CITY OF PORTLAND
ENVIRONMENTAL SERVICES
1120 SW Fifth Avenue, Room 1000, Portland, Oregon 97204-1912 ▪ Sam Adams, Commissioner ▪ Dean Marriott, Director

TECHNICAL MEMORANDUM No. OF22C-3

City Outfall Basin 22C
Northwest Drainage Pond Evaluation

TO: Dana Bayuk, Oregon Department of Environmental Quality (DEQ)
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DATE: April 18, 2007

SUBJECT: **Portland Harbor Source Control Investigation**

Introduction

This technical memorandum evaluates existing sediment data from the Northwest Drainage Pond (NDP) located within City Outfall Basin 22C. Basin 22C has three major stormwater branches that converge at the NDP. The NDP functions as a natural settling pond for stormwater solids prior to discharging to the 84-inch-diameter conveyance pipe that leads to Outfall 22C and therefore, the detected analytes and concentrations in NDP sediment indicate what may be transported to the river.

The objective of this evaluation is to identify potential contaminant contributions of solids to the river. The results are used to refine the potential contaminants of interest (PCOI) list for Basin 22C and to assist in evaluating the need for additional source control actions as part of the stormwater pathway evaluations being performed at sites within Basin 22C.

This investigation is part of the City's ongoing source control program associated with the Portland Harbor City of Portland Outfalls Remedial Investigation Project. These investigation results are submitted pursuant to the August 13, 2003, Intergovernmental Agreement (IGA) between the Oregon Department of Environmental Quality (DEQ) and the City.

Background

The Outfall 22C drainage basin is approximately 1,093 acres, consisting of approximately 33 acres of developed industrial land (including upland industrial facilities and Highway 30), 35 acres of undeveloped industrial land, and approximately 1,025 acres of Forest Park open space.

The City identified Basin 22C as a Priority 1 basin in the "Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project" (CH2M HILL, 2004) based on the elevated concentrations of contaminants in surface sediments collected near Outfall 22C. The

City defines a Priority 1 basin as having considerably elevated concentrations of contaminants in the surface sediments near the respective outfalls that may be associated with upland sources located within the drainage basin. The "Phase I Report for City of Portland Priority 1 Basins" (Phase I Report [GSI, 2006]) evaluated and summarized the known potential sources, migration pathways, and PCOIs associated with the facilities and land uses identified in Basin 22C. PCOIs identified for Basin 22C in the Phase I Report include arsenic, pesticides (DDT and breakdown products), and polynuclear aromatic hydrocarbons (PAHs). However, the report also noted that arsenic and pesticide PCOIs identified at Outfall 22C potentially were associated with redistribution of upstream river sediments (such as upriver transport from the Arkema site, a DDT manufacturing facility).

There are three major drainage branches that discharge into the NDP (Figure 1):

- Forest Park runoff
- Koppers, Highway 30, and railroad drainage
- North Doane Lake

Drainage from all three branches converges at the NDP prior to discharging through Outfall 22C. This pond functions as a natural settling basin for stormwater solids transported through this drainage system. Downstream of the NDP, discharges to the conveyance system are limited to groundwater infiltration and stormwater runoff from a small subbasin that includes the Wacker Siltronic site guard shack and a portion of the parking area. Limited dry-weather flow samples collected at the outfall indicate that groundwater may be a source of manganese and cyanide to the river (AMEC, 2004; Hahn and Associates, 2006).

The drainage system in this area has been significantly altered by property owners over time. Doane Creek historically crossed Highway 30 and discharged in the general vicinity of what is now the property line between the GASCO and Wacker Siltronic sites. In 1966, Doane Creek was diverted to North Doane Lake (NDL), which was drained by an NDL-Willamette River ditch that discharged to the river. In 1968 when the railway was constructed north of NDL, an outlet structure for NDL was constructed across the railway and the creek was likely rerouted directly to the NDL-Willamette River ditch. In approximately 1972, a 96-inch-diameter pipe was installed to drain the creek and lake as the Wacker Siltronic site was being filled for development; at that time, the NDP was created. The City abandoned the 96-inch outfall pipe and constructed an 84-inch-diameter pipe (Outfall 22C) in 1980 as part of the Wacker Siltronic site development. The City owns and maintains the trash rack at the NDP outlet and the 84-inch pipe downstream of the trash rack but does not own or maintain the NDP.

Northwest Drainage Pond Samples

The NDP sediment data consist of four samples collected between 2003 and 2005 by AMEC and Hahn and Associates (AMEC, 2004; Hahn and Associates, 2006). As shown in Figure 2, AMEC sample NDP-101-S was collected near the North Doane Lake outlet pipe to the NDP; AMEC sample NDP-102-S was collected near the NDP outlet to Outfall 22C; and AMEC sample NDP-103-S was collected near the North Doane Creek outlet to the NDP. Hahn sample 5237-050224-01 is believed to be located in the central portion of the NDP, based on photographs taken during sampling; a specific sample location is not stated in detail in the Hahn report (Hahn and Associates, 2006).

All four samples were collected from the surface although the sample depths varied between 0.5 and 1 foot. Therefore, the samples represent more current (versus historical) accumulation of solids.

Summary of Results

The results of the chemical analysis from the NDP sediment investigations are summarized in Table 1. The analytical results of the in-river sediment sample located 20 feet from Outfall 22C are also presented in Table 1 for comparison purposes. The 2005 DEQ/EPA Portland Harbor Joint Source Control Strategy (JSCS) screening level values (SLVs) for bioaccumulation and toxicity, and the DEQ Default Background Concentrations for Metals (DEQ, 2002) are included in Table 1. Notable observations from the NDP sediment data and a comparison with Outfall 22C in-river sediment data are summarized as follows:

- **Metals.** Manganese was the only metal detected at a concentration that exceeded JSCS toxicity criteria. The exceedance was in the sediment sample NDP-102-S, which was collected near a groundwater seep in the NDP (see Figure 1). The elevated manganese found in the sediment may result from manganese dissolution occurring where groundwater that is under reduced condition is discharging to the NDP. This condition may be the result of groundwater contamination at the adjacent upland cleanup site(s). It is unclear if manganese is an issue for the Portland Harbor project.

  Arsenic was identified in the Phase I Report (GSI, 2006) as a PCOI for Basin 22C based on elevated concentrations detected in sediment at Outfall 22C. Arsenic was not detected above JSCS SLVs or DEQ background concentrations in sediment samples from the NDP. The low arsenic concentrations within the NDP sediments suggest that the arsenic detected in in-river sediments near Outfall 22C is likely from an upriver source.

- **Dioxin and Furans.** Dioxin and furan concentrations detected in sediment sample NDP-101-S, collected at the outlet of the North Doane Lake discharge pipe, are significantly higher than the concentrations detected in the other NDP sediment samples. The concentration of dioxin 2,3,7,8-TCDD in NDP-101-S exceeded the JSCS bioaccumulation SLV. The City understands DEQ is working with responsible parties to address upland sources of these contaminants.

- **PAHs.** PAH concentrations detected in two of the four sediment samples from the NDP are noticeably higher than the remaining two samples. The samples with higher concentrations are the Lake outlet sample NDP-101-S, which has the highest overall concentrations of PAHs, and mid-NDP sample 5237-050224-01. Both samples had several PAHs detected above JSCS toxicity SLVs. PAHs were not detected at concentrations above JSCS screening criteria in the in-river sediment sample. There are potentially several sources of PAH compounds at upland sites within Basin 22C. The City understands DEQ is working with responsible parties to address upland sources of these contaminants.

- **Pesticides.** The pesticide DDT and its breakdown compounds were identified as a PCOI for Basin 22C based on the detection of elevated concentrations in sediment at Outfall 22C. DDT and its breakdown compounds were not detected in samples that were analyzed for pesticides from the NDP. Based on the lack of detections in the NDP, it is

likely that in-river sediment DDT detections near Outfall 22C originated from upriver sources.

- **Phthalates.** Phthalates were not detected in the NDP sediment samples, however, the method reporting limits for several of the phthalates were elevated above JSCS screening criteria.
- **SVOCs and Chlorinated Herbicides.** Semivolatile organic compounds (SVOC) and chlorinated herbicides were not detected in NDP sediment samples or in the sediment near Outfall 22C.

NDP sediment samples were not analyzed for polychlorinated biphenyls (PCB) as part of the two studies evaluated. To the City's knowledge, DEQ has not identified PCBs as an issue at upland sites currently being evaluated under DEQ oversight and PCBs have not been analyzed at these sites (e.g., there are no PCB data in North Doane Lake).

Conclusions

NDP sediment data were reviewed to evaluate the potential contribution of sediment contamination to the river because the NDP functions as a natural settling pond for stormwater solids prior to discharging through Outfall 22C. Based on this review, the City proposes the following refinements in the Basin 22C CSM, source control actions, and PCOI list for the basin. The Phase I Report (GSI, 2006) retained the arsenic and DDT contaminants detected in the in-river sediments near Outfall 22C as PCOIs for Basin 22C because it was unclear if there were potential sources within the basin even though there is a strong potential that these contaminants were associated with upstream sources. Based on the lack of elevated arsenic and DDT concentrations in NDP sediments, it is likely that the Willamette River detections near Outfall 22C are associated with redistribution of upstream in-river sediments. Therefore, arsenic and DDT no longer will be retained as PCOIs in Basin 22C.

The NDP sediment samples indicate that PAHs, dioxins and furans, and manganese are migrating from upland sources to the NDP. The City understands that DEQ is working with the appropriate upland cleanup sites to address the sources of these contaminants to the City's stormwater conveyance system. The City will continue to work collaboratively with DEQ to address these sources.

References

AMEC. 2004. *Remaining Remedial Investigation Technical Memorandum Addendum,* North Doane Lake Investigation, RP – Portland Site, July 9, 2004.

CH2M HILL. 2004. *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project*, March 2004.

DEQ. 2002. DEQ Default Background Concentrations for Inorganic Contaminants in Various Environmental Media. Internal Memorandum from the Toxicology Workgroup to DEQ Project Managers, dated October 28, 2002.

GSI. 2006. *Phase I Report for City of Portland Priority 1 Basins*, May 2006.

Hahn and Associates. 2006. *City of Portland Outfall 22C Drainage Sampling Activities, Siltronic Corporation Property, 7200 NW Front Avenue, Portland, Oregon*. June 2, 2006.

Table

Table 1 – Summary of Chemical Analytical Results, Northwest Drainage Pond Sediment Samples

Figures

Figure 1 – Outfall Basin 22C Drainage System

Figure 2 – Sediment Sampling Locations Including Sampling Depths and Analyte List (*Figure 2 from AMEC 2004 RRI TM Addendum)*

Table 1
Summary of Chemical Analytical Results
Northwest Drainage Pond Sediment Samples
City Outfall Basin 22C

		Near North Doane Lake Outlet	Near NDP Outlet	Near North Doane Creek Outlet	Center of NDP	Outfall 22C Beach Sample (20' from Outfall)	JSCS Catch Basin Toxicity SLVs[2]	JSCS Catch Basin Bioacc SLVs[2]	DEQ Inriver Baseline[3]	DEQ Background Metal Concentrations	
Description										Soil	Freshwater Sediment
Sample Type		surface	surface	surface	surface	surface					
Sample ID		NDP-101-S	NDP-102-S	NDP-103-S	5237-050224-01	SI0122C040					
Sample Date		11/24/2003	11/25/2003	12/19/2003	2/24/2005	10/17/2002					
Depth		0-1 feet	0-1 feet	0-0.5 feet	0-0.5 feet	0-05 cm					
Conventional Analyses	**Units[1]**										
% Solids	%	59.5	95.0	87.2	52.2	--	--	--		--	--
Ammonia (as N)	mg/kg	48.4	0.117 X	0.721	--	--	--	--		--	--
Dry Weight	%	57.6	85.1	87.3	--	--	--	--		--	--
Sulfide	µmol/g	1.94	0.0600 U	--	--	--	--	--		--	--
TOC	mg/kg	37,800	7,620	1,710	--	7,320	--	--		--	--
Total Residue	mg/kg	607,000	801,000	859,000	--	--	--	--		--	--
Volatile Residue	mg/kg	42,800	32,600	30,000	--	--	--	--		--	--
Metals and Major Ions											
Aluminum	mg/kg	18,900	19,800	8,440 J	**--**	1,630	--	--	42800	--	--
Antimony	mg/kg	0.192 JX	0.400 UJ	0.0620 X	1.53	0.579	64	10	5	4	1
Arsenic	mg/kg	5.71	0.859	1.40	5.45	53.7	33	--	5	7	7.9
Barium	mg/kg	113	187	95.4	126	--	--	--		--	--
Beryllium	mg/kg	0.449	0.602	0.537	--	--	--	--		--	--
Boron	mg/kg	0.730 X	3.51 U	2.00 U	--	--	--	--		--	--
Cadmium	mg/kg	**0.403**	*2.38* U	**0.190**	*2.45* U	*1.1* U	4.98	0.003	0.6	1	0.5
Calcium	mg/kg	3,380	6,770	4,910	--	--	--	--		--	--
Chromium	mg/kg	20.9	11.0	7.82	21.1	7.84	111	4200	41	42	30
Cobalt	mg/kg	13.6	28.3 J	10.3	**--**	**--**	--	--		--	--
Copper	mg/kg	**24.2**	**16.2**	**13.4**	**27.6**	**18.3**	149	10	60	36	12
Cyanide (Total)	mg/kg	--	--	--	0.227 U	--	--	--		--	--
Iron	mg/kg	35,200	117,000	29,600	26,400	--	--	--		--	--
Lead	mg/kg	39.8	9.58	7.39	34.7	13.3 B2	128	128	30	17	2
Magnesium	mg/kg	2,810	2,230	1,400	--	--	--	--		--	--
Manganese	mg/kg	524	1,340	577	452	**--**	1100	--		--	--
Mercury	mg/kg	0.0466 X	0.0137 X	0.0833 U	0.0481 U	0.0372 U	1.06	--	0.1	--	--
Molybdenum	mg/kg	1.70 UX	1.00 UJX	1.59 U	--	--	--	--		--	--
Nickel	mg/kg	14.8	7.97	5.52	14.2	7.03	48.6	316	32	38	20
Potassium	mg/kg	756	656	314	**--**	**--**	--	--		--	--
Selenium	mg/kg	*0.424* U	*0.400* U	**0.661**	*0.500* U	*1.83* U	5	0.1	15	2	0.4
Silver	mg/kg	0.0783 X	0.0589 X	0.0568 X	0.500 U	0.573	5	--	1.4	1	0.4
Sodium	mg/kg	280	164	131	--	--	--	--		--	--
Thallium	mg/kg	0.424 U	0.400 U	0.450 U	0.500 U	--	--	--		--	--
Vanadium	mg/kg	77.1	139	78.9	84.0	**--**	--	--		--	--
Zinc	mg/kg	**132**	**98.3**	**78.1**	--	**48**	459	3	118	86	53
Dioxins and Furans											
2,3,7,8,-TCDD	pg/g	**2.30**	0.670 U	0.700 U	--	--	9.0	8.5E-04		--	--
1,2,3,7,8-PeCDD	pg/g	3.20 U	0.600 U	0.490 U	--	--	--	--		--	--
1,2,3,6,7,8-HxCDD	pg/g	11.7	1.44 U	1.50 U	--	--	--	--		--	--
1,2,3,4,7,8-HxCDD	pg/g	4.00	0.900 U	0.240 JX	--	--	--	--		--	--
1,2,3,7,8,9-HxCDD	pg/g	11.7	1.25 U	1.30 U	--	--	--	--		--	--
1,2,3,4,6,7,8-HpCDD	pg/g	198	6.50	4.40 J	--	--	--	--		--	--
1,2,3,4,6,7,8,9-OCDD	pg/g	1,530	49.3	32.3	--	--	--	--		--	--
2,3,7,8-TCDF	pg/g	1.70	0.490 U	0.510 U	--	--	--	--		--	--
1,2,3,7,8-PeCDF	pg/g	2.40 J	0.910 U	0.950 U	--	--	--	--		--	--
2,3,4,7,8-PeCDF	pg/g	4.10 J	0.680 U	0.710 U	--	--	--	--		--	--
1,2,3,6,7,8-HxCDF	pg/g	3.40 J	0.960 U	1.00 U	--	--	--	--		--	--
1,2,3,7,8,9-HxCDF	pg/g	4.90 J	1.06 U	1.10 U	--	--	--	--		--	--
1,2,3,4,7,8-HxCDF	pg/g	5.60	0.780 U	0.810 U	--	--	--	--		--	--
2,3,4,6,7,8-HxCDF	pg/g	4.00 J	1.15 U	1.20 U	--	--	--	--		--	--
1,2,3,4,6,7,8-HpCDF	pg/g	27.0	1.92 U	0.750 JX	--	--	--	--		--	--
1,2,3,4,7,8,9-HpCDF	pg/g	3.90 JX	1.06 U	1.10 U	--	--	--	--		--	--
1,2,3,4,6,7,8,9-OCDF	pg/g	83.0	4.14 U	1.90 JX	--	--	--	--		--	--
Total TCDD	pg/g	14.3	0.670 U	0.700 U	--	--	--	--		--	--
Total PeCDD	pg/g	5.90 J	0.600 U	0.490 U	--	--	--	--		--	--
Total HxCDD	pg/g	117	1.30 U	0.820 X	--	--	--	--		--	--
Total HpCDD	pg/g	555	14.0	8.60	--	--	--	--		--	--
Total TCDF	pg/g	127 J	3.10 J	0.540	--	--	--	--		--	--
Total PeCDF	pg/g	81.0 J	3.00 U	0.410 X	--	--	--	--		--	--
Total HxCDF	pg/g	106 J	4.40	2.60	--	--	--	--		--	--
Total HpCDF	pg/g	106 J	3.10	3.00	--	--	--	--		--	--
Organic Chlorine Pesticides											
Aldrin	µg/kg	3.33 UJ	3.33 U	1.67 U	**--**	3.72 U	40	40	--	--	--
alpha-BHC (α-BHC)[4]	µg/kg	3.33 UJ	3.33 U	1.67 U	**--**	2.68 U	--	--	--	--	--
beta-BHC (β-BHC)[4]	µg/kg	3.33 U	3.33 U	1.67 U	**--**	3.65 U	--	--	--	--	--
gamma-BHC (γ-BHC, Lindane)[4]	µg/kg	3.33 UJ	3.33 U	1.67 U	**--**	3.3 U	4.99	1160	--	--	--
delta-BHC (δ-BHC)[4]	µg/kg	6.67 UJ	6.67 U	3.33 U	**--**	3.31 U	--	--	--	--	--
alpha-Chlordane	µg/kg	3.33 U	3.33 U	1.67 U	--	3.43 U	--	--		--	--
beta-Chlordane	µg/kg	--	--	--	--	3.5 U	--	--		--	--
gamma-Chlordane	µg/kg	3.33 UJ	3.33 U	1.67 U	--	--	--	--		--	--
Chlordane	µg/kg	--	--	--	--	12.1 U	--	--		--	--
Oxychlordane	µg/kg	--	--	--	--	8.62 U	--	--		--	--
2,4'-DDD	µg/kg	--	--	--	--	8.62 U	--	--		--	--
2,4'-DDE	µg/kg	--	--	--	--	8.62 U	--	--		--	--
2,4'-DDT	µg/kg	--	--	--	--	8.62 U	--	--		--	--
4,4'-DDD	µg/kg	*3.33* U	*3.33* U	*1.67* U	**--**	**7.34** J,C1	28	0.3	--	--	--
4,4'-DDE	µg/kg	*3.33* UJ	*3.33* U	*1.67* U	**--**	*1.98* U	31.3	0.3	--	--	--
4,4'-DDT	µg/kg	*3.33* UJ	*3.33* U	*1.67* U	**--**	2.23 U	62.9	0.3	--	--	--
Dieldrin	µg/kg	3.33 UJ	3.33 U	1.67 U	**--**	2.83 U	61.8	4	--	--	--
Endosulfan I	µg/kg	3.33 UJ	3.33 U	1.67 U	--	3.67 U	--	110		--	--
Endosulfan II	µg/kg	3.33 UJ	3.33 U	1.67 U	--	3.33 U	--	110		--	--
Endosulfan sulfate	µg/kg	3.33 UJ	3.33 U	1.67 U	**--**	3.14 U	--	110	--	--	--
Endrin	µg/kg	3.33 UJ	3.33 U	1.67 U	**--**	3.11 U	207	4	--	--	--
Endrin aldehyde	µg/kg	3.33 UJ	3.33 U	1.67 U	**--**	3.52 U	--	--	--	--	--
Endrin ketone	µg/kg	3.33 U	3.33 U	1.67 U	**--**	2.42 U	--	--	--	--	--
Heptachlor	µg/kg	6.67 UJ	6.67 U	3.33 U	**--**	2.97 U	10	24	--	--	--
Heptachlor epoxide	µg/kg	3.33 UJ	3.33 U	1.67 U	**--**	3.15 U	16	--	--	--	--
Methoxychlor	µg/kg	3.33 UJ	3.33 UJ	1.67 U	**--**	11.9 U	--	990	--	--	--
cis-Nonachlor	µg/kg	**--**	**--**	**--**	**--**	8.62 U	--	--		--	--
trans-Nonachlor	µg/kg	**--**	**--**	**--**	**--**	8.62 U	--	--		--	--
Hexachlorobenzene	µg/kg	3.33 UJ	3.33 U	1.67 U	--	4.31 U	100	--		--	--

Table 1
Summary of Chemical Analytical Results
Northwest Drainage Pond Sediment Samples
City Outfall Basin 22C

		Near North Doane Lake Outlet	Near NDP Outlet	Near North Doane Creek Outlet	Center of NDP	Outfall 22C Beach Sample (20' from Outfall)	JSCS Catch Basin Toxicity SLVs[2]	JSCS Catch Basin Bioacc SLVs[2]	DEQ Inriver Baseline[3]	DEQ Background Metal Concentrations	
Description										Soil	Freshwater Sediment
Sample Type		surface	surface	surface	surface	surface					
Sample ID		NDP-101-S	NDP-102-S	NDP-103-S	5237-050224-01	SI0122C040					
Sample Date		11/24/2003	11/25/2003	12/19/2003	2/24/2005	10/17/2002					
Depth		0-1 feet	0-1 feet	0-0.5 feet	0-0.5 feet	0-05 cm					
Chlorinated Herbicides											
2,4-D	µg/kg	25.0 U	20.0 U	59.8 UJN	--	8.93 UJ	--	--	3.3	--	--
2,4-DB	µg/kg	20.0 U	20.0 U	17.1 UJX	--	6.44 UJ	--	--	5	--	--
2,4,5-TP (Silvex)	µg/kg	20.0 U	20.0 U	59.8 UJ	--	8.6 UJ	--	--	--	--	--
2,4,5-T	µg/kg	20.0 U	20.0 U	59.8 UJ	--	10.5 UJ	--	--	--	--	--
Bromoxynil	µg/kg	20.0 U	20.0 U	59.8 UJ	--	--	--	--		--	--
Dalapon	µg/kg	20.0 JU	20.0 UJ	59.8 UJ	--	5.16 UJ	--	--	--	--	--
Dicamba	µg/kg	20.0 U	20.0 U	59.8 UJ	--	5.27 UJ	--	--	--	--	--
Dichloroprop	µg/kg	25.0 U	20.0 U	59.8 UJ	--	8.5 UJ	--	--	--	--	--
MCPA	µg/kg	2,000 JU	2,000 UJ	5,980 UJ	--	10.1 UJ	--	--	--	--	--
MCPP	µg/kg	2,000 JU	2,000 UJ	5,980 UJ	--	4.49 UJ	--	--	--	--	--
Dinoseb	µg/kg	20.0 JU	20.0 UJ	59.8 UJ	--	--	--	--		--	--
Toxaphene	µg/kg	--	--	--	--	54 U	--	2,550		--	--
Polychlorinated Biphenyls (PCBs)											
PCB-008	µg/kg	--	--	--	--	1.26 U	--	--		--	--
PCB-018	µg/kg	--	--	--	--	1.23 U	--	--		--	--
PCB-028	µg/kg	--	--	--	--	1.44 P	--	--		--	--
PCB-044	µg/kg	--	--	--	--	0.71 U	--	--		--	--
PCB-052	µg/kg	--	--	--	--	1.11 U	--	--		--	--
PCB-066	µg/kg	--	--	--	--	0.65 U	--	--		--	--
PCB-101	µg/kg	--	--	--	--	0.9 U	--	--		--	--
PCB-105	µg/kg	--	--	--	--	0.55 U	--	--		--	--
PCB-118	µg/kg	--	--	--	--	0.67 U	--	--		--	--
PCB-128	µg/kg	--	--	--	--	0.57 U	--	--		--	--
PCB-138	µg/kg	--	--	--	--	0.62 U	--	--		--	--
PCB-153	µg/kg	--	--	--	--	0.79 U	--	--		--	--
PCB-170	µg/kg	--	--	--	--	0.62 U	--	--		--	--
PCB-180	µg/kg	--	--	--	--	0.55 U	--	--		--	--
PCB-187	µg/kg	--	--	--	--	0.68 U					
Estimated Total PCBs[5]	µg/kg	--	--	--	--	4.9	676	--		--	--
VOCs											
1,1,1,2-Tetrachloroethane	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
1,1,1-Trichloroethane	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
1,1,2,2-Tetrachloroethane	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
1,1,2-Trichloroethane	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
1,1-Dichloroethane	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
1,1-Dichloroethene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
1,1-Dichloropropene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
1,2,3-Trichlorobenzene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
1,2,3-Trichloropropane	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
1,2,4-Trichlorobenzene	µg/kg	100 U	100 U	100 U	--	--	9,200	--		--	--
1,2,4-Trimethylbenzene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
1,2-Dibromo-3-chloropropane	µg/kg	500 U	500 U	500 U	--	--	--	--		--	--
1,2-Dibromoethane	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
1,2-Dichlorobenzene	µg/kg	100 U	100 U	48.2 X	--	--	1,700	--		--	--
1,2-Dichloroethane	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
1,2-Dichloropropane	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
1,3,5-Trimethylbenzene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
1,3-Dichlorobenzene	µg/kg	100 U	100 U	100 U	--	--	300	--		--	--
1,3-Dichloropropane	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
1,4-Dichlorobenzene	µg/kg	100 U	100 U	100 U	--	--	300	--		--	--
2,2-Dichloropropane	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
2-Butanone (MEK)	µg/kg	1,000 U	1,000 U	1,000 U	--	--	--	--		--	--
2-Chlorotoluene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
2-Ethyl-1-hexanol	µg/kg	10,000 UJ	10,000 UJ	10,000 U	--	--	--	--		--	--
2-Hexanone	µg/kg	1,000 U	1,000 U	1,000 U	--	--	--	--		--	--
4-Chlorotoluene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
4-Isopropyltoluene	µg/kg	200 U	200 U	200 U	--	--	--	--		--	--
4-Methyl-2-pentanone (MIBK)	µg/kg	500 U	500 U	500 U	--	--	--	--		--	--
Acetone	µg/kg	2,500 UJ	2,500 UJ	2,500 U	--	--	--	--		--	--
Benzene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
Bromobenzene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
Bromochloromethane	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
Bromodichloromethane	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
Bromoform	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
Bromomethane	µg/kg	35.3 X	33.7 X	22.9 X	--	--	--	--		--	--
Carbon disulfide	µg/kg	1,000 U	1,000 U	1,000 U	--	--	--	--		--	--
Carbon tetrachloride	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
Chlorobenzene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
Chloroethane	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
Chloroform	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
Chloromethane	µg/kg	500 U	500 U	500 U	--	--	--	--		--	--
cis-1,2-Dichloroethene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
cis-1,3-Dichloropropene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
Dibromochloromethane	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
Dibromomethane	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
Dichlorodifluoromethane	µg/kg	500 U	500 U	500 U	--	--	--	--		--	--
Ethylbenzene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
Hexachlorobutadiene	µg/kg	200 U	200 U	200 U	--	4.31 U	600	--		--	--
Iodomethane	µg/kg	2,000 U	726 X	139 X	--	--	--	--		--	--
Isobutylalcohol	µg/kg	10,000 UJ	10,000 UJ	10,000 U	--	--	--	--		--	--
Isopropylbenzene	µg/kg	200 U	200 U	200 U	--	--	--	--		--	--
m,p-Xylene	µg/kg	200 U	200 U	200 U	--	--	--	--		--	--
Methylene chloride	µg/kg	500 U	500 U	178 UX	--	--	--	--		--	--
Naphthalene	µg/kg	37.0 X	200 U	200 U	--	--	561	--		--	--
n-Butylbenzene	µg/kg	500 U	500 U	500 U	--	--	--	--		--	--
n-Propylbenzene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
o-Xylene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
sec-Butylbenzene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
Styrene	µg/kg	100 U	100 U	71.1 X	--	--	--	--		--	--
tert-Butylbenzene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
Tetrachloroethene	µg/kg	100 U	100 U	100 U	--	--	500	--		--	--
Toluene	µg/kg	100 U	100 U	34.4 X	--	--	--	--		--	--

Table 1
Summary of Chemical Analytical Results
Northwest Drainage Pond Sediment Samples
City Outfall Basin 22C

		Near North Doane Lake Outlet	Near NDP Outlet	Near North Doane Creek Outlet	Center of NDP	Outfall 22C Beach Sample (20' from Outfall)	JSCS Catch Basin Toxicity SLVs[2]	JSCS Catch Basin Bioacc SLVs[2]	DEQ Inriver Baseline[3]	DEQ Background Metal Concentrations	
Description										Soil	Freshwater Sediment
Sample Type		surface	surface	surface	surface	surface					
Sample ID		NDP-101-S	NDP-102-S	NDP-103-S	5237-050224-01	SI0122C040					
Sample Date		11/24/2003	11/25/2003	12/19/2003	2/24/2005	10/17/2002					
Depth		0-1 feet	0-1 feet	0-0.5 feet	0-0.5 feet	0-05 cm					
trans-1,2-Dichloroethene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
trans-1,3-Dichloropropene	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
Trichloroethene	µg/kg	100 U	100 U	100 U	--	--	2,100	--		--	--
Trichlorofluoromethane	µg/kg	100 U	100 U	100 U	--	--	--	--		--	--
Vinyl chloride	µg/kg	100 U	100 U	100 UJ	--	--	--	--		--	--
Phthalates											
Bis(2-ethylhexyl) phthalate	ug/kg	*10,000* U	*2,000* U	*2,000* U	*7,920* U	65 UJ	800	330	390	--	--
Butylbenzyl phthalate	ug/kg	1,650 U	330 U	330 U	1,310 U	65 UJ	--	--	20	--	--
Diethyl phthalate	ug/kg	*1,650* U	330 U	330 U	*1,310* U	102 J	600	--	--	--	--
Dimethyl phthalate	ug/kg	1,650 U	330 U	330 U	1,310 U	65 UJ	--	--	20	--	--
Di-n-butyl phthalate	µg/kg	*5,000* U	*1,000* U	*1,000* U	*3,960* U	65 UJ	100	--	20	--	--
Di-n-octyl phthalate	µg/kg	1,650 U	330 U	330 U	1,310 U	65 UJ	--	--	20	--	--
PAHs											
1-Methylnaphthalene	µg/kg	2,470	330 U	330 U	--	--	--	--	--	--	--
2-Methylnaphthalene	µg/kg	4,450	*330* U	*330* U	*1,310* U	6.5 UJ	200	--	150	--	--
Acenaphthene	µg/kg	28,900	42.7	6.83 X	1,850	12.8 J	300	--	180	--	--
Acenaphthylene	µg/kg	*670* U	7.71 X	13.4 U	*268* U	7 J	200	--	60	--	--
Anthracene	µg/kg	7,530	41.0	7.48 X	2,780	12.8 J	845	--	150	--	--
Benzo(a)anthracene	µg/kg	8,910	235	47.1	1,660	30 J	1050	--	360	--	--
Benzo(a)pyrene	µg/kg	4,560	309	60.6	1,290	64.2 J	1450	--	500	--	--
Benzo(b)fluoranthene	µg/kg	4,210	299	62.8	1,310	--	--	--	--	--	--
Benzo(g,h,i)perylene	µg/kg	1,880 J	222 J	51.3 J	814	59.6 J	300	--	250	--	--
Benzo(k)fluoranthene	µg/kg	4,660	211	51.4	1,120	--	13000	--	--	--	--
Benzofluoranthenes	µg/kg	--	--	--	--	127 J	--	--	--	--	--
Chrysene	µg/kg	7,670	284	50.5	1,940	59.1 J	1290	--	425	--	--
Dibenzo(a,h)anthracene	µg/kg	617 X	56.6	14.3 J	268 U	17 J	1300	--	125	--	--
Fluoranthene	µg/kg	39,400	325	62.3	4,430	89.4 J	2230	--	600	--	--
Fluorene	µg/kg	25,000	24.0	13.4 U	2,640	6.5 UJ	536	--	125	--	--
Indeno(1,2,3-cd)pyrene	µg/kg	1,780	185	43.4 J	714	53.4 J	100	--	225	--	--
Naphthalene	µg/kg	*670* U	47.8	13.4 U	268 U	14.4 J	561	--	200	--	--
Phenanthrene	µg/kg	87,300	175	29.6	6,050	28.8 J	1170	--	700	--	--
Pyrene	µg/kg	33,100	409	69.9	3,660	95.9 J	1,520	--	700	--	--
Phenolic SVOCs											
2,4,5-Trichlorophenol	µg/kg	1,650 U	330 U	330 U	1,310 U	65 UJ	--	--	--	--	--
2,4,6-Trichlorophenol	µg/kg	1,650 U	330 U	330 U	1,310 U	65 UJ	--	--	--	--	--
2,4-Dichlorophenol	µg/kg	1,650 U	330 U	330 U	1,310 U	65 UJ	--	--	--	--	--
2,4-Dimethylphenol	µg/kg	5,000 U	1,000 U	1,000 U	3,960 U	65 UJ	--	--	--	--	--
2,4-Dinitrophenol	µg/kg	10,000 UJ	2,000 UJ	2,000 U	7,920 U	325 UJ	--	--	--	--	--
2,6-Dichlorophenol	µg/kg	5,000 U	1,000 U	1,000 U	--	--	--	--		--	--
2-Chlorophenol	µg/kg	1,650 U	330 U	330 U	1,310 U	65 UJ	--	--	--	--	--
2-Methyl-4,6-dinitrophenol	µg/kg	5,000 U	1,000 U	1,000 U	3,960 U	325 UJ	--	--		--	--
2-Methylphenol	µg/kg	1,650 U	330 U	330 U	1,310 U	179 J	--	--	--	--	--
2-Nitrophenol	µg/kg	1,650 U	330 U	330 U	1,310 U	65 UJ	--	--	--	--	--
3 & 4-Methylphenol	µg/kg	1,650 U	330 U	330 U	1,310 U	--	--	--	680	--	--
4-Methylphenol	µg/kg	--	--	--	--	130 UJ	--	--	680	--	--
4-Chloro-3-methylphenol	µg/kg	1,650 U	330 U	330 U	1,310 U	--	--	--	--	--	--
4-Nitrophenol	µg/kg	5,000 U	1,000 U	1,000 U	3,960 U	5.12 UJ	--	--	--	--	--
Pentachlorophenol	µg/kg	*5,000* U	1,000 U	1,000 U	*3,960* U	6.59 UJ	1000	--	97	--	--
Phenol	µg/kg	*1,650* U	*330* U	*330* U	*1,310* U	*65* UJ	50	--	20	--	--
Tetrachlorophenols		5,000 U	1,000 U	1,000 U	--	--	--	--		--	--
2,3,4,6-Tetrachlorophenol	µg/kg	--	--	--	--	65 UJ	--	--		--	--
2,3,5,6-Tetrachlorophenol	µg/kg	--	--	--	--	65 UJ	--	--		--	--
Organonitrogen SVOCs											
Aniline	µg/kg	--	--	--	--	65 UJ	--	--		--	--
Nitrobenzene	µg/kg	1,650 U	330 U	330 U	1,310 U	65 UJ	--	--	--	--	--
2,4-Dinitrotoluene	µg/kg	1,650 U	330 U	330 U	1,980 U	65 UJ	--	--	--	--	--
2,6-Dinitrotoluene	µg/kg	1,650 U	330 U	330 U	1,980 U	65 UJ	--	--	--	--	--
2-Nitroaniline	µg/kg	1,650 U	330 U	330 U	1,310 U	65 UJ	--	--	--	--	--
3-Nitroaniline	µg/kg	5,000 U	1,000 U	1,000 U	3,960 U	65 UJ	--	--	--	--	--
4-Nitroaniline	µg/kg	1,650 U	330 U	330 U	1,310 U	65 UJ	--	--	--	--	--
Carbazole	µg/kg	--	--	--	0.668 JX	65 UJ	1600	--		--	--
N-Nitrosodi-n-propylamine	µg/kg	1,650 U	330 U	330 U	1,310 U	65 UJ	--	--	--	--	--
N-Nitrosodiphenylamine	µg/kg	1,650 U	330 U	330 U	1,310 U	325 UJ	--	--	--	--	--
Haloganated SVOCs											
1,2,4-Trichlorobenzene	µg/kg	1,650 U	330 U	330 U	3,960 U	65 UJ	9200	--	--	--	--
1,2-Dichlorobenzene	µg/kg	*5,000* U	1,000 U	1,000 U	*3,960* U	65 UJ	1700	--	--	--	--
1,3-Dichlorobenzene	µg/kg	*5,000* U	*1,000* U	*1,000* U	*3,960* U	65 UJ	300	--	--	--	--
1,4-Dichlorobenzene	µg/kg	*5,000* U	*1,000* U	*1,000* U	*3,960* U	65 UJ	300	--	--	--	--
2-Chloronaphthalene	µg/kg	1,650 U	330 U	330 U	1,310 U	6.5 UJ	--	--	--	--	--
3,3'-Dichlorobenzidine	µg/kg	5,000 UR	1,000 U	1,000 U	3,960 U	65 UJ	--	--	--	--	--
4-Bromophenyl phenyl ether	µg/kg	1,650 U	330 U	330 U	1,310 U	65 UJ	--	--	--	--	--
4-Chloroaniline	µg/kg	10,000 UJ	2,000 UJ	2,000 U	7,920 U	65 UJ	--	--	--	--	--
4-Chlorophenyl phenyl ether	µg/kg	1,650 U	330 U	330 U	1,310 U	65 UJ	--	--	--	--	--
Bis(2-chloroethoxy) methane	µg/kg	1,650 U	330 U	330 U	1,310 U	65 UJ	--	--	--	--	--
Bis(2-chloroethyl) ether	µg/kg	1,650 U	330 U	330 U	1,310 U	65 UJ	--	--	--	--	--
Bis(2-chloroisopropyl) ether	µg/kg	1,650 U	330 U	330 U	1,310 U	65 UJ	--	--	--	--	--
Hexachlorobenzene	µg/kg	*1,650* U	*330* U	*330* U	*1,310* U	65 UJ	100	--	--	--	--
Hexachlorobutadiene	µg/kg	*5,000* U	*1,000* U	*1,000* U	*3,960* U	65 UJ	600	--	--	--	--
Hexachlorocyclopentadiene	µg/kg	*5,000* UJ	*1,000* U	*1,000* U	*3,960* U	65 UJ	400	--	--	--	--
Hexachloroethane	µg/kg	5,000 U	1,000 U	1,000 U	3,960 U	65 UJ	--	--	--	--	--
Oxygen-Containing SVOCs											
Benzoic acid	µg/kg	5,000 U	1,000 UR	1,000 UR	3,960 U	325 UJ	--	--	200	--	--
Benzyl alcohol	µg/kg	1,650 U	330 U	330 U	3,960 U	65 UJ	--	--	20	--	--
Dibenzofuran	µg/kg	12,500	330 U	330 U	981 JX	65 UJ	--	--	100	--	--
Isophorone	µg/kg	1,650 U	330 U	330 U	1,310 U	65 UJ	--	--	--	--	--
TPH											
Gasoline Range Hydrocarbons	mg/kg	20.0 U	20.0 U	20.0 U	--	--	--	--	--	--	--
Diesel Range Hydrocarbons	mg/kg	332	25.0 U	*50.0* U	--	38.4	--	--	--	--	--
Heavy Oil Range Hydrocarbons	mg/kg	355	50.0 U	100 U	--	--	--	--	--	--	--
Lube Oil	mg/kg	--	--	--	--	226				--	--

Table 1
Summary of Chemical Analytical Results
Northwest Drainage Pond Sediment Samples
City Outfall Basin 22C

Description	Near North Doane Lake Outlet	Near NDP Outlet	Near North Doane Creek Outlet	Center of NDP	Outfall 22C Beach Sample (20' from Outfall)	JSCS Catch Basin Toxicity SLVs[2]	JSCS Catch Basin Bioacc SLVs[2]	DEQ Inriver Baseline[3]	DEQ Background Metal Concentrations	
Sample Type	surface	surface	surface	surface	surface				Soil	Freshwater Sediment
Sample ID	NDP-101-S	NDP-102-S	NDP-103-S	5237-050224-01	SI0122C040					
Sample Date	11/24/2003	11/25/2003	12/19/2003	2/24/2005	10/17/2002					
Depth	0-1 feet	0-1 feet	0-0.5 feet	0-0.5 feet	0-05 cm					

Notes:
[1]All results reported on a dry-weight basis.
[2]Portland Harbor Joint Source Control Strategy (DEQ/EPA Final, December 2005) levels are presented for comparison to sediment sample results.
[3]DEQ baseline values are used here for comparison purposes only.
[4]BHC = Hexachlorocyclohexane
[5]Total PCBs estimated by NOAA method (NOAA Technical Memorandum NOA OMA 49, August 1989): Total PCB = 1.95 (Σ congeners listed) + 2.1.
Total DDT - Sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT.
Total PCBs - Sum of detected aroclors.
Total PAHs - Sum of the detected analytes.
-- Analysis not run for this sample; no corresponding screening level. No value.
italic The method reporting limit exceeds JSCS Screening Levels.
bold The detected concentration exceeds JSCS Bioaccumulation Screening Level.
shaded The detected concentration exceeds JSCS Toxicity Screening Level.
Qualifiers:
B2 = This analyte was detected in the associated method blank. The analyte concentration in the sample was determined to be significantly higher than the method blank (greater than 10 times the concentration reported in the blank).
C1 = Second column confirmation was performed. The relative percent difference (RPD) value between the results on the two columns was evaluated and determined to be <40%
J = Estimate.
N = Presumptive evidence of a compound.
P = The difference between the analyte detected in the front and back column is greater than 40%.
T = Value is an average or selected result.
U = Not detected at value shown.
R = Data rejected by LAB
X = Value is in between MDL and MRL
UJ - Not detected, and the detection limit is an estimate.

Abbreviations/Definitions:
JSCS - Portland Harbor Joint Source Control Strategy
PCBs - Polychlorinated biphenyls
PAHs - Polycyclic aromatic hydrocarbons
SVOCs - Semivolatile organic compounds
TPH - Total petroleum hydrocarbons
µg/kg - Micrograms per kilogram
mg/kg - Milligrams per kilogram
NA - Not analyzed
ND - Not detected

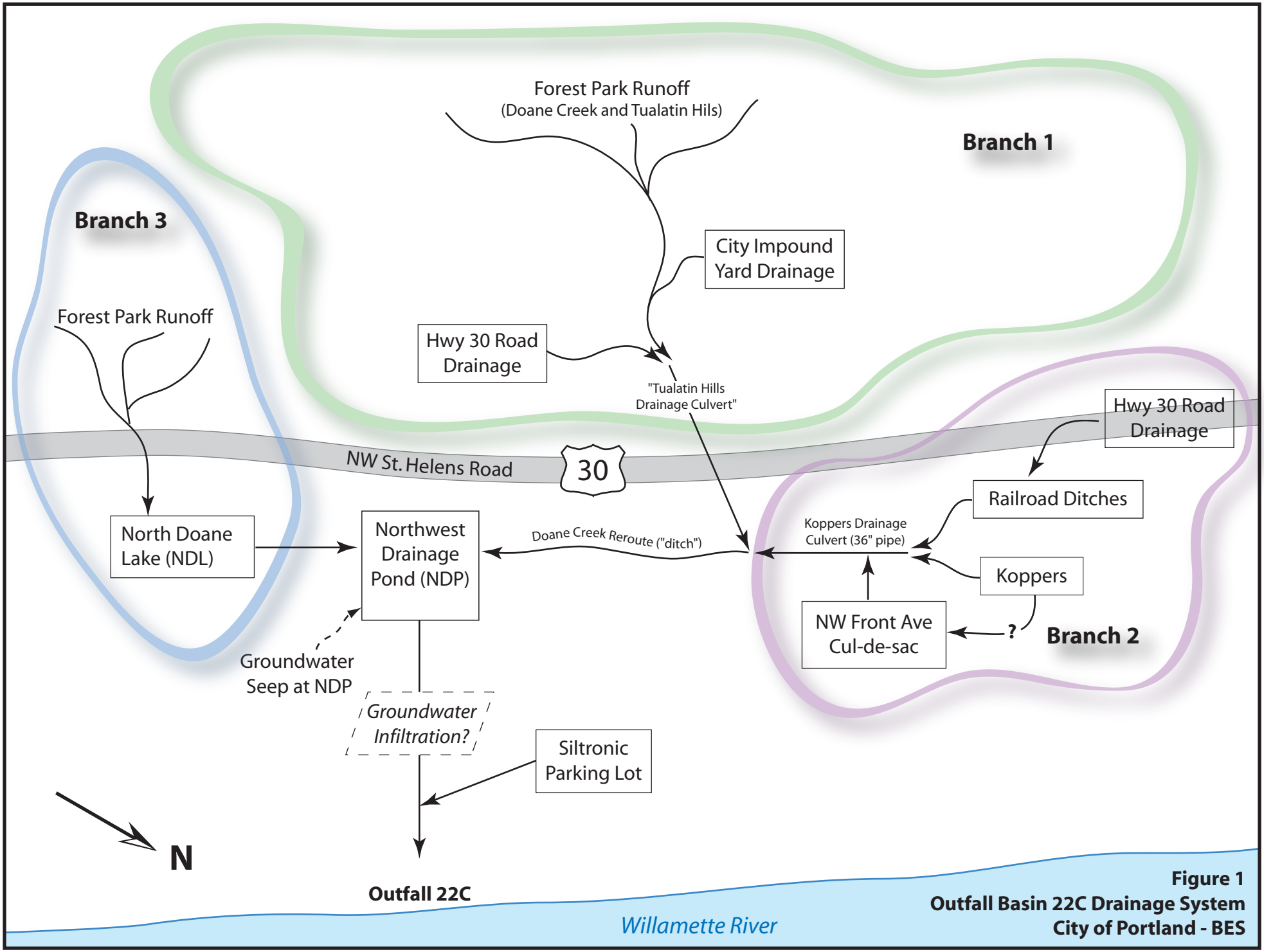

Figure 1
Outfall Basin 22C Drainage System
City of Portland - BES

84" CONCRETE PIPE TO WILLAMETTE RIVER

Hahn
5237-050224-01

Trash Rack

NORTHWEST DRAINAGE POND

NDP-102-S
6010B, 8081A, 8151A, 8260B, 8270C, 1613B, OPP, HCID,
DEPTH INTERVAL: 0'-1'

STREAM FLOW

OUTFLOW FROM NORTH DOANE LAKE

NDP-103-S
6010B, 8081A, 8151A, 8260B, 8270C, 1613B, OPP (EXCEPT SULFIDE), HCID,
DEPTH INTERVAL: 0'-0.5'

NDP-101-S
6010B, 8081A, 8151A, 8260B, 8270C, 1613B, OPP, HCID,
DEPTH INTERVAL: 0'-1'

48" CORRUGATED PIPE TO NORTHWEST DRAINAGE POND

ENLARGEMENT VIEW

BNSF

ESCO

West Doane Lake

NDL-104-S
6010B, 8081A, 8151A, 8260B, 8270C, 1613B, OPP, HCID,
DEPTH INTERVALS: 0'-1', 1'-5', 5'-10', 10'-15'

NDL-103-S
6010B, 8081A, 8151A, 8260B, 8270C, 1613B, OPP, HCID,
DEPTH INTERVALS: 0'-1', 1'-5', 5'-9', 9'-14'

NDL-107-S
6010B, 8081A, 8151A, 8260B, 8270C, 1613B, OPP, HCID,
DEPTH INTERVALS: 0'-1', 1'-5', 5'-10', 10'-15'

NDL-101-S
6010B, 8081A, 8151A, 8260B, 8270C, 1613B, OPP, HCID,
DEPTH INTERVALS: 0'-1', 1'-5', 5'-7', 7'-10'

North Doane Lake

Doane Creek

NDL-102-S
6010B, 8081A, 8151A, 8260B, 8270C, 1613B, OPP, HCID,
DEPTH INTERVALS: 0'-1', 1'-5', 5'-7.5', 7.5'-10'

NDL-106-S
6010B, 8081A, 8151A, 8260B, 8270C, 1613B, OPP, HCID,
DEPTH INTERVALS: 0'-1', 1'-5', 5'-10', 10'-15'

NDL-105-S
6010B, 8081A, 8151A, 8260B, 8270C, 1613B, OPP, HCID,
DEPTH INTERVALS: 0'-1', 1'-5', 5'-9'

RP

BNSF

LEGEND

NDL-101-W ◆ Surface Water Sample Location and Designation

Property Boundary

Surface Water Boundary

Existing Structures

RP Area Designations

Railroad Tracks

Existing Roads

Piping

6010B Total & Dissolved Metals by EPA Methods 6010B / 6020 / 7471A

8081A Organochlorine Pesticides by EPA Method 8081A + Low Level Extraction

8151A Chlorinated Herbicides by EPA Method 8151A

8260B VOCs by EPA Method 8260B

8270C SVOCs by EPA 8270C (Including Phenols) +8270-SIM for PAHs

1613B Dioxins/Furans by EPA Method 1613B

OPP Other Physical Parameters, Including:
Total and Volatile Solids Following PSEP Guidance or EPA 160.3/160.4 (Modified)
Particle Size Following PSEP Guidance or ASTM D422 (Including Silt/Clay Fraction)
Ammonia by EPA Method 350.1, 350.2, or 350.3 (Modified)
Total Organic Carbon Following PSEP Guidance or EPA Method 9060 (Modified)
Acid Volatile Sulfide Following EPA Draft Method

HCID Hydrocarbon Identification with appropriate follow-up Analysis for Quantification

0 150 300
SCALE IN FEET

Sample location 5237-050224-01 from "City of Portland Outfall 22C Drainage Sampling Activities, Siltronic Corporation Property, 7200 NW Front Avenue, Portland, Oregon" by Hahn and Associates, dated June 2, 2006.

amec
7376 SW Durham Road
Portland, OR, U.S.A. 97224-7307

W.O.	0-61M-10703 T59
DESIGN	TARW
DRAWN	DLD
DATE	MARCH 2004
SCALE	1"=150'

FIGURE 2
SEDIMENT SAMPLING LOCATIONS INCLUDING SAMPLING DEPTHS AND ANALYTE LIST

RP - PORTLAND SITE

AMEC DRAWING NO. K:\10000\10700\10703\Task 59 Remaining RI Work Plan\dwg\0304 Sediment.dwg