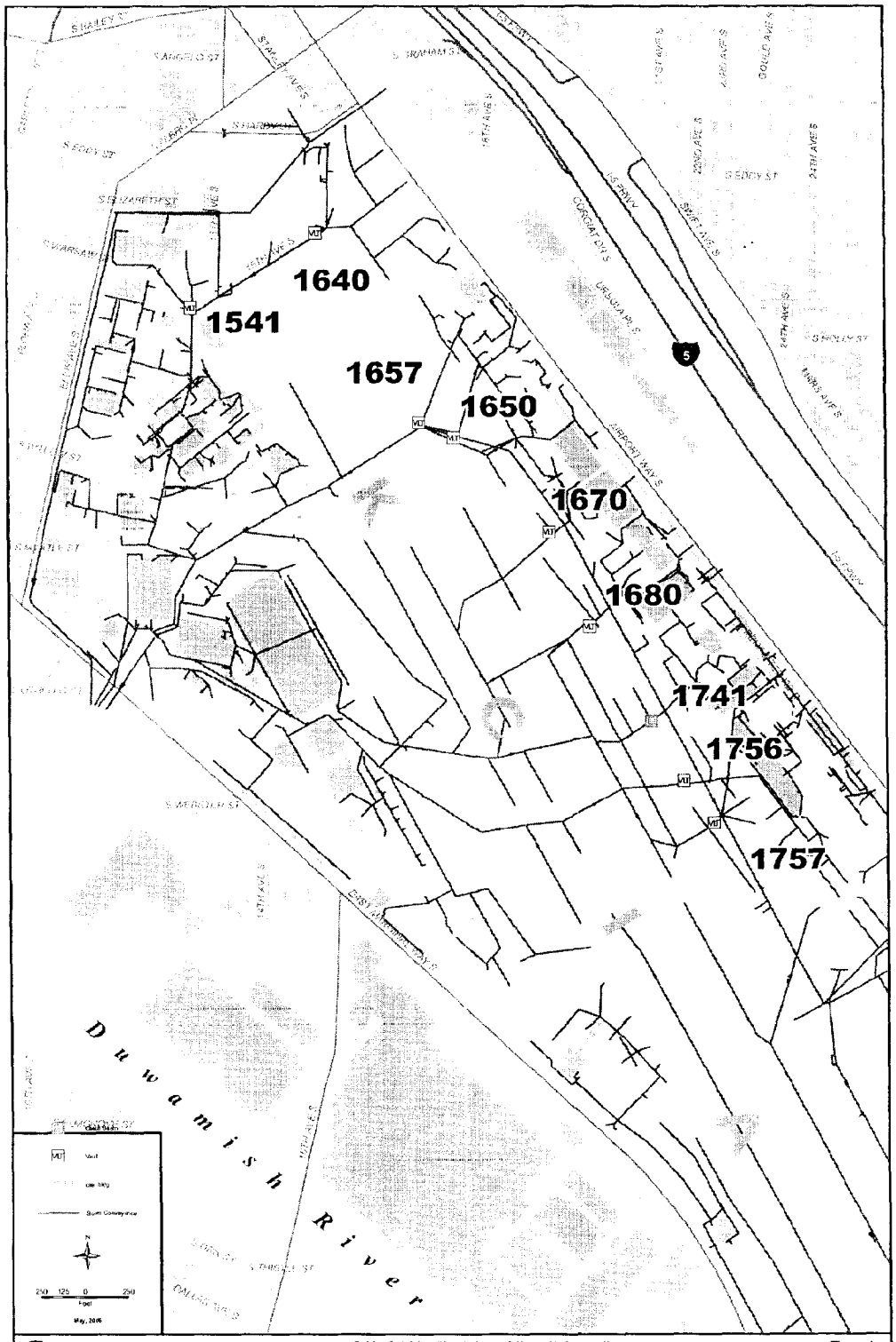

King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

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File Name: s:\wd\projects\stormwater\projects\misc\airport\airport.mxd
Shaun O'Neil 2006531

Figure 1:
King County International Airport
Stormwater Structures

KCSlip4 56826

SEA423138

Table 1
King County International Airport - Stormwater Vault Sediment Results - Dry Weight Values

	1541 KCIA L39363-1	1640 KCIA L39363-2	1650 KCIA L39363-3	1657 KCIA L39363-4	1670[a] KCIA L39363-5	1680 KCIA L39363-6	1680(FD) KCIA L39361-10	1756 KCIA L39363-7	1757[b] KCIA L39363-8	1757[c] KCIA L39396-1
Date Sampled	6/8/2006	6/7/2006	6/7/2006	6/7/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006
TOC (percent)	8.65	7.2	6.98	3.98	6.27	6.59	-	5.27	8.27	0.45
Metals (mg/kg DW)										
As	9.4	23	34.4	14	9.3	29.3	-	12	16	4 U
Cu	1,550	233	567	204	227	284	-	286	301	31
Pb	190	463	744	263	396	420	-	237	385	10
Hg	0.13	0.21	0.24	0.20	0.30	0.24	-	0.54	0.24	0.04 U
Zn	1,880	1,250	1,810	1,620	574	1,240	-	1,580	813	40
LPAH (µg/kg DW)										
Acenaphthene	820 U	1,100 U	1,600 U	870 U	1,000	1,500 U	-	1,600 U	1,300 U	49 U
Acenaphthylene	1,800 U	2,300 U	3,500 U	1,900 U	1,300 U	3,300 U	-	3,500 U	2,800 U	100 U
Anthracene	470 U	1,200	990	840	4,170	1,910	-	4,390	6,360	63
Fluorene	1,500 U	2,000 U	3,000 U	1,600 U	1,700	2,900 U	-	3,000 U	2,400 U	90 U
2-Methylnaphthalene	1,600 U	2,200 U	3,300 U	1,700 U	1,200 U	3,100 U	-	3,300 U	2,600 U	97 U
Naphthalene	1,600 U	2,200 U	3,300 U	1,700 U	1,200 U	3,100 U	-	3,300 U	2,600 U	97 U
Phenanthrene	3,260	13,700	6,980	6,580	20,900	19,100	-	33,700	47,200	703
Total LPAH	3,260	14,900	7,970	7,420	27,770	21,010	-	38,090	53,560	766
HPAH (µg/kg DW)										
Benzo(a)anthracene	2,230	7,160	4,530	3,730	19,600	11,600	-	30,800	35,500	495
Benzo(a)pyrene	2,770	11,500	7,150	6,240	26,100	19,000	-	42,600	50,000	741
Benzo(b)fluoranthene	4,520	20,500	10,000	10,400	40,700	30,500	-	77,800	83,200	1,310
Benzo(k)fluoranthene	3,280	13,900	10,600	9,910	26,700	30,400	-	58,200	58,900	861
Benzo(g,h,i)perylene	3,140	11,900	7,270	6,610	25,000	20,300	-	42,600	44,800	736
Chrysene	4,690	18,900	10,800	9,970	32,200	31,300	-	67,300	70,100	1,010
Dibenzo(a,h)anthracene	820 U	3,100	2,300	1,600	7,480	4,050	-	10,400	12,900	184
Fluoranthene	7,420	33,600	18,000	17,100	52,500	53,300	-	106,000	132,000	1,910
Indeno(1,2,3-cd)pyrene	2,570	10,300	6,570	5,810	23,300	18,200	-	40,200	42,500	684
Pyrene	6,770	26,000	14,100	12,800	44,500	38,500	-	76,600	100,000	1,450
Total HPAH	37,390	156,860	91,320	84,170	298,080	257,150	-	552,500	629,900	9,381
Phthalates (µg/kg DW)										
Bis(2-ethylhexyl)phthalate	53,100	73,200	31,600	29,400	39,000	64,300	-	56,900	232,000	63,900
Butylbenzylphthalate	700 U	2,040	3,130	1,490	2,610	3,040	-	3,510	4,090	115
Diethylphthalate	700 U	930 U	1,400 U	750 U	510 U	1,300 U	-	1,400 U	1,100 U	42 U
Dimethylphthalate	1,300 U	1,700 U	2,600 U	1,400 U	930 U	2,400 U	-	2,600 U	2,100 U	76 U
Di-n-butylphthalate	590 U	780 U	3,150	710	420 U	2,810	-	1,200 U	930 U	35 U
Di-n-octylphthalate	940 U	1,200 U	1,900 U	990 U	680 U	1,800 U	-	1,900 U	1,500 U	110
PCBs (µg/kg DW)										
Aroclor 1016	40 U	51 U	73 U	40 U	31 U	71 U	70 U	80 U	60 U	22 U
Aroclor 1221	40 U	51 U	73 U	40 U	31 U	71 U	70 U	80 U	60 U	22 U
Aroclor 1232	40 U	51 U	73 U	40 U	31 U	71 U	70 U	80 U	60 U	22 U
Aroclor 1242	40 U	51 U	73 U	40 U	31 U	71 U	70 U	80 U	60 U	22 U
Aroclor 1248	40 U	51 U	248	71	31 U	725	795	80 U	97	22 U
Aroclor 1254	40 U	152	203	75	115	1,040	1,150	274	328	22 U
Aroclor 1260	40 U	100	266	97	172	157	163	265	332	22 U
Total PCBs	ND	252	717	243	287	1,922	2,108	539	757	ND
TPH (mg/kg)										
Diesel	11,000	16,000	ND	940	2,000	2,100	-	8,100	6,300	1,600
Motor Oil	81,000	8,800	10,000	3,500	8,500	8,200	-	25,000	13,000	ND

Notes:
Detected values shown in **bold**.
Except where noted, all samples collected from final (outflow) chamber of vault.
(a) = Sample collected from first (inflow) chamber of a two-chamber vault. Insufficient sediment in second (outflow) chamber.
(b) = Sample collected from the middle chamber of vault. Sediment sample appeared normal.
(c) = Sample collected from the last (outflow) chamber of vault. Sediment sample appeared to be a greyish-colored slurry.
DW = Dry weight
FD = Field duplicate
ND = Not detected
U = Chemical not detected at reported concentration.

Look @ Hydraulic & Current Contaminants.

Table 2
King County International Airport - Stormwater Vault Sediment Results - Comparison to Sediment Management Standards

	SQS	CSL	1541 KCIA L39363-1	1640 KCIA L39363-2	1650 KCIA L39363-3	1657 KCIA L39363-4	1670[a] KCIA L39363-5	1680 KCIA L39363-6	1756 KCIA L39363-7	1757[b] KCIA L39363-8	1757[c] KCIA L39396-1
Date Sampled			6/8/2006	6/7/2006	6/7/2006	6/7/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006
TOC (percent)			8.65	7.2	6.98	3.98	6.27	6.59	5.27	8.27	0.45
Metals (mg/kg DW)											
As	57	93	**9.4**	**23**	**34.4**	**14**	**9.3**	**29.3**	**12**	**16**	4 U
Cu	390	390	**1,550**	**233**	**567**	**204**	**227**	**284**	**286**	**301**	**31**
Pb	450	530	**190**	**463**	**744**	**263**	**396**	**420**	**237**	**385**	**10**
Hg	0.41	0.59	**0.13**	**0.21**	**0.24**	**0.20**	**0.30**	**0.24**	**0.54**	**0.24**	0.04 U
Zn	410	960	**1,880**	**1,250**	**1,810**	**1,620**	**574**	**1,240**	**1,580**	**813**	**40**
LPAH (mg/kg OC)											
Acenaphthene	16	57	9 U	15 U	23 U	22 U	**16**	23 U	30 U	16 U	11 U
Acenaphthylene	66	66	21 U	32 U	50 U	48 U	21 U	50 U	66 U	34 U	22 U
Anthracene	220	1,200	5 U	**17**	**14**	**21**	**67**	**29**	**83**	**77**	**14**
Fluorene	23	79	17 U	28 U	43 U	40 U	**27**	44 U	57 U	29 U	20 U
2-Methylnaphthalene	38	64	18 U	31 U	47 U	43 U	19 U	47 U	63 U	31 U	22 U
Naphthalene	99	170	18 U	31 U	47 U	43 U	19 U	47 U	63 U	31 U	22 U
Phenanthrene	100	480	**38**	**190**	**100**	**165**	**333**	**290**	**639**	**571**	**156**
Total LPAH	370	780	**38**	**207**	**114**	**186**	**443**	**319**	**723**	**648**	**170**
HPAH (mg/kg OC)											
Benzo(a)anthracene	110	270	**26**	**99**	**65**	**94**	**313**	**176**	**584**	**429**	**110**
Benzo(a)pyrene	99	210	**32**	**160**	**102**	**157**	**416**	**288**	**808**	**605**	**164**
Benzo(b)fluoranthene[d]	230	450	**52**	**285**	**143**	**261**	**649**	**463**	**1,476**	**1,006**	**290**
Benzo(k)fluoranthene	-	-	**38**	**193**	**152**	**249**	**426**	**461**	**1,104**	**712**	**191**
Benzo(g,h,i)perylene	31	78	**36**	**165**	**104**	**166**	**399**	**308**	**808**	**542**	**163**
Chrysene	110	460	**54**	**263**	**155**	**251**	**514**	**475**	**1,277**	**843**	**224**
Dibenzo(a,h)anthracene	12	33	9 U	**43**	**33**	**40**	**119**	**61**	**197**	**156**	**41**
Fluoranthene	160	1,200	**86**	**467**	**258**	**430**	**837**	**809**	**2,011**	**1,596**	**424**
Indeno(1,2,3-cd)pyrene	34	88	**30**	**143**	**94**	**146**	**372**	**276**	**763**	**514**	**152**
Pyrene	1,000	1,400	**78**	**361**	**202**	**322**	**710**	**584**	**1,454**	**1,209**	**322**
Total HPAH	960	5,300	**432**	**2,179**	**1,308**	**2,115**	**4,754**	**3,902**	**10,484**	**7,617**	**2,080**
Phthalates (mg/kg OC)											
Bis(2-ethylhexyl)phthalate	47	78	**614**	**1,017**	**453**	**739**	**622**	**976**	**1,080**	**2,805**	**14,169**
Butylbenzylphthalate	4.9	64	8 U	**28**	**45**	**37**	**42**	**46**	**67**	**49**	**25**
Diethylphthalate	61	110	8 U	13 U	20 U	19 U	8 U	20 U	27 U	13 U	9 U
Dimethylphthalate	53	53	15 U	24 U	37 U	35 U	15 U	36 U	49 U	25 U	17 U
Di-n-butylphthalate	220	1,700	7 U	11 U	**45**	**18**	7 U	**43**	23 U	11 U	8 U
Di-n-octylphthalate	58	4,500	11 U	17 U	27 U	25 U	11 U	27 U	36 U	18 U	**24**
PCBs (mg/kg OC)											
Aroclor 1016	-	-	0.5 U	0.7 U	1.0 U	1.0 U	0.5 U	1.1 U	1.5 U	0.7 U	4.9 U
Aroclor 1221	-	-	0.5 U	0.7 U	1.0 U	1.0 U	0.5 U	1.1 U	1.5 U	0.7 U	4.9 U
Aroclor 1232	-	-	0.5 U	0.7 U	1.0 U	1.0 U	0.5 U	1.1 U	1.5 U	0.7 U	4.9 U
Aroclor 1242	-	-	0.5 U	0.7 U	1.0 U	1.0 U	0.5 U	1.1 U	1.5 U	0.7 U	4.9 U
Aroclor 1248	-	-	0.5 U	0.7 U	**3.6**	**1.8**	0.5 U	**11.0**	1.5 U	**1.2**	4.9 U
Aroclor 1254	-	-	0.5 U	**2.1**	**2.9**	**1.9**	**1.8**	**15.8**	**5.2**	**4.0**	4.9 U
Aroclor 1260	-	-	0.5 U	**1.4**	**3.8**	**2.4**	**2.7**	**2.4**	**5.0**	**4.0**	4.9 U
Total PCBs	12	65	ND	**3.5**	**10.3**	**6.1**	**4.6**	**29.2**	**10.2**	**9.2**	ND
TPH (mg/kg)	***MTCA A***										
Diesel		2,000	**11,000**	**16,000**	ND	**940**	**2,000**	**2,100**	**8,100**	**6,300**	**1,600**
Motor Oil		2,000	**81,000**	**8,800**	**10,000**	**3,500**	**8,500**	**8,200**	**25,000**	**13,000**	ND

Notes:
Detected values shown in **bold**.
Except where noted, all samples collected from final (outflow) chamber of vault.
(a) = Sample collected from first (inflow) chamber of a two-chamber vault. Insufficient sediment in second (outflow) chamber.
(b) = Sample collected from the middle chamber of vault. Sediment sample appeared normal.
(c) = Sample collected from the last (outflow) chamber of vault. Sediment sample appeared to be a greyish-colored slurry.
(d) = Standard based on total benzofluoranthenes
DW = Dry weight
FD = Field duplicate
ND = Not detected
OC = Organic carbon
U = Chemical not detected at reported concentration.
= Exceeds Sediment Quality Standards (SQS).
= Exceeds Cleanup Screening Levels (CSL) or MTCA Method A soil cleanup level for industrial use.

KCSlip4 56828

SEA423140

Table 3
LDW - Passive Deposition Sampling - Phase 2
Data Sorted According to Sampling Station

Blank-Corrected Air Deposition Flux (µg/m²/day) (A)

Station	Station ID	Round	Benzyl Butyl Phthalate	Bis(2-Ethylhexyl)Phthalate	Diethyl Phthalate	Dimethyl Phthalate	Di-N-Butyl Phthalate	Di-N-Octyl Phthalate	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Indeno(1,2,3-Cd)Pyrene	Pyrene
			ug/m²/day	ug/m²/day	ug/m²/day	ug/m²/day	ug/m²/day	ug/m²/day	ug/m²/day	ug/m²/day	ug/m²/day	ug/m²/day	ug/m²/day	ug/m²/day	ug/m²/day	ug/m²/day	ug/m²/day
Beacon Hill	BW	1	**0.980**	1.340	0.135	0.035	ND	0.144	0.030	ND	0.072	0.070	0.054	0.090	0.012	0.059	0.112
Beacon Hill	BW	2	0.404	**1.632**	0.092	0.025	0.143	0.096	0.023	0.026	0.049	0.040	0.040	0.075	ND	0.025	0.125
Beacon Hill	BW	3	0.256	1.007	0.150	0.034	0.015	**0.165**	0.021	0.021	0.049	0.045	0.040	0.065	ND	0.027	0.091
Beacon Hill	BW	5	0.586	0.955	0.304	0.030	ND	0.099	ND	ND	0.033	ND	ND	0.038	ND	ND	0.109
Beacon Hill	BW	6	0.688	1.573	0.093	0.035	0.030	ND	ND	ND	0.060	0.058	ND	0.074	ND	ND	0.157
Beacon Hill	BW	7	0.193	1.145	0.093	0.022	0.044	0.137	0.022	0.021	0.044	0.039	0.032	0.051	ND	0.025	0.075
Duwamish	CE	1	**1.069**	8.176	0.172	0.048	0.171	0.667	0.043	0.144	0.206	0.235	0.204	0.111	0.060	0.151	0.153
Duwamish	CE	2	0.916	6.373	0.102	0.050	0.405	0.249	0.243	0.217	0.159	0.126	0.124	0.403	0.030	0.069	0.675
Duwamish	CE	3	0.719	5.135	0.126	0.153	0.058	**0.760**	0.223	0.265	0.317	0.323	0.317	0.464	0.079	0.208	0.831
Duwamish	CE	5	0.419	7.129	0.385	0.120	ND	0.487	0.054	0.052	0.080	0.092	0.065	0.127	ND	0.048	0.291
Duwamish	CE	6	1.005	**12.240**	0.145	0.103	0.381	ND	0.143	0.148	0.250	0.273	0.188	0.327	0.043	0.152	0.671
Duwamish	CE	7	0.678	6.679	0.098	0.076	0.079	0.329	0.195	0.233	0.267	0.231	0.270	0.373	0.043	0.164	0.759
Georgetown	DZ	1	**0.883**	2.550	0.214	0.063	ND	**1.402**	0.059	0.030	0.102	0.062	0.063	0.136	ND	0.052	0.194
Georgetown	DZ	2	0.677	**2.989**	0.200	0.059	0.283	0.360	0.064	0.065	0.166	0.135	0.104	0.186	0.027	0.086	0.274
Georgetown	DZ	3	0.293	2.255	0.093	0.116	ND	0.541	0.074	0.094	0.161	0.161	0.157	0.212	0.033	0.110	0.338
Georgetown	DZ	5	0.652	1.187	0.426	0.085	ND	0.318	0.021	ND	0.036	0.032	0.032	0.050	ND	ND	0.129
Georgetown	DZ	6	0.764	2.617	0.218	0.074	0.224	0.737	0.069	0.134	0.179	0.302	0.152	0.172	0.170	0.232	0.313
Georgetown	DZ	7	0.274	2.512	0.024	0.051	0.004	0.706	0.086	0.089	0.164	0.154	0.145	0.207	0.022	0.103	0.327
King County Intl. Airport	KCIA	1	**2.913**	1.149	0.217	0.059	0.057	**0.187**	0.704	0.963	1.532	0.996	1.309	1.540	0.387	0.889	1.910
King County Intl. Airport	KCIA	2	0.535	**2.275**	0.134	0.036	0.250	0.144	1.090	1.483	2.144	1.566	2.026	2.245	0.460	1.390	2.831
King County Intl. Airport	KCIA	3	0.336	2.043	0.203	0.058	0.100	0.112	1.235	1.815	2.692	1.830	2.261	2.768	0.546	1.661	3.522
King County Intl. Airport	KCIA	5	2.799	0.669	0.447	0.053	ND	0.076	0.185	0.234	0.375	0.259	0.310	0.347	0.072	0.228	0.574
King County Intl. Airport	KCIA	6	1.330	1.694	0.154	0.100	0.086	0.125	1.311	1.697	2.644	1.851	2.358	2.622	0.507	1.686	3.416
King County Intl. Airport	KCIA	7	0.698	1.941	0.121	0.032	0.053	ND	0.870	1.211	1.815	1.236	1.548	1.847	0.309	1.102	2.797
South Park Com. Cntr.	SPCC	1	**7.007**	1.682	0.184	0.060	0.082	0.158	0.044	0.029	0.097	0.065	0.074	0.116	ND	0.050	0.163
South Park Com. Cntr.	SPCC	2	2.078	1.704	0.138	0.052	0.239	0.149	0.063	0.055	0.125	0.101	0.092	0.145	0.022	0.069	0.238
South Park Com. Cntr.	SPCC	3	4.437	**6.370**	0.202	0.103	0.138	**0.215**	0.084	0.101	0.145	0.120	0.146	0.194	0.030	0.091	0.337
South Park Com. Cntr.	SPCC	5	2.447	4.730	0.447	0.066	ND	0.140	ND	ND	0.035	0.032	ND	0.047	ND	ND	0.121
South Park Com. Cntr.	SPCC	6	1.223	1.146	0.146	0.038	0.087	0.191	0.044	ND	0.103	ND	0.068	0.110	ND	ND	0.210
South Park Com. Cntr.	SPCC	7	1.778	2.711	0.131	0.042	0.093	0.160	0.061	0.066	0.100	0.082	0.099	0.138	0.020	0.056	0.246

Notes:

Detected values only.

(A) - Blank-correction conducted by subtracting two-times (2x) aqueous method blank mass from aqueous sample mass combined with subtracting two-times (2x) wipe method blank mass from wipe sample mass. If blank subtraction results in a negative value, a value of zero (0) is used instead.

ND - Not detected in original sample

Bold - Maximum value for benzyl butyl phthalate, bis(2-ethylhexyl)phthalate, or di-n-octylphthalate

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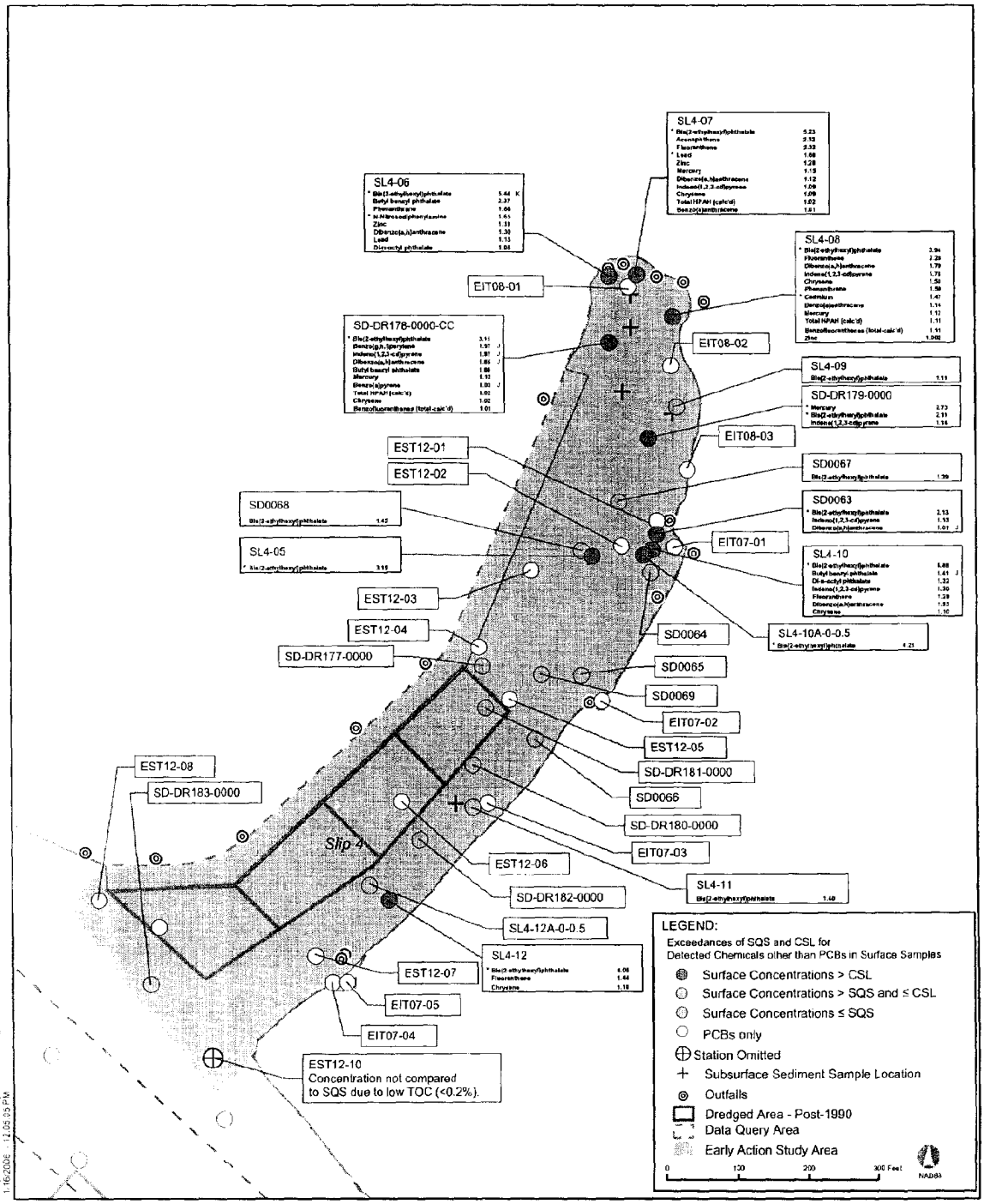

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integral

Notes:
SQS exceedance factors shown from highest to lowest.
* Exceedance shown also exceeds CSL
U = Undetected
J = Estimated
The symbol at each location represents the maximum exceedance for one or more SMS analytes.

Map Feature Sources: King County GIS, Seattle Public Utilities, USACE, Ecology, Windward Environmental, and others

Figure 2-7
Slip 4 - EE/CA
Exceedances of SQS and CSL for
Detected Chemicals other than PCBs
in Historical Surface Sediment Samples

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SEA423142