

Port of Seattle

T-117 ADDITIONAL UPLANDS SOIL SAMPLING – AUGUST 2005

DATA MEMORANDUM

November 15, 2005

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1.0 Introduction

This technical memorandum presents the results of the soil investigation conducted in August 2005 at the Terminal 117 (T-117) site in accordance with addendum 5 to the T-117 Quality Assurance Project Plan (Windward et al. 2005a). This supplemental investigation of T-117 was conducted independently by the Port of Seattle in order to further assess contamination previously identified (Windward et al. 2005b) under an Administrative Order on Consent with EPA. An Upland Area investigation is being performed at T-117 under US Environmental Protection Agency Administrative Settlement Agreement and Order on Consent No. CERCLA 10-2006-0072 (EPA 2005) to better characterize the upland portion of the T-117 site.

The primary focus of this investigation was to collect additional subsurface soil data to delineate the lateral and vertical extent of elevated polychlorinated biphenyl (PCB) contamination in the bank and the paved driveway area inboard of the bank extending north of the 1999 PCB soil removal area (Figure 1). Soil samples were collected from 26 moderate depth soil borings (0-9 ft) and submitted for laboratory analysis.

2.0 Sampling and Results

All field activities were performed under the direction of the field coordinator or other qualified personnel. Sampling was accomplished by a joint operation of Windward Environmental LLC, Onsite Enterprises, Inc, and Dalton, Olmsted and Fuglevand, Inc. Soil borings were conducted using a hollow-stem auger drill deployed from a drill rig. Soil borings generally penetrated up to 9 ft, with four sample intervals each (0-1.5, 2.5-4, 5-6.5, 7.5-9ft). All soil samples were analyzed for total PCBs, total solids and total organic carbon. The PCB results are summarized in Table 1. These results have undergone data validation and are of good quality and should be considered acceptable for all project uses. The data validation report, raw laboratory data, and sample documentation forms are available upon request.

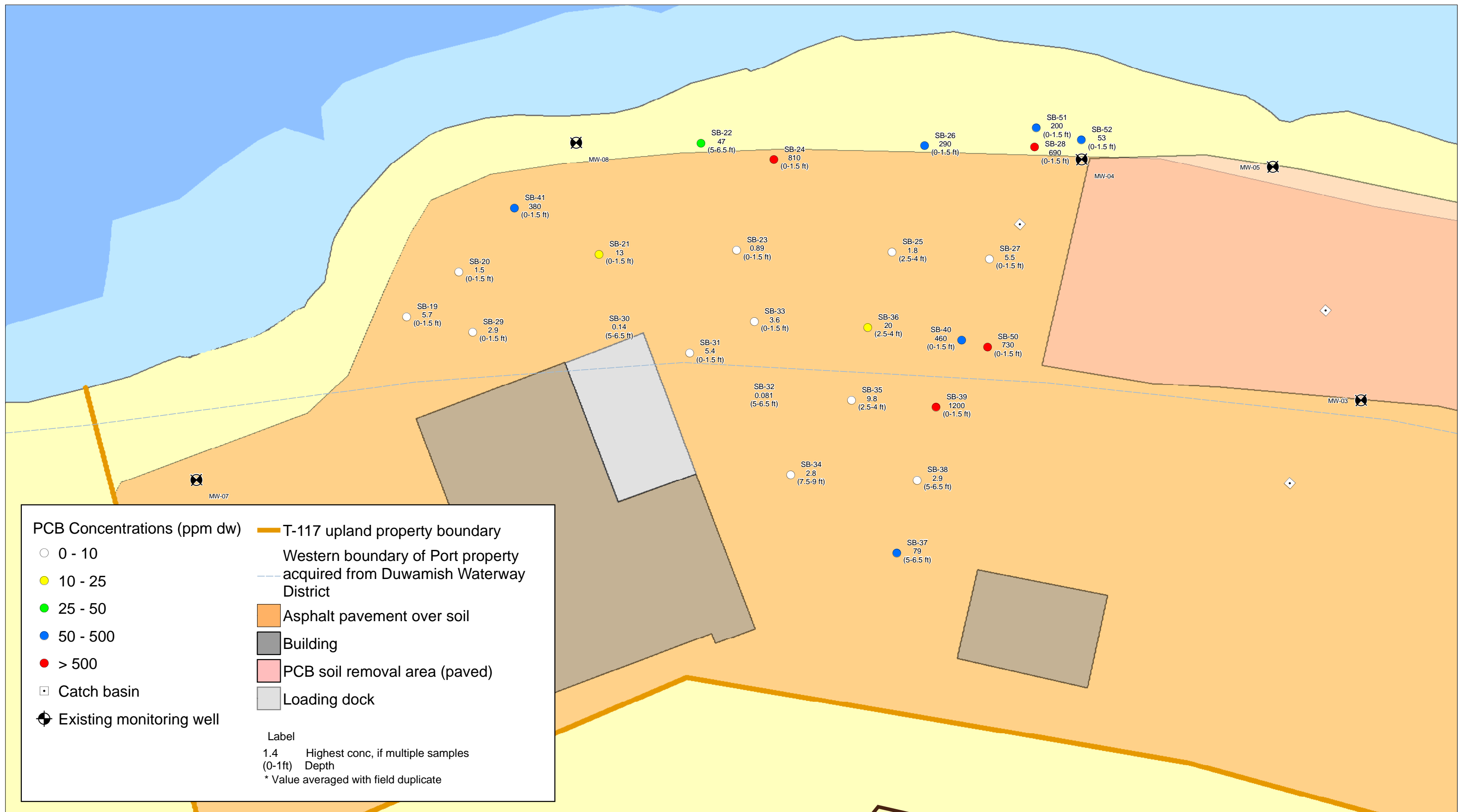


Figure 1. T-117 Maximum PCB concentrations at each station August 2005

Table 1. PCB results in T-117 soil samples from August 2005

LOCATION ID	SAMPLE ID	DEPTH ft	TOC %	TOTAL SOLIDS %	AROCLOR 1016 ppm dw	AROCLOR 1221 ppm dw	AROCLOR 1232 ppm dw	AROCLOR 1242 ppm dw	AROCLOR 1248 ppm dw	AROCLOR 1254 ppm dw	AROCLOR 1260 ppm dw	TOTAL PCBs ppm dw
T117-SB19	T117-SB19-01	0-1.5	0.829 ^a	90.1 ^a	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	5.7	5.7
	T117-SB19-02	2.5-4	0.745	87.6	0.90 U	0.90 U	0.90 U	0.90 U	0.90 U	0.90 U	0.90 U	0.90 U
	T117-SB19-03	5-6.5	1.85	92.6	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U
	T117-SB19-04	7.5-9	0.213 ^a	90.9 ^a	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
T117-SB20	T117-SB20-01	0-1.5	0.373	91.2	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	1.5	1.5
	T117-SB20-02	2.5-4	0.374	90.2	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U
	T117-SB20-03	5-6.5	5.63	96.1	0.84 U	0.84 U	0.84 U	0.84 U	0.84 U	0.84 U	0.84 U	0.84 U
	T117-SB20-04	7.5-9	0.325	83.8	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
T117-SB21	T117-SB21-01	0-1.5	1.02	90.5	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	13	13
	T117-SB21-02	2.5-4	0.518	87.2	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U
	T117-SB21-03	5-6.5	0.389	94.5	0.84 U	0.84 U	0.84 U	0.84 U	0.84 U	0.84 U	0.84 U	0.84 U
	T117-SB21-04	7.5-9	1.51	91.1	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 J	0.019 J
T117-SB22	T117-SB22-01	0-1.5	1.08	96.4	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	29	29
	T117-SB22-02	2.5-4	1.11	97.0	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	1.9	1.9
	T117-SB22-03	5-6.5	1.09	93.6	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	47	47
	T117-SB22-04	7.5-9	0.649	92.4	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	2.4	2.4
T117-SB23	T117-SB23-01	0-1.5	4.03	90.5	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U
	T117-SB23-02	2.5-4	2.74	93.7	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U
	T117-SB23-03	5-6.5	2.77 ^a	93.0 ^a	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U
T117-SB24	T117-SB24-01	0-1.5	1.48	90.1	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	810	810
	T117-SB24-02	2.5-4	1.24	94.8	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	5.2	5.2
	T117-SB24-03	5-6.5	0.544	92.8	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U

LOCATION ID	SAMPLE ID	DEPTH ft	TOC %	TOTAL SOLIDS %	AROCLOR 1016 ppm dw	AROCLOR 1221 ppm dw	AROCLOR 1232 ppm dw	AROCLOR 1242 ppm dw	AROCLOR 1248 ppm dw	AROCLOR 1254 ppm dw	AROCLOR 1260 ppm dw	TOTAL PCBs ppm dw
T117-SB25	T117-SB25-01	0-1.5	2.76	90.2	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U
	T117-SB25-02	2.5-4	2.90	92.7	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	1.8	1.8
	T117-SB25-04	7.5-9	0.878	76.5	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
	T117-SB25-05	10-11.5	0.23	74.1	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
T117-SB26	T117-SB26-01	0-1.5	1.18	94.9	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	290	290
	T117-SB26-02	2.5-4	0.527	90.9	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U
	T117-SB26-03	5-6.5	0.661	92.2	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	0.96	0.96
	T117-SB26-04	7.5-9	0.469	90.2	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	1.0	1.0
	T117-SB26-05	10-11.5	0.352	88.9	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.067	0.067
T117-SB27	T117-SB27-01	0-1.5	4.00	93.1	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	5.5	5.5
	T117-SB27-02	2.5-4	0.337	92.4	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U
	T117-SB27-04	7.5-9	0.623	71.5	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U
T117-SB28	T117-SB28-01	0-1.5	2.45	95.1	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	690	690
	T117-SB28-02	2.5-4	0.270	93.4	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	1.1	1.1
	T117-SB28-03	5-6.5	0.471	92.1	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	3.0	3.0
	T117-SB28-04	7.5-9	0.394	75.0	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.057	0.057
T117-SB29	T117-SB29-01	0-1.5	0.644	89.9	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	2.9	2.9
	T117-SB29-02	2.5-4	0.905	87.6	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U
	T117-SB29-03	5-6.5	1.40	93.0	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.10	0.10
	T117-SB29-04	7.5-9	0.635	93.0	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.038	0.038
T117-SB30	T117-SB30-01	0-1.5	0.947	87.3	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U
	T117-SB30-02	2.5-4	1.05	84.5	0.94 U	0.94 U	0.94 U	0.94 U	0.94 U	0.94 U	0.94 U	0.94 U
	T117-SB30-03	5-6.5	2.65	85.0	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.14	0.14
	T117-SB42-03 ^b	5-6.5	4.16	85.1	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.10	0.10
	T117-SB30-04	7.5-9	0.099	85.2	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U
T117-SB31	T117-SB31-01	0-1.5	0.773	92	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	5.4	5.4

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T117-SB32	T117-SB32-01	0-1.5	1.68	87.6	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U
	T117-SB32-02	2.5-4	7.36	84.9	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
	T117-SB32-03	5-6.5	0.755	90.7	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.081	0.081
	T117-SB32-04	7.5-9	0.092	87.7	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U
T117-SB33	T117-SB33-01	0-1.5	1.39	88.5	0.90 U	0.90 U	0.90 U	0.90 U	0.90 U	0.90 U	3.6	3.6
	T117-SB33-02	2.5-4	5.13	91.6	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U
	T117-SB33-03	5-6.5	0.146	93.3	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	1.9	1.9
	T117-SB33-04	7.5-9	0.724	89.9	0.044 U	0.044 U	0.044 U	0.044 U	0.044 U	0.044 U	0.39	0.39
T117-SB34	T117-SB34-01	0-1.5	0.371	94.8	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U
	T117-SB43-01 ^b	0-1.5	0.570	93.0	0.042 U	0.042 U	0.042 U	0.042 U	0.042 U	0.042 U	0.17	0.17
	T117-SB34-02	2.5-4	0.098	92.8	0.043 U	0.043 U	0.043 U	0.043 U	0.043 U	0.043 U	0.11	0.11
	T117-SB34-03	5-6.5	0.064	94.7	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.083	0.083
	T117-SB34-04	7.5-9	0.343	90.1	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	2.8	2.8
T117-SB35	T117-SB35-01	0-1.5	3.64	92.2	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	4.6	4.6
	T117-SB35-02	2.5-4	3.82	92.1	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	9.8	9.8
	T117-SB35-03	5-6.5	3.32	81.2	0.058 U	0.058 U	0.058 U	0.058 U	0.058 U	0.058 U	0.24	0.24
	T117-SB35-04	7.5-9	0.190	80.2	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.15	0.15
T117-SB36	T117-SB36-01	0-1.5	1.47 ^a	86.2 ^a	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	1.3	1.3
	T117-SB36-02	2.5-4	1.89	93.2	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	20	20
	T117-SB36-03	5-6.5	0.667	94.3	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.029	0.029
	T117-SB36-04	7.5-9	0.560	92.8	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.46	0.46
T117-SB37	T117-SB37-01	0-1.5	0.134	97.1	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U
	T117-SB37-02	2.5-4	0.083	96.5	0.041 U	0.041 U	0.041 U	0.041 U	0.041 U	0.041 U	0.30	0.30
	T117-SB37-03	5-6.5	0.197	95.5	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	79	79
	T117-SB37-04	7.5-9	0.193	84.4	0.048 U	0.048 U	0.048 U	0.048 U	0.048 U	0.048 U	0.17	0.17

LOCATION ID	SAMPLE ID	DEPTH ft	TOC %	TOTAL SOLIDS %	AROCLOR 1016 ppm dw	AROCLOR 1221 ppm dw	AROCLOR 1232 ppm dw	AROCLOR 1242 ppm dw	AROCLOR 1248 ppm dw	AROCLOR 1254 ppm dw	AROCLOR 1260 ppm dw	TOTAL PCBs ppm dw
T117-SB38	T117-SB38-01	0-1.5	1.46	95.4	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U
	T117-SB38-02	2.5-4	0.081	97.2	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.18	0.18
	T117-SB38-03	5-6.5	0.442	86.9	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	2.9	2.9
	T117-SB38-04	7.5-9	0.316	73.1	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.061	0.061
T117-SB39	T117-SB39-01	0-1.5	1.89 ^a	93.9 ^a	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	1,200	1,200
	T117-SB39-02	2.5-4	0.102 ^a	97.3 ^a	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	2.2	2.2
	T117-SB39-03	5-6.5	0.257	84.4	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
	T117-SB39-04	7.5-9	0.257	80.8	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	3.1	3.1
T117-SB40	T117-SB40-01	0-1.5	1.82	94.2	82 U	82 U	82 U	82 U	82 U	82 U	460	460
	T117-SB40-03	5-6.5	0.571	83.1	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	2.2	2.2
	T117-SB40-04	7.5-9	0.343	74.2	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.03	0.03
T117-SB41	T117-SB41-01	0-1.5	1.52	91.6	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	380	380
	T117-SB41-02	2.5-4	0.107	81.9	0.96 U	0.96 U	0.96 U	0.96 U	0.96 U	0.96 U	0.96 U	0.96 U
	T117-SB41-03	5-6.5	1.02 ^a	83.9 ^a	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U
	T117-SB41-04	7.5-9	0.247	93.7	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
T117-SB50 ^c	T117-SB50-01	0-1.5	2.75	92.7	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	730	730
	T117-SB50-02	2.5-4	1.54	94.3	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	13	13
T117-SB51 ^c	T117-SB51-01	0-1.5	2.58	93.2	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	200	200
T117-SB52 ^c	T117-SB52-01	0-1.5	2.24	93.4	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	53	53

^a result averaged with laboratory replicates

^b field duplicate of sample in row above

^c contingency locations collected based on results in nearby locations

U results undetected at reporting limit shown

J result estimated

TOC total organic carbon

ppm dw parts per million dry weight

3.0 References

- EPA. 2005. Administrative Settlement Agreement order on consent for Terminal 117 Upland Investigation. US EPA Docket No. CERCLA 10-2006-0072. US Environmental Protection Agency, Region 10, Seattle, WA.
- Windward, DOF, Onsite. 2005a. Lower Duwamish Waterway Superfund site, Terminal 117 early action area. T-117 quality assurance project plan addendum - additional upland subsurface soils and monitoring wells. Prepared for the Port of Seattle. Windward Environmental LLC, Dalton, Olmstead & Fuglevand, Inc., and Onsite Enterprises, Inc., Seattle, WA.
- Windward, DOF, Onsite. 2005b. Lower Duwamish Waterway Superfund site, Terminal 117 early action area. T-117 upland soil - June 2005 field sampling and data report. Draft. Prepared for the Port of Seattle. Windward Environmental LLC, Dalton, Olmstead & Fuglevand, Inc., and Onsite Enterprises, Inc., Seattle, WA.