil with Silica Gel Cleanup

Sample Number	Date Analyzed	Surrogate Recovery (%)	Bunker C (mg/kg)
G10-B-14	12/1/11	89	190
H12-B-15	12/1/11	107	210
NCGS-3-1	12/1/11	101	nd
NCGS-3-2	12/1/11	97	370
NCGS-3-3	12/1/11	96	150
NCGS-4-1	12/1/11	100	280
NCGS-4-2	12/1/11	97	nd
NCGS-4-3	12/1/11	96	300
Practical Quantitation Limit			80

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-F Biphenyl): 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

LIBBY ENVIRONMENTAL CHEMISTRY LABORATORY

GP BUNKER C PROJECT
Bellingham, Washington
Aspect Consulting, LLC
Client Project # 70188
Libby Project No. L111130-20

Analyses of Bunker C (NWTPH-Dx/Dx Extended) in Soil with Silica Gel Cleanup

Sample Number	Date Analyzed	Surrogate Recovery (%)	Bunker C (mg/kg)
Method Blank	12/2/11	79	nd
NCGS-5-1	12/2/11	99	nd
NCGS-5-2	12/2/11	94	nd
NCGS-5-3	12/2/11	84	86
NCGS-6-1	12/2/11	100	330
NCGS-6-2	12/2/11	84	330
NCGS-6-3	12/2/11	103	330
NCGS-7-1	12/2/11	87	470
NCGS-7-2	12/2/11	84	420
NCGS-7-3	12/2/11	73	530
NCGS-7-3 Dup	12/2/11	98	620
Practical Quantitation Limit			80

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-F Biphenyl): 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

LIBBY ENVIRONMENTAL CHEMISTRY LABORATORY

GP BUNKER C PROJECT
Bellingham, Washington
Aspect Consulting, LLC
Client Project # 70188
Libby Project No. L111130-20

Analyses of Bunker C (NWTPH-Dx/Dx Extended) in Soil with Silica Gel Cleanup

Sample Number	Date Analyzed	Surrogate Recovery (%)	Bunker C (mg/kg)
Method Blank	12/1/11	90	nd
H11-B-13	12/1/11	100	nd
H10-B-13	12/1/11	105	100
H10-B-13 Dup	12/1/11	100	nd
H9-B-12	12/1/11	105	nd
I11-B-13	12/1/11	96	210
I10-B-13	12/1/11	124	360
I9-B-12	12/1/11	129	nd
J11-B-12	12/1/11	116	200
H6-S-6-9	12/1/11	128	nd
H6-S-9-12	12/1/11	119	83
H6-B-12	12/1/11	124	nd
H6-B-12 Dup	12/1/11	135	nd
H7-B-12	12/1/11	134	nd
H8-B-12	12/1/11	124	nd
Practical Quantitation Limit			80

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-F Biphenyl): 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

LIBBY ENVIRONMENTAL CHEMISTRY LABORATORY

GP BUNKER C PROJECT
Bellingham, Washington
Aspect Consulting, LLC
Client Project # 70188
Libby Project No. L111130-20

Analyses of Bunker C (NWTPH-Dx/Dx Extended) in Soil with Silica Gel Cleanup

Sample Number	Date Analyzed	Surrogate Recovery (%)	Bunker C (mg/kg)
Method Blank	12/2/11	95	nd
I6-S-9-12	12/2/11	135	180
I6-S-6-9	12/2/11	114	120
I6-B-12	12/2/11	110	nd
J6-S-6-9	12/2/11	128	nd
J6-S-9-12	12/2/11	113	nd
J6-B-12	12/2/11	110	nd
K6-B-12	12/2/11	88	nd
K6-S-6-9	12/2/11	135	nd
K6-S-9-12	12/2/11	105	nd
J7-B-12	12/2/11	124	nd
K11-B-12	12/2/11	91	nd
L11-B-12	12/2/11	115	nd
M11-S-6-9	12/2/11	90	nd
M11-S-9-12	12/2/11	112	nd
M11-B-12	12/2/11	82	nd
N11-S-6-9	12/2/11	int	85000
N11-S-9-12	12/2/11	102	290
N11-B-12	12/2/11	85	nd
Practical Quantitation Limit			80

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-F Biphenyl): 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

LIBBY ENVIRONMENTAL CHEMISTRY LABORATORY

GP BUNKER C PROJECT
Bellingham, Washington
Aspect Consulting, LLC
Client Project # 70188
Libby Project No. L111130-20

Analyses of Bunker C (NWTPH-Dx/Dx Extended) in Soil with Silica Gel Cleanup

Sample Number	Date Analyzed	Surrogate Recovery (%)	Bunker C (mg/kg)
Method Blank	12/5/11	96	nd
I8-B-12	12/5/11	116	nd
I7-B-12	12/5/11	106	439
J10-B-14	12/5/11	122	488
K10-B-13	12/5/11	115	388
J9-B-13	12/5/11	124	nd
J8-B-13	12/5/11	93	225
Practical Quantitation Limit			40

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-F Biphenyl): 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

LIBBY ENVIRONMENTAL CHEMISTRY LABORATORY

GP BUNKER C PROJECT
Bellingham, Washington
Aspect Consulting, LLC
Client Project # 70188
Libby Project No. L111130-20

Analyses of Bunker C (NWTPH-Dx/Dx Extended) in Soil with Silica Gel Cleanup

Sample Number	Date Analyzed	Surrogate Recovery (%)	Bunker C (mg/kg)
Method Blank	12/6/11	94	nd
K9-B-12	12/6/11	104	837
K8-B-13	12/6/11	100	872
K7-B-12	12/6/11	87	303
K7-S-9-12	12/6/11	91	237
K7-S-6-9	12/6/11	104	317
L9-B-12	12/6/11	106	259
L10-B-12	12/6/11	102	414
L10-B-12 Dup	12/6/11	94	397
Practical Quantitation Limit			40

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-F Biphenyl): 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

LIBBY ENVIRONMENTAL CHEMISTRY LABORATORY

GP BUNKER C PROJECT
Bellingham, Washington
Aspect Consulting, LLC
Client Project # 70188
Libby Project No. L111130-20

Analyses of Bunker C (NWTPH-Dx/Dx Extended) in Soil with Silica Gel Cleanup

Sample Number	Date Analyzed	Surrogate Recovery (%)	Bunker C (mg/kg)
Method Blank	12/7/11	94	nd
M10-B-12	12/7/11	93	329
L8-B-12	12/7/11	102	238
L8-S-9-12	12/7/11	88	236
L8-S-6-9	12/7/11	98	224
N9-B-12	12/7/11	96	332
N9-S-9-12	12/7/11	106	340
N9-S-6-9	12/7/11	100	444
N9-S-6-9 Dup	12/7/11	102	443
M10-S-9-12	12/7/11	91	473
M10-S-6-9	12/7/11	109	519
N10-B-12	12/7/11	106	469
N10-S-9-12	12/7/11	105	415
N10-S-6-9	12/7/11	int	22800
M9-B-12	12/7/11	109	458
M8-B-12	12/7/11	92	490
M8-B-12 Dup	12/7/11	113	431
M8-S-9-12	12/7/11	108	514
M8-S-6-9	12/7/11	97	634
N11-S-6-9-B	12/7/11	92	303
N9-S-6-9-B	12/7/11	107	540
N10-S-6-9-B	12/7/11	91	774
Practical Quantitation Limit			40

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-F Biphenyl): 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

Chain of Custody Record

4139 Libby Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Client: Aspect Consulting, LLC
Address:
Phone: Fax:
Client Project # 070188

Date: 11/30/11 Page: 1 of 2
Project Manager: Steve Germiat
Project Name: GP ~~Bunker~~ Bunker C
Location: Bellingham
Collector: AET, MDV Date of Collection: 11/29 - 11/30

Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx DIESEL ONLY SILICA GEL	NWTPH-Dx Ext.	PAH 8270	PCB's 8082	MTCA 5 Metals				Field Note/# Containers
1 I13-S-6-9	6-9	1102	SOIL	4oz Jar						X									
2 30-IN-S-6-9	6-9	1000	"	"						X									
3 H12-B-13	13	1300	"	"						X									
4 G11-B-13	13	1305	"	"						X									
5 I13-S-3-6	3-6	1101	"	"						X									
6 ~~J12-B-12~~	~~12~~	~~1235~~	~~"~~	~~"~~						~~X~~		OUT 11/30/11							
7 G9-B-12	12	1435	"	"						X									
8 G10-B-12	12	1500	SOIL	"						X									
9 G7-S-6-9	6-9	1520								X									
10 G7-B-12	12	1522								X									
11 G7-S-9-12	9-12	1521								X									
12																			
13																			
14																			
15																			
16																			
17																			
18																			

Relinquished by:	Date / Time	Received by	Date / Time
[signature]	11/30/11	[signature]	11-30-11 1635
Relinquished by:	Date / Time	Received by	Date / Time
Relinquished by:	Date / Time	Received by	Date / Time

Sample Receipt:

Good Condition?	
Cold?	
Seals Intact?	
Total Number of Containers	

Remarks:

TAT 24HR 48HR 5-Day

Distribution White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.

Chain of Custody Record

4139 Libby Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Client: Aspect
Address:
Phone: Fax:
Client Project # 070188

Date: 11/30/11 Page: 2 of 2
Project Manager: Steve Germiat
Project Name: GP - Bunker C
Location: Bellingham
Collector: AET, MV Date of Collection: 11/30/11

Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx Ext.	PAH 8270	PCB's 8082	MTCA 5 Metals			Field Note/# Containers
1 NCGS-1-1		0800	SOIL	4oz							X							
2 NCGS-1-2		0801									X							
3 NCGS-1-3		0802									X							
4 NCGS-2-1		0845									X							
5 NCGS-2-2		0846									X							
6 NCGS-2-3		0847	↓	↓							X							
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
16																		
17																		
18																		

Relinquished by:	Date / Time	Received by	Date / Time
[signature]	11/30/11	[signature]	11-30-11 1637
Relinquished by:	Date / Time	Received by	Date / Time
Relinquished by:	Date / Time	Received by	Date / Time

Sample Receipt:

Good Condition?	
Cold?	
Seals Intact?	
Total Number of Containers	

Remarks:

TAT 24HR 48HR 5-Day

Distribution White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.

Chain of Custody Record

4139 Libby Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Client: Aspect Consulting, Inc
Address: 401 2nd Ave S, Seattle WA
Phone: Fax:
Client Project # 070188

Date: 12-1-11 Page: 1 of 2
Project Manager: Steve Germiat
Project Name: GP-West-Bunker
Location: Bellingham, WA
Collector: AET Date of Collection: 12-1-11

Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx Ext. (Bunker)	PAH 8270	PCB's 8082	MTCA 5 Metals			Field Note/# Containers
1 GID-B-14		0805	S	4oz Jar							X							1
2 GID-B-15		0800	S	"							X							1
3 NCGS-3-1		0830	S								X							1
4 NCGS-3-2		0835	S								X							1
5 NCGS-3-3		0840	S								X							1
6 NCGS-4-1		0837	S								X							1
7 NCGS-4-2		0839	S								X							1
8 NCGS-4-3		0841	S								X							1
9 NCGS-5-1		0842	S								X							1
10 NCGS-5-2		0843	S								X							1
11 NCGS-5-3		0844	S								X							1
12 NCGS-6-1		0857	S								X							1
13 NCGS-6-2		0858	S								X							1
14 NCGS-6-3		0902	S								X							1
15 NCGS-7-1		0859	S								X							1
16 NCGS-7-2		0900	S								X							1
17 NCGS-7-3		0901	S								X							1
18																		

Relinquished by:	Date / Time	Received by	Date / Time
	12/1/11 1547		12-1-11
Relinquished by:	Date / Time	Received by	Date / Time
Relinquished by:	Date / Time	Received by	Date / Time

Sample Receipt:

Good Condition?	
Cold?	
Seals Intact?	
Total Number of Containers	

Remarks:

TAT 24HR 48HR 5-Day

Distribution White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.

Chain of Custody Record

4139 Libby Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Date: 12/1/11 Page: 2 of 2

Client: Aspect Consulting, LLC
Project Manager: Steve Germiat

Address: 401 2nd Ave S, Seattle, WA
Project Name: GP-West - Bunker

Phone: Fax:
Location: Bellingham, WA

Client Project # 070188
Collector: AET Date of Collection: 12/1/11

Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx Diesel and Oil (Silica gel)	NWTPH-Dx Ext.	PAH 8270	PCB's 8082	MTCA 5 Metals			Field Note/# Containers
1 H11-B-13	13	1130	Soil	4 oz Jar							X							1
2 H10-B-13	13	1135									X							1
3 H9-B-12	12	1140									X							1
4 I11-B-13	13	1145									X							1
5 I10-B-13	13	1150									X							1
6 I9-B-12	12	1155									X							1
7 J11-B-12	12	1200									X							1
8 H6-S-6-9	6-9	1305									X							1
9 H6-S-9-12	9-12	1304									X							1
10 H6-B-12	12	1310									X							1
11 H7-B-12	12	1315									X							1
12 H8-B-12	12	1300									X							1
13																		
14																		
15																		
16																		
17																		
18																		

Relinquished by:	Date / Time	Received by	Date / Time
[signature]	12/1/11 1547	[signature]	12-11
Relinquished by:	Date / Time	Received by	Date / Time
Relinquished by:	Date / Time	Received by	Date / Time

Sample Receipt:

Good Condition?	
Cold?	
Seals Intact?	
Total Number of Containers	

Remarks:

TAT 24HR 48HR 5-Day

Distribution White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.

Chain of Custody Record

4139 Libby Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Client: Aspect Consulting, LLC

Address:

Phone: Fax:

Client Project #

Date: 12-2-11 Page: 1 of 1

Project Manager: Steve Germiat

Project Name: GP Bunker C Project

Location: Bellingham, WA

Collector: A Tice / Mrvendu? Date of Collection: 12-2-11

Margin note	#	Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx Ext. Bunker C	PAH 8270	PCB's 8082	MTCA 5 Metals			Field Note/# Containers
180 (MW)	1	I6-S-9-12		1120	S	4oz jar								X						1
120	2	I6-S-6-9		1122	S	↓								X						1
ND	3	I6-B-12		1125	S	↓								X						1
	4	J6-S-6-9		1130	S	↓								X						1
	5	J6-S-9-12		1132	S	↓								X						1
	6	J6-B-12		1135	S	↓								X						1
	7	K6-B-12		1140	S	↓								X						1
	8	K6-S-6-9		1142	S	↓								X						1
	9	K6-S-9-12		1145	S	↓								X						1
	10	J7-B-12		1147	S	↓								X						1
	11	K11-B-12		1410	S	↓								X						1
	12	L11-B-12		1411	S	↓								X						1
	13	M11-S-6-9		1500	↓	↓								↓						1
	14	M11-S-9-12		1501	↓	↓								↓						1
	15	M11-B-12		1502	↓	↓								↓						1
85000	16	N11-S-6-9		1510	↓	↓								↓						1
290	17	N11-S-9-12		1511	↓	↓								↓						1
ND	18	N11-B-12		1512	↓	↓								↓						1

Relinquished by:	Date / Time	Received by	Date / Time
[signature]	12/2/2011 1550 1600 mv	[signature] LWB	12-2-11 1549
Relinquished by:	Date / Time	Received by	Date / Time
Relinquished by:	Date / Time	Received by	Date / Time

Sample Receipt:

Good Condition?	
Cold?	
Seals Intact?	
Total Number of Containers	

Remarks:

TAT 24HR 48HR 5-Day

Libby Environmental, Inc.

Chain of Custody Record

4139 Libby Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Date: 12-5-11 Page: 1 of

Client: Aspect Consulting LLC

Project Manager:

Address: 401 2nd Ave S Seattle WA

Project Name: GP-West-Bunker

Phone: Fax:

Location: Bellingham WA City: Bellingham

Client Project # 070188

Collector: Date of Collection: 12-5-11

Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx silica gel cleanup	NWTPH-Dx Ext.	PAH 8270	PCB's 8082	MTCA 5 Metals			Field Notes
1 I8-B-12	12	1324	S	4oz glass							X								
2 I7-B-12	12	1336	S	↓							X								
3 J10-B-14	14	1425	S	"							X								
4 K10-B-13	13	1440	S	"							X								
5 J9-B-13	13	1500	S	"							X								
6 I8-B-13	13	1515	S	"							X								
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			

Relinquished by:	Date / Time	Received by:	Date / Time
[signature]	12/5/2011 16:25	[signature]	12/5/2011 16:25
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt:

Good Condition?	
Cold?	
Seals Intact?	
Total Number of Containers	

Remarks:

silica gel cleanup on all samples, please

Distribution: White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.

4139 Libby Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Chain of Custody Record

Client: Aspect Consulting
Address:
Phone: Fax:
Client Project #

Date: 12/6/2011 Page: 1 of 1
Project Manager: Steve Germiat
Project Name: Bunker C 070188-001-16
Location: City:
Collector: MV Date of Collection: 12/6/11

	Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx Ext.	PAH 8270	PCB's 8082	MTCA 5 Metals				Field Notes
1	K9-B-12	12	1350	Soil	4oz g/ass								X							
2	K8-B-13	13	1400	"	"								X							
3	K7-B-12	12	1410	"	"								X							
4	K7-S-9-12	9-12	1420	"	"								X							
5	K7-S-6-9	6-9	1425	"	"								X							
6	L9-B-12	12	15:05	"	"								X							
7	K10-B-12 (mv)	12	15:30	"	"								X							
8																				
9																				
10																				
11																				
12																				
13																				
14																				
15																				
16																				
17																				
18																				

Relinquished by:	Date / Time	Received by:	Date / Time
MV [signature]	12/6/2011 16:25	[signature]	12-6-11 1625
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt:

Good Condition?	
Cold?	
Seals Intact?	
Total Number of Containers	

Remarks: silica gel cleanup

Distribution: White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.

Chain of Custody Record

4139 Libby Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Date: 12/7/11 Page: 1 of 2

Client: Aspect

Project Manager: Steve Germiat

Address:

Project Name: GP-Bunker C

Phone: Fax:

Location:

Client Project #

Collector: MV Date of Collection: 12/7/2011

Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx Ext.	PAH 8270	PCB's 8082	MTCA 5 Metals	Field Note/# Containers
1 M10-B-12	12	0800	S	4oz glass							X					
2 L8-B-12	12	0845									X					
3 L8-S-9-12	9-12	0850									X					
4 L8-S-6-9	6-9	0840									X					
5 N9-B-12	12	0915									X					
6 N9-S-9-12	9-12	0915									X					
7 N9-S-6-9	6-9	0910									X					
8 M10-S-9-12	9-12	1105														
9 M10-S-6-9	6-9	1115														
10 N10-B-12	12	1120														
11 N10-S-9-12	9-12	1121														
12 N10-S-6-9	6-9	1122														
13 M9-B-12	12	1125														
14 M8-B-12	12	1128														
15 M8-S-9-12	9-12	11:30														
16 M8-S-6-9	6-9	11:32														
17 N11-S-6-9-B	6-9	10:57														
18 N9-S-6-9-B	6-9	13:25														

Relinquished by:	Date / Time	Received by	Date / Time
Relinquished by:	Date / Time	Received by	Date / Time
Relinquished by:	Date / Time	Received by	Date / Time

Sample Receipt:

Good Condition?	
Cold?	
Seals Intact?	
Total Number of Containers	

Remarks: silica gel cleanup

TAT 24HR 48HR 5-Day

Distribution White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.

Chain of Custody Record

4139 Libby Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Client: Aspect Consulting

Address: 401 2nd Ave S #201 Seattle 98104

Phone: 206 838 5830 Fax:

Client Project # 070188-001-13

Date: 2011-Nov-17 Page: 1 of 2

Project Manager: Steve Germiat, sgermiat@aspectconsulting.com

Project Name: GP West- Bunker C IA

Location: City:

Collector: Mv Date of Collection: 2011-Nov-17

	Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx Ext.	PAH 8270	PCB's 8082	MTCA 5 Metals			Field Notes
1	G8-5-9-12	9-12	1540	Soil	4 oz jar							X	X						Silica gel cleanup
2	G8-5-6-9	6-9	1535																
3	G8-B-12	12	1530																
4	H12-5-6-9	6-9	1420																
5	H12-5-9-12	9-12	1425																
6	H12-B-12	12	1430																
7	I12-B-12	12	1415																
8	I12-5-9-12	9-12	1410																
9	I12-5-6-9	6-9	1405																
10	J12-B-12	12	1400																
11	J12-5-9-12	9-12	1355																
12	J12-5-6-9	6-9	1350																
13	K12-B-12	12	1345																
14	K12-5-9-12	9-12	1340																
15	K12-5-6-9	6-9	1335																
16	L12-5-9-12	9-12	1330																
17	L12-5-6-9	6-9	1325																
18																			

Relinquished by:	Date / Time	Received by:	Date / Time
[signature]	11-18-2011 1200	[signature]	11/19/11 1am
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt:

Good Condition?	
Cold?	
Seals Intact?	
Total Number of Containers	

Remarks:
Please call/email Steve with results ~~Friday~~.
sgermiat@aspectconsulting.com by 7AM Monday

TAT: 24HR 48HR 5-DAY

Distribution: White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.

Chain of Custody Record

4139 Libby Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Client: Aspect Consulting

Address: 401 2nd Ave S #201 Seattle 98104

Phone: 206 838 5830 Fax:

Client Project # 070188-001-13

Date: 2011-Nov-17 Page: 2 of 2

Project Manager: Steve Germiat, sgermiat@aspectconsulting.com

Project Name: GP West- Bunker C IA

Location: City:

Collector: Mv Date of Collection: 2011-Nov-17

	Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx Ext.	PAH 8270	PCB's 8082	MTCA 5 Metals			Field Notes
1	F9-S-6-9	6-9	1525	Soil	4 oz jar							X							Silica gel cleanup
2	F9-S-9-12	9-12	1530	↓	↓							↓							↓
3	F9-B-12	12	1535																
4	F10-B-12	12	1455																
5	F10-S-9-12	9-12	1500																
6	F10-S-6-9	6-9	1505																
7	F10-S-3-6	3-6	15:10																
8	G11-B-12	12	1435																
9	G11-S-9-12	9-12	1445																
10	G11-S-6-9	6-9	1440																
11	F9-S-3-6	3-6	1515																
12																			
13																			
14																			
15																			
16																			
17																			
18																			

Relinquished by:	Date / Time	Received by:	Date / Time
MSL	11-18-2011 1200	James Hart	11/19/11 1pm
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt:

Good Condition?	
Cold?	
Seals Intact?	
Total Number of Containers	

Remarks:
Please ~~call~~/email Steve with results ~~Friday~~.
sgermiat@aspectconsulting.com before Monday @ 5 PM

TAT: (24HR) 48HR 5-DAY

Distribution: White - Lab, Yellow - File, Pink - Originator

APPENDIX B

Clarifier Settlement Survey Monitoring Data (Wilson Engineering Inc.)

BM:WSE 47-- Record El = 14.623* | BM Elev Revised 11/21/2001-- Current Elev. = 14.619
BM:WSE 49-- Record El = 15.923

Monitor Event Number	*Date*	*Ref BM*	*Ref BM Elev*	*TBM-A Elev*	*Δ Z this event*	*Total Δ Z*	*TBM-B Elev*	*Δ Z this event*	*Total Δ Z*	*TBM-C Elev*	*Δ Z this event*	*Total Δ Z*	*TBM-D Elev*	*Δ Z this event*	*Total Δ Z*	*TBM-E Elev*	*Δ Z this event*	*Total Δ Z*	*Closing BM*	*Closing BM Elev*
Baseline	11/7/2011	WSE 47	14.623	21.727			21.74			21.727			21.72			18.889			WSE 49	15.927
1	11/9/2011	WSE 47	14.623	21.723			21.737			21.726			21.717			18.888			WSE 47	14.625
					-0.004	-0.004		-0.003	-0.003		-0.001	-0.001		-0.003	-0.003		-0.001	-0.001		
2	11/11/2011	WSE47	14.623	21.725			21.739			21.726			21.716			18.885			wse 49	15.921
					0.002	-0.002		0.002	-0.001		0	-0.001		-0.001	-0.004		-0.003	-0.004		
3	11/14/2011	WSE 47	14.623	21.725			21.738			21.726			21.716			18.884			WSE 49	15.926
					0	-0.002		-0.001	-0.002		0	-0.001		0	-0.004		-0.001	-0.005		
4	11/17/2011	WSE 47	14.623	21.727			21.739			21.73			21.721			18.891			WSE 49	15.933
					0.002	0		0.001	-0.001		0.004	0.003		0.005	0.001		0.007	0.002		
5	11/21/2011	WSE 47*	14.619	21.726			21.741			21.729			21.719			18.889			WSE 49	15.923
					-0.001	-0.001		0.002	0.001		-0.001	0.002		-0.002	-0.001		-0.002	0		
6	11/28/2011	WSE 47	14.619	21.724			21.736			21.726			21.715			18.884			WSE 49	15.923
					-0.002	-0.003		-0.005	-0.004		-0.003	-0.001		-0.004	-0.005		-0.005	-0.005		
7	12/2/2011	WSE 47	14.619	21.725			21.736			21.725			21.713			18.88			WSE 49	15.923
					0.001	-0.002		0	-0.004		-0.001	-0.002		-0.002	-0.007		-0.004	-0.009		
8	12/5/2011	WSE 47	14.619	21.727			21.739			21.731			21.718			18.886			WSE 49	15.927
					0.002	0		0.003	-0.001		0.006	0.004		0.005	-0.002		0.006	-0.003		
9	12/8/2011	WSE 47	14.619	21.727			21.738			21.727			21.715			18.884			WSE 49	15.923
					0	0		-0.001	-0.002		-0.004	0		-0.003	-0.005		-0.002	-0.005		
10	12/12/2011	WSE 47	14.619	21.728			21.744			21.73			21.72			18.883			WSE 49	15.923
					0.001	0.001		0.006	0.004		0.003	0.003		0.005	0		-0.001	-0.006		

Contract Limit-- 14 Monitor Events

APPENDIX C

Records for Off-Site Soil Disposal

Release of Liability/Certificate of Disposal

Strider Construction Co. & their client.; are released from liability for all petroleum contaminated waste originating from:

Port of Bellingham Bunker-C Project
300 West Laurel Street
Bellingham WA.

and transported to:

CEMEX USA-Everett Soil Remediation
6300 Glenwood Ave.
Everett WA 98203

From 12/02/2011 through 12/20/2011

A total of 4710.43 tons of petroleum contaminated soil were transported to the above facility. The material was disposed of in the following manner:

Thermal Remediation / Landfill for Reclamation

Disposal of the contaminated soil was performed in accordance with all applicable federal, state, and local laws and regulations.

Date: January 24th, 2012

Signed:

Larry W. Baker
Soil Remediation Operations Manager
CEMEX
Northwest Region
U.S. Operations

Table C-1 - Tabulation of Scale Tickets for Off-Site Disposal of Contaminated Soil

Bunker C Tank Interim Action

Ticket Number	Date	Tonnage	Hauler	Cemex Vehicle ID	Hauled to
1876055345	12/1/11	31.07	Cowden Trucking	2261876	CEMEX
1876055347	12/1/11	31.30	Everett Soil Generic	2034265	CEMEX
1876055350	12/1/11	31.42	Everett Soil Generic	2034264	CEMEX
1876055352	12/1/11	32.87	Everett Soil Generic	2030804	CEMEX
1876055353	12/1/11	31.92	Cowden Trucking	2259389	CEMEX
1876055369	12/1/11	32.11	Everett Soil Generic	2030805	CEMEX
1876055372	12/1/11	32.79	Everett Soil Generic	2092891	CEMEX
1876055381	12/1/11	31.09	Soils Cash	2031824	CEMEX
1876055384	12/1/11	31.03	Cowden Trucking	2261876	CEMEX
1876055385	12/1/11	31.66	Everett Soil Generic	2034264	CEMEX
1876055389	12/1/11	31.49	Everett Soil Generic	2034265	CEMEX
1876055390	12/1/11	32.12	Everett Soil Generic	2030804	CEMEX
1876055392	12/1/11	30.40	Cowden Trucking	2259389	CEMEX
1876055401	12/1/11	30.68	Everett Soil Generic	2092891	CEMEX
1876055409	12/2/11	31.29	Everett Soil Generic	2034264	CEMEX
1876055411	12/2/11	32.50	Everett Soil Generic	2030804	CEMEX
1876055414	12/2/11	31.16	Cowden Trucking	2259389	CEMEX
1876055415	12/2/11	31.94	Everett Soil Generic	2030805	CEMEX
1876055436	12/2/11	31.52	Everett Soil Generic	2034265	CEMEX
1876055437	12/2/11	30.98	Everett Soil Generic	2092891	CEMEX
1876055457	12/2/11	31.18	Maltby Generic	2031855	CEMEX
1876055467	12/2/11	31.40	Everett Soil Generic	2034264	CEMEX
1876055468	12/2/11	32.06	Everett Soil Generic	2030805	CEMEX
1876055469	12/2/11	32.57	Everett Soil Generic	2030804	CEMEX
1876055474	12/2/11	30.63	Cowden Trucking	2259389	CEMEX
1876055475	12/2/11	30.08	Maltby Generic	2031856	CEMEX
1876055476	12/2/11	31.21	Everett Soil Generic	2030805	CEMEX
1876055484	12/2/11	32.61	Everett Soil Generic	2034265	CEMEX
1876055485	12/2/11	32.60	Everett Soil Generic	2092891	CEMEX
1876055492	12/2/11	30.96	Everett Soil Generic	2034264	CEMEX
1876055493	12/2/11	31.15	Maltby Generic	2031855	CEMEX
1876055494	12/2/11	32.37	Everett Soil Generic	2030804	CEMEX
1876055496	12/2/11	31.13	Cowden Trucking	2261840	CEMEX
1876055498	12/2/11	30.27	Cowden Trucking	2261876	CEMEX
1876055499	12/2/11	29.74	Cowden Trucking	2259389	CEMEX
1876055549	12/5/11	29.39	Cowden Trucking	2261876	CEMEX
1876055552	12/5/11	30.68	Everett Soil Generic	2034265	CEMEX
1876055554	12/5/11	31.72	Everett Soil Generic	2030804	CEMEX
1876055555	12/5/11	31.39	Cowden Trucking	2261840	CEMEX
1876055558	12/5/11	31.77	Everett Soil Generic	2030805	CEMEX
1876055563	12/5/11	31.19	Cowden Trucking	2259389	CEMEX
1876055567	12/5/11	30.83	Everett Soil Generic	2092891	CEMEX
1876055571	12/5/11	31.03	Soils Cash	2031824	CEMEX
1876055573	12/5/11	30.89	Soils Cash	2032408	CEMEX

Table C-1 - Tabulation of Scale Tickets for Off-Site Disposal of Contaminated Soil

Bunker C Tank Interim Action

Ticket Number	Date	Tonnage	Hauler	Cemex Vehicle ID	Hauled to
1876055582	12/5/11	30.40	Everett Soil Generic	2034265	CEMEX
1876055586	12/5/11	31.14	Cowden Trucking	2261876	CEMEX
1876055587	12/5/11	32.28	Everett Soil Generic	2030804	CEMEX
1876055590	12/5/11	31.25	Everett Soil Generic	2030805	CEMEX
1876055592	12/5/11	31.53	Cowden Trucking	2261840	CEMEX
1876055594	12/5/11	30.79	Everett Soil Generic	2092891	CEMEX
1876055599	12/5/11	31.72	Cowden Trucking	2259389	CEMEX
1876055600	12/5/11	31.02	Cowden Trucking	2261875	CEMEX
1876055602	12/5/11	31.81	Soils Cash	2031824	CEMEX
1876055604	12/5/11	31.15	Soils Cash	2032408	CEMEX
1876055609	12/5/11	29.39	Riverside Sand & Gravel	2082318	CEMEX
1876055610	12/5/11	30.83	Riverside Sand & Gravel	2147798	CEMEX
1876055615	12/5/11	29.95	Riverside Sand & Gravel	2261842	CEMEX
1876055619	12/6/11	31.17	Everett Soil Generic	2034265	CEMEX
1876055620	12/6/11	31.24	Cowden Trucking	2261876	CEMEX
1876055621	12/6/11	31.59	Soils Cash	2031824	CEMEX
1876055622	12/6/11	30.92	Everett Soil Generic	2030805	CEMEX
1876055623	12/6/11	32.62	Everett Soil Generic	2030804	CEMEX
1876055624	12/6/11	31.54	Cowden Trucking	2259389	CEMEX
1876055631	12/6/11	30.75	Soils Cash	2032408	CEMEX
1876055632	12/6/11	27.55	Maltby Generic	2031854	CEMEX
1876055633	12/6/11	28.22	Maltby Generic	2031855	CEMEX
1876055634	12/6/11	30.89	Waasenaar Trucking	2036527	CEMEX
1876055635	12/6/11	30.75	JH Kooy Trucking	740036	CEMEX
1876055637	12/6/11	30.58	Everett Soil Generic	2034263	CEMEX
1876055639	12/6/11	29.03	Storms Transport	2048918	CEMEX
1876055640	12/6/11	31.01	Northwest Sand & Gravel	2087850	CEMEX
1876055646	12/6/11	31.03	Springbrook Nursery	2059319	CEMEX
1876055647	12/6/11	31.83	Northwest Sand & Gravel	2031537	CEMEX
1876055648	12/6/11	27.34	Northwest Sand & Gravel	2119714	CEMEX
1876055649	12/6/11	31.54	Riverside Sand & Gravel	2031006	CEMEX
1876055652	12/6/11	31.31	Soils Cash	2031824	CEMEX
1876055654	12/6/11	31.35	Everett Soil Generic	2034265	CEMEX
1876055655	12/6/11	30.03	Springbrook Nursery	2059322	CEMEX
1876055656	12/6/11	31.47	Cowden Trucking	2261876	CEMEX
1876055657	12/6/11	31.44	Everett Soil Generic	2030805	CEMEX
1876055658	12/6/11	32.70	Everett Soil Generic	2030804	CEMEX
1876055660	12/6/11	31.53	Cowden Trucking	2259389	CEMEX
1876055666	12/6/11	28.62	Soils Cash	2032408	CEMEX
1876055669	12/6/11	26.64	Maltby Generic	2031854	CEMEX
1876055670	12/6/11	26.08	Maltby Generic	2031855	CEMEX
1876055672	12/6/11	30.81	Withers Trucking	2031111	CEMEX
1876055673	12/6/11	31.87	JH Kooy Trucking	2031276	CEMEX
1876055675	12/6/11	30.87	Everett Soil Generic	1192508	CEMEX

Table C-1 - Tabulation of Scale Tickets for Off-Site Disposal of Contaminated Soil

Bunker C Tank Interim Action

Ticket Number	Date	Tonnage	Hauler	Cemex Vehicle ID	Hauled to
1876055676	12/6/11	28.72	Storms Transport	2048918	CEMEX
1876055677	12/6/11	32.07	Northwest Sand & Gravel	2031537	CEMEX
1876055679	12/6/11	34.93	Northwest Sand & Gravel	2087850	CEMEX
1876055681	12/6/11	30.46	Riverside Sand & Gravel	2031006	CEMEX
1876055682	12/6/11	31.32	Northwest Sand & Gravel	2119714	CEMEX
1876055684	12/6/11	30.79	Soils Cash	2031824	CEMEX
1876055685	12/6/11	31.01	Everett Soil Generic	2034265	CEMEX
1876055686	12/6/11	30.62	Springbrook Nursery	2059322	CEMEX
1876055687	12/6/11	31.61	Cowden Trucking	2261876	CEMEX
1876055689	12/6/11	31.43	Everett Soil Generic	2030805	CEMEX
1876055693	12/7/11	30.80	Everett Soil Generic	2034265	CEMEX
1876055695	12/7/11	30.63	Soils Cash	1192408	CEMEX
1876055698	12/7/11	27.25	Maltby Generic	2031854	CEMEX
1876055699	12/7/11	27.36	Maltby Generic	2031855	CEMEX
1876055701	12/7/11	31.70	Cowden Trucking	2259389	CEMEX
1876055702	12/7/11	29.99	Everett Soil Generic	2092891	CEMEX
1876055704	12/7/11	30.30	Northwest Sand & Gravel	2087850	CEMEX
1876055706	12/7/11	29.00	Northwest Sand & Gravel	2080188	CEMEX
1876055708	12/7/11	31.79	SureWould Trucking	2031096	CEMEX
1876055709	12/7/11	31.13	SureWould Trucking	2219735	CEMEX
1876055710	12/7/11	31.17	Mike McAuliffe	2049984	CEMEX
1876055711	12/7/11	30.99	Cowden Trucking	2261875	CEMEX
1876055716	12/7/11	31.00	Everett Soil Generic	2034265	CEMEX
1876055717	12/7/11	31.08	Soils Cash	1192408	CEMEX
1876055719	12/7/11	28.14	Maltby Generic	2031855	CEMEX
1876055720	12/7/11	27.15	Maltby Generic	2031854	CEMEX
1876055721	12/7/11	30.10	Everett Soil Generic	2092891	CEMEX
1876055723	12/7/11	31.45	Cowden Trucking	2259389	CEMEX
1876055726	12/7/11	29.20	Northwest Sand & Gravel	2030188	CEMEX
1876055729	12/7/11	32.03	SureWould Trucking	2031096	CEMEX
1876055731	12/7/11	32.15	Mike McAuliffe	2049948	CEMEX
1876055732	12/7/11	31.42	SureWould Trucking	2219735	CEMEX
1876055733	12/7/11	30.61	Cowden Trucking	2261875	CEMEX
1876055734	12/7/11	29.36	Northwest Sand & Gravel	2087850	CEMEX
1876055733	12/8/11	30.59	Everett Soil Generic	2092891	CEMEX
1876055739	12/8/11	30.19	Cowden Trucking	2261876	CEMEX
1876055740	12/8/11	30.81	Everett Soil Generic	2034265	CEMEX
1876055741	12/8/11	30.91	Soils Cash	2032408	CEMEX
1876055745	12/8/11	26.49	Maltby Generic	2031854	CEMEX
1876055746	12/8/11	27.32	Maltby Generic	2031855	CEMEX
1876055753	12/8/11	32.38	SureWould Trucking	2031096	CEMEX
1876055756	12/8/11	32.07	Mike McAuliffe	2049984	CEMEX
1876055758	12/8/11	29.70	Northwest Sand & Gravel	2087850	CEMEX
1876055759	12/8/11	29.17	Northwest Sand & Gravel	2030188	CEMEX

Table C-1 - Tabulation of Scale Tickets for Off-Site Disposal of Contaminated Soil

Bunker C Tank Interim Action

Ticket Number	*Date*	*Tonnage*	*Hauler*	*Cemex Vehicle ID*	*Hauled to*
1876055762	12/8/11	30.76	Soils Cash	2032408	CEMEX
1876055763	12/8/11	31.47	Everett Soil Generic	2034265	CEMEX
1876055764	12/8/11	31.05	Everett Soil Generic	2092891	CEMEX
1876055765	12/8/11	32.20	SureWould Trucking	2219735	CEMEX
1876055771	12/8/11	29.67	Cowden Trucking	2261876	CEMEX
1876055777	12/8/11	28.65	Everett Soil Generic	2034265	CEMEX
1876055778	12/8/11	30.84	Soils Cash	2032408	CEMEX
1876055848	12/16/11	30.12	Cowden Trucking	2261876	CEMEX
1876055858	12/19/11	22.33	Cowden Trucking	2261876	CEMEX
	Total tonnage	**4,333.25**			

Table C-2 - Tabulation of Scale Tickets for Off-Site Disposal of Geotechnically Unsuitable Overburden

Bunker C Tank Interim Action

Ticket Number	*Date*	*Tonnage*	*Hauler*	*Cemex Vehicle ID*	*Hauled to*
1875337196	12/7/2011	31.78	Cowden Trucking	2261876	CEMEX
1875337201	12/7/2011	31.26	Everett Soil Generic	2030805	CEMEX
1875337203	12/7/2011	31.30	Cowden Trucking	2261840	CEMEX
1875337220	12/7/2011	31.54	Cowden Trucking	2261876	CEMEX
1875337229	12/7/2011	31.04	Everett Soil Generic	2030805	CEMEX
1875337233	12/7/2011	33.40	Cowden Trucking	2261840	CEMEX
1875337307	12/8/2011	31.55	Everett Soil Generic	2030805	CEMEX
1875337323	12/9/2011	28.92	Cowden Trucking	2261876	CEMEX
1875337325	12/9/2011	31.23	Cowden Trucking	2261840	CEMEX
1875337326	12/9/2011	30.51	Cowden Trucking	2271449	CEMEX
1875337344	12/9/2011	31.84	Cowden Trucking	2261876	CEMEX
1875337345	12/9/2011	32.76	Cowden Trucking	2261840	CEMEX
	Total tonnage	**377.13**			

APPENDIX D

Backfill Compaction Test Reports (Materials Testing and Consulting Inc.)

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REPORT OF INPLACE DENSITIES BY NUCLEAR METHOD

Report #D 13536

CLIENT:	Aspect Consulting	DATE:	December 5, 2011
ATTN:	Steve Germiat	PROJECT NAME :	POB Bunker C
ADDRESS:	350 Madison Avenue	PROJECT LOCATION:	Bellingham, WA
	Bainbridge Island, WA 98110	MTC PROJECT #:	11W069-01
		PERMIT #:	

WORK / LOCATION: Backfill for contaminated excavation.

INPLACE DENSITY TEST RESULTS (ASTM D-6938)									
TEST #	MODE / DEPTH	LOCATION OF TEST	ELEV.	WET DENSITY	DRY DENSITY	MOIST %	*	COMP %	REQ'D %
1	8"	64.28.33'N - 124.17, 78'E	10'BSG	137.0	128.4	6.7	1	96	90
2	8"	64.28.29'N - 124.17, 84'E	10'BSG	135.9	128.1	6.1	1	96	90
3	8"	64.28.33'N - 124.17, 51'E	10'BSG	137.1	128.8	6.5	1	96	90
4	8"	64.28.21'N - 124.17, 32'E	9'BSG	139.1	131.3	5.9	1	98	90
5	8"	64.28.05'N - 124.17, 21'E	6'BSG	137.0	129.8	5.6	1	97	90
6	8"	64.28.39'N - 124.17, 15'E	5'BSG	140.9	132.7	6.1	1	99	90

TEST METHOD: ☐ ASTM D-698/ AASHTO T-99 ☒ ASTM D-1557 / AASHTO T-180

*1 SAMPLE # :	B11-831	DESCRIPTION: Orange Brown Sand with Gravel (polaris pit)	PROCTOR VALUE : 133.7@7.5% 20oc
*2 SAMPLE # :		DESCRIPTION:	PROCTOR VALUE :
*3 SAMPLE # :		DESCRIPTION:	PROCTOR VALUE :
*4 SAMPLE # :		DESCRIPTION:	PROCTOR VALUE :

GAUGE STANDARD: MS- 662 DS-1691 | EQUIPMENT ID & S/N (as applicable): 3430 #19148

Native Soils: ☐ Soils consistent with Proctor: Yes ☒ No ☐

Imported Fills: ☒ Soils found to be firm and stable; and to the best of our knowledge, meet compaction: Yes ☒ No ☐

Contractor notified of results: Yes ☒ No ☐

REMARKS: Locations are state plane coordinates.

BSG = Below Subgrade. Sample was taken of import and existing fill.

REPORTED BY: K. Walters, Staff Geologist bla REVIEWED BY: Brian Steele, L.E.G.

DISTRIBUTION: original: sgermiat@aspectconsulting.com cc: Johnh@portofbellingham.com cc:

cc: cc: cc:

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REPORT OF INPLACE DENSITIES BY NUCLEAR METHOD

Report #D 17139

CLIENT:	Aspect Consulting	DATE:	December 6, 2011
ATTN:	Steve Germiat	PROJECT NAME :	POB Bunker C
ADDRESS:	350 Madison Avenue	PROJECT LOCATION:	Bellingham, WA
	Bainbridge Island, WA 98110	MTC PROJECT #:	11W069-01
		PERMIT #:	

WORK / LOCATION: Backfill of contaminated soil over-excavation at Bunker C tank area.

INPLACE DENSITY TEST RESULTS (ASTM D-6938)

TEST #	MODE / DEPTH	LOCATION OF TEST	ELEV.	WET DENSITY	DRY DENSITY	MOIST %	*	COMP %	REQ'D %
1	12"	64.28.47N, 124.17 91 E	4'BSG	124.9	110.4	13.1	1	90	90
2	12"	64.28.43N, 124.17, 76 E	4'BSG	128.4	117.3	9.5	1	96	90
3	12"	64.28.29N, 124.17, 21E	4'BSG	129.4	114.7	12.9	1	94	90
4	12"	64.28.21N, 124.17, 93E	9'BSG	128.8	119.7	7.6	2	90	90
5	12"	64.28.18N, 124.17, 56E	9'BSG	131.5	123.5	6.5	2	93	90
6	12"	64.27.61N, 124.17, 58E	8'BSG	126.4	118.6	6.6	2	89	90
7	12"	64.27.72N, 124.17, 47E	8'BSG	131.5	124.7	5.5	2	94	90
8	12"	64.28.39N, 124..17, 80E	4'BSG	134.5	122.3	10.0	1	99	90
9	12"	64.28.45N, 124.17, 49E	4'BSG	136.6	121.7	12.3	1	99	90
10	12"	64.28.30N, 124.17, 38E	3.5'BSG	135.8	120.2	13.0	1	98	90

TEST METHOD: ☐ ASTM D-698/ AASHTO T-99 ☒ ASTM D-1557 / AASHTO T-180

*1 SAMPLE # :	B11-832	DESCRIPTION: Well Graded Sand with Silt, Gravel (native)	PROCTOR VALUE : 122.2 @ 9.6 %
*2 SAMPLE # :	B11-831	DESCRIPTION: Poorly Graded Sand with Gravel (import)	PROCTOR VALUE : 132.7 @ 7.8 %
*3 SAMPLE # :		DESCRIPTION:	PROCTOR VALUE :
*4 SAMPLE # :		DESCRIPTION:	PROCTOR VALUE :

GAUGE STANDARD: MS- 11760 DS-26912 | EQUIPMENT ID & S/N (as applicable): CPN MC-1 / 5572

Native Soils: ☒ Soils consistent with Proctor: Yes ☒ No ☐

Imported Fills: ☒ Soils found to be firm and stable; and to the best of our knowledge, meet compaction: Yes ☐ No ☒

Contractor notified of results: Yes ☒ No ☐

REMARKS: MTC on site for IPD testing of fill. Tests #8 to 11 are retests of the area for tests #1 and 3 after additional compaction using a large, single drum roller. BSG = Below Subgrade.

REPORTED BY: R. Jorgensen, Field Technician bla REVIEWED BY: Brian Steele, L.E.G.

DISTRIBUTION: original: sgermiat@aspectconsulting.com cc: Johnh@portofbellingham.com cc:

cc: cc: cc:

REPORT OF INPLACE DENSITIES BY NUCLEAR METHOD (Additional Tests)

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Report #D 17140

CLIENT:	Aspect Consulting	DATE:	December 6, 2011
ADDRESS:	Steve Germiat	PROJECT:	POB Bunker C
	350 Madison Avenue	PROJECT LOCATION:	Bellingham, WA
	Bainbridge Island, WA 98110	PROJECT #:	11W069-01
		PERMIT #:	

WORK / LOCATION: Backfill of contaminated soil over-excavation at Bunker C tank area.

PAGE: 2 OF 2

INPLACE DENSITY TEST RESULTS (ASTM D-6938)

TEST	MODE/ DEPTH	LOCATION	ELEV.	WET DENSITY	DRY DENSITY	MOIST. %	*	COMP. %	REQ'D %
11	12"	64.28.21N, 124.17, 07E	3.5'BSG	131.5	117.5	12.1	1	96	90
12	12"	64.28.14N, 124.17, 49E	7'BSG	128.7	121.2	6.2	2	91	90
13	12"	64.28.23N, 124.17, 65E	7'BSG	127.4	120.1	6.0	2	91	90
14	12"	64.28.26N, 124.17, 87E	7'BSG	130.5	122.2	6.8	2	92	90
15	12"	64.27.80N, 124.17, 45E	7'BSG	127.5	119.8	6.5	2	90	90
16	12"	64.27.60N, 124.17, 58E	7'BSG	130.0	122.4	6.2	2	92	90
17	12"	64.27.59N, 124.17, 50E	4'BSG	130.9	123.6	5.9	2	93	90
18	12"	64.28.19N, 124.17, 45E	4'BSG	133.0	124.6	6.8	2	94	90
19	12"	64.28.29N, 124.17, 67E	4'BSG	132.7	124.4	6.7	2	94	90
20	12"	64.28.26N, 124.17, 90E	4'BSG	128.4	119.9	7.1	2	90	90

REPORTED BY: R. Jorgensen, Field Technician bla

REVIEWED BY: Brian Steele, L.E.G.

DISTRIBUTION: original: sgermiat@aspectconsulting.com cc: Johnh@portofbellingham.com cc:

cc: cc: cc:

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REPORT OF INPLACE DENSITIES BY NUCLEAR METHOD

Report #D 17390

CLIENT:	Aspect Consulting	DATE:	December 7, 2011
ATTN:	Steve Germiat	PROJECT NAME :	POB Bunker C
ADDRESS:	350 Madison Avenue	PROJECT LOCATION:	Bellingham, WA
	Bainbridge Island, WA 98110	MTC PROJECT #:	11W069-01
		PERMIT #:	

WORK / LOCATION: Backfill for contaminated excavation with import fill.

INPLACE DENSITY TEST RESULTS (ASTM D-6938)

TEST #	MODE / DEPTH	LOCATION OF TEST	ELEV.	WET DENSITY	DRY DENSITY	MOIST %	*	COMP %	REQ'D %
1	DT/8"	642785N - 1247234E	~-4'	132.0	124.0	6.4	1	93	90
2	DT/8"	642754N - 1241739E	~-4'	128.9	120.8	6.7	1	91	90
3	DT/8"	642757N - 1241755E	~-4'	132.3	124.8	6.0	1	94	90
4	DT/8"	642809N - 1241736E	~-4'	131.2	123.9	6.0	1	93	90
5	DT/8"	642833N - 1241730E	~-4'	138.9	123.2	12.7	1	93	90
6	DT/8"	642844N - 1241744E	~-4'	135.8	122.6	10.8	1	92	90
7	DT/8"	642846N - 1241760E	~-4'	140.7	127.5	10.3	1	96	90
8	DT/8"	642829N - 1241764E	~-4'	130.7	124.0	5.4	1	93	90
9	DT/8"	642837N - 1241782E	~-4'	131.2	123.8	6.0	1	93	90
10	DT/8"	642769N - 1241779E	~-7'	132.9	126.2	5.3	1	95	90

TEST METHOD: ☐ ASTM D-698/ AASHTO T-99 ☒ ASTM D-1557 / AASHTO T-180

*1 SAMPLE # :	B11-831	DESCRIPTION: SP- Poorly Graded Sand with Gravel	PROCTOR VALUE : 132.7 @ 7.8 %
*2 SAMPLE # :		DESCRIPTION:	PROCTOR VALUE :
*3 SAMPLE # :		DESCRIPTION:	PROCTOR VALUE :
*4 SAMPLE # :		DESCRIPTION:	PROCTOR VALUE :

GAUGE STANDARD: MS- 649 DS-1684 | EQUIPMENT ID & S/N (as applicable): 3430 / 19148

Native Soils: ☐	Soils consistent with Proctor:	Yes ☒	No ☐
Imported Fills: ☒	Soils found to be firm and stable; and to the best of our knowledge, meet compaction:	Yes ☒	No ☐
	Contractor notified of results:	Yes ☒	No ☐

REMARKS: Locations & Elevations provided by client.

REPORTED BY: D. Bender, Field Technician bla REVIEWED BY: Brian Steele, L.E.G.

DISTRIBUTION: original: sgermiat@aspectconsulting.com cc: Johnh@portofbellingham.com cc:
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REPORT OF INPLACE DENSITIES BY NUCLEAR METHOD (Additional Tests)

Report #D 17391-17392

CLIENT:	Aspect Consulting	DATE:	December 7, 2011
ADDRESS:	Steve Germiat	PROJECT:	POB Bunker C
	350 Madison Avenue	PROJECT LOCATION:	Bellingham, WA
	Bainbridge Island, WA 98110	PROJECT #:	11W069-01
		PERMIT #:	

WORK / LOCATION: Backfill for contaminated excavation with import fill.

PAGE: 2 OF 2

INPLACE DENSITY TEST RESULTS (ASTM D-6938)

TEST	MODE/ DEPTH	LOCATION	ELEV.	WET DENSITY	DRY DENSITY	MOIST. %	*	COMP. %	REQ'D %
11	DT/8"	642795N - 1241771E	~-2'	132.7	125.1	6.1	1	94	90
12	DT/8"	642805N - 1241727E	~-2'	131.8	124.4	6.0	1	94	90
13	DT/8"	642826N - 1241729E	~-2'	130.8	123.6	5.8	1	93	90
14	DT/8"	642828N - 1241747E	~-3'	127.4	120.3	5.9	1	91	90
15	DT/8"	642843N - 1241756E	~-3'	130.2	123.9	5.14	1	93	90
16	DT/8"	642840N - 1241772E	~-3'	129.2	122.3	5.7	1	92	90
17	DT/8"	642839N - 1241787E	~-3'	130.1	123.0	5.8	1	93	90
18	DT/8"	642817N - 1241780E	~-5'	132.5	124.8	6.2	1	94	90
19	DT/8"	642776N - 1241769E	~-5'	133.1	126.4	5.3	1	95	90
20	DT/8"	642793N - 1241763E	~-5'	130.0	122.7	6.0	1	93	90
21	DT/8"	642816N - 1241799E	~-8'	131.5	124.6	5.6	1	94	90
22	DT/8"	642795N - 1241796E	-8'	130.5	123.2	5.9	1	93	90
23	DT/8"	Location coordinates not provided	-6'	137.0	130.3	5.1	1	98	90
24	DT/8"	Location coordinates not provided	-6'	131.6	125.1	5.2	1	94	90

REPORTED BY: D. Bender, Field Technician bla REVIEWED BY: Brian Steele, L.E.G.

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REPORT OF INPLACE DENSITIES BY NUCLEAR METHOD

Report #D 16212

CLIENT:	Aspect Consulting	DATE:	December 8, 2011
ATTN:	Steve Germiat	PROJECT NAME :	POB Bunker C
ADDRESS:	350 Madison Avenue	PROJECT LOCATION:	Bellingham, WA
	Bainbridge Island, WA 98110	MTC PROJECT #:	11W069-01
		PERMIT #:	

WORK / LOCATION: Contaminated excavation backfill

INPLACE DENSITY TEST RESULTS (ASTM D-6938)

TEST #	MODE / DEPTH	LOCATION OF TEST	ELEV.	WET DENSITY	DRY DENSITY	MOIST %	*	COMP %	REQ'D %
1	8"	642794N, 1241802E	4'BSG	131.6	125.5	4.9	1	95	90
2	8"	642782N, 1241788E	4'BSG	135.4	128.4	5.5	1	97	90
3	8"	642811N, 1241790E	4'BSG	135.3	128.2	5.5	1	97	90
4	8"	642797N, 1241774E	4'BSG	133.1	126.3	5.4	1	95	90
5	8"	642787N, 1241752E	4'BSG	134.9	127.6	5.8	1	96	90
6	8"	642805N, 1241764E	4'BSG	133.2	127.0	4.9	1	96	90
7	8"	642746N, 1241766E	1'BSG	130.1	122.2	6.5	1	92	90
8	8"	642769N, 1241764E	2'BSG	133.0	126.0	5.6	1	95	90
9	8"	642779N, 1241756E	3'BSG	129.9	123.5	5.2	1	93	90
10	8"	642804N, 1241810E	2'BSG	127.0	120.6	5.3	1	91	90

TEST METHOD: ☐ ASTM D-698/ AASHTO T-99 ☒ ASTM D-1557 / AASHTO T-180

*1 SAMPLE # :	B11-831	DESCRIPTION: SP - Sand with Gravel	PROCTOR VALUE : 132.7 @ 7.8 %
*2 SAMPLE # :		DESCRIPTION:	PROCTOR VALUE :
*3 SAMPLE # :		DESCRIPTION:	PROCTOR VALUE :
*4 SAMPLE # :		DESCRIPTION:	PROCTOR VALUE :

GAUGE STANDARD: MS- 646 DS-1697 | EQUIPMENT ID & S/N (as applicable): 3430 #19148

Native Soils: ☐ Soils consistent with Proctor: Yes ☒ No ☐

Imported Fills: ☒ Soils found to be firm and stable; and to the best of our knowledge, meet compaction: Yes ☒ No ☐

Contractor notified of results: Yes ☒ No ☐

REMARKS: Page 1 of 2 See Report #16213.

BSG = Below Subgrade.

REPORTED BY: K. Walters, Staff Geologist bla REVIEWED BY: Brian Steele, L.E.G.

DISTRIBUTION: original: sgermiat@aspectconsulting.com cc: Johnh@portofbellingham.com cc:

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REPORT OF INPLACE DENSITIES BY NUCLEAR METHOD (Additional Tests)

Report #D 16213

CLIENT:	Aspect Consulting	DATE:	December 8, 2011
ADDRESS:	Steve Germiat	PROJECT:	POB Bunker C
	350 Madison Avenue	PROJECT LOCATION:	Bellingham, WA
	Bainbridge Island, WA 98110	PROJECT #:	11W069-01
		PERMIT #:	

WORK / LOCATION: Contaminated excavation backfill

See Report #16212 FG = Final Grade.

PAGE: 2 OF 2

INPLACE DENSITY TEST RESULTS (ASTM D-6938)

TEST	MODE/ DEPTH	LOCATION	ELEV.	WET DENSITY	DRY DENSITY	MOIST. %	*	COMP. %	REQ'D %
11	8"	642775N, 1241801E	FG	133.1	126.5	5.2	1	95	90
12	8"	642758N, 1241780E	FG	138.1	129.4	6.8	1	98	90
13	8"	642756N, 1241762E	FG	130.6	121.3	7.6	1	91	90
14	8"	642770N, 1241749E	1'BSG	131.7	124.1	6.1	1	94	90
15	8"	642773N, 1241770E	2'BSG	135.6	126.3	7.4	1	95	90
16	8"	642774N, 1241777E	2'BSG	132.2	124.5	6.2	1	94	90
17	8"	642745N, 1241762E	1'BSG	135.7	126.7	7.1	1	95	90

REPORTED BY: K. Walters, Staff Geologist bla REVIEWED BY: Brian Steele, L.E.G.

DISTRIBUTION: original: sgermiat@aspectconsulting.com cc: Johnh@portofbellingham.com cc:
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Proctor Report

Project: POB Bunker C Remediation
Project #: 11W069-01
Client: Aspect Consulting
Source: Polaris Pit
Sample#: B11-831

Date Received: 5-Dec-11
Sampled By: KW
Date Tested: 6-Dec-11
Tested By: TB

Unified Soils Classification System, ASTM D-2487
SP, Poorly graded Sand with Gravel

Sample Color
Orange Brown

Sample Prepared:	Moist: X	Manual:	
	Dry:	Mechanical: X	
Test Standard:	ASTM D698:	AASHTO T 99:	Method
	ASTM D 1557: X	AASHTO T 180:	C

Assumed Sp. Gr. 2.75

Point Number	Percent Moisture	Dry Density
1	5.4 %	123.7
2	7.2 %	125.7
3	9.4 %	126.7
4	11.3 %	125.8

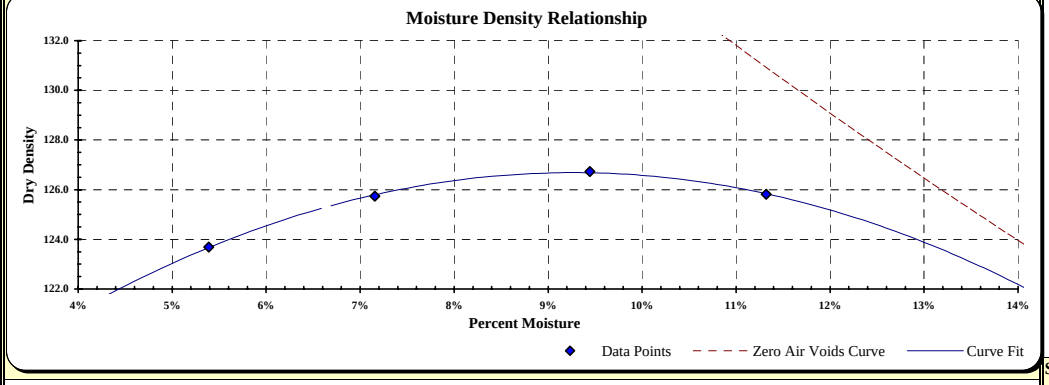
Uncorrected Proctor Value

Max. Dry Density		Optimum Moist.
126.7	**lbs/ft^3**	**9.3 %**

Value w/ Oversize Correction Applied

Max. Dry Density		Optimum Moist.
132.7	**lbs/ft^3**	**7.8%**

ACCREDITED
Certificate #: 1365.01, 1366.02 & 1366.03



ASTM D-4718, Misc. Oversize Correction Values

% Oversize Mat'l: 17%

% Oversize Retained	Corrected Density	Optimum Moisture	% Oversize Retained	Corrected Density	Optimum Moisture
5%	128.4	8.8%	20%	133.7	7.5%
10%	130.1	8.4%	25%	135.6	7.1%
15%	131.9	8.0%	30%	137.5	6.7%

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ASTM C-136

Sieve US	Size mm	Percent Passing	Specifications Max	Specifications Min
12.00"	300.00		100.0 %	0.0 %
10.00"	250.00		100.0 %	0.0 %
8.00"	200.00		100.0 %	0.0 %
6.00"	150.00		100.0 %	0.0 %
4.00"	100.00		100.0 %	0.0 %
3.00"	75.00		100.0 %	0.0 %
2.50"	63.00		100.0 %	0.0 %
2.00"	50.00	97 %	100.0 %	0.0 %
1.75"	45.00		100.0 %	0.0 %
1.50"	37.50		100.0 %	0.0 %
1.25"	31.50		100.0 %	0.0 %
1.00"	25.00	89 %	100.0 %	0.0 %
3/4"	19.00	83 %	100.0 %	0.0 %
5/8"	16.00		100.0 %	0.0 %
1/2"	12.50	72 %	100.0 %	0.0 %
3/8"	9.50	66 %	100.0 %	0.0 %
1/4"	6.30		100.0 %	0.0 %
#4	4.75	62 %	100.0 %	0.0 %
#8	2.36		100.0 %	0.0 %
#10	2.00	58 %	100.0 %	0.0 %
#16	1.18		100.0 %	0.0 %
#20	0.850	51 %	100.0 %	0.0 %
#30	0.600		100.0 %	0.0 %
#40	0.425	26 %	100.0 %	0.0 %
#50	0.300		100.0 %	0.0 %
#60	0.250	11 %	100.0 %	0.0 %
#80	0.180		100.0 %	0.0 %
#100	0.150	4 %	100.0 %	0.0 %
#140	0.106		100.0 %	0.0 %
#170	0.090		100.0 %	0.0 %
#200	0.075	0.7 %	100.0 %	0.0 %

Specs: No Specs **Meets Specs?** Yes

% Gravel:	38.5%	$D_{(10)}$:	0.237
% Sand:	60.8%	$D_{(30)}$:	0.499
% Silt&Clay:	0.7%	$D_{(60)}$:	3.686
C_C:	0.28	LL:	n/a
C_U:	15.54	PL:	n/a
FM:	4.28	PI:	n/a
Fracture %:	n/a	Sand Eq.:	n/a

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Comments: _____

Reviewed by: _____

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