



ENVIRONMENTAL SERVICES

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July 9, 1996

Roger B. Horne, Jr.  
Rear Admiral, USN (Ret.)  
Principal Engineer  
Failure Analysis Associates  
1900 Tekiu Point  
Bremerton, Washington 98312

Subject: Results of sampling in the northern portion of Evergreen Park  
PTI Contract CA5Q-06-04

Dear Admiral Horne:

On behalf of Failure Analysis Associates and the City of Bremerton (the City), PTI Environmental Services (PTI) is submitting this letter report summarizing the results of an environmental investigation focused on a portion of Evergreen Park in Bremerton, Washington (Figure 1).

The investigation confirmed the presence of heavy oil and diesel in the subsurface soil at concentrations above Washington State Model Toxics Control Act (MTCA) Method A cleanup levels. However, the subject area is covered by 2-3 ft of fill and an asphalt parking lot. The contamination is confined to the soils and is highly weathered. No contamination was found in the groundwater underlying the site. Furthermore, the groundwater is saline and has no potential for use as potable water. Therefore, it is recommended that the impacted soils be managed in place using institutional controls.

## INTRODUCTION

Evergreen Park is located between 14th Street on the south and Park Drive on the north and is bounded by Park Avenue to the west and Port Washington Narrows to the east (Figures 1 and 2). The portion of the park addressed under this investigation is delineated in Figure 2. Historical information indicates that no industrial activity has occurred in this portion of the park, although the area east of Park Drive was filled between 1928 and 1947. The land is currently operated by the City for recreational purposes, and the subject portion of the site is currently awaiting minor renovations.

In support of a shoreline reconstruction project, the City of Bremerton retained Fish Pro, Inc., to excavate two test pits (referred to as Test Pit #1 and Test Pit #2) in the northern portion of the park in August 1992 (Figure 2). No lithographic soil logs or formal field reports were prepared; the available documentation is provided in the work plan for this investigation (PTI 1996). Analytical results for soil samples collected from the test pits indicated that total petroleum hydrocarbons (TPH) as diesel and heavy oil were found in Test Pit #2. Because no historical industrial operations have been located in this section of the park, fill materials are suspected to be the source of the TPH.

The purpose of PTI's investigation was to investigate the nature and extent of TPH contaminated soil and groundwater in the vicinity of Test Pit #2. The results of this investigation are intended to be used by the City of Bremerton to plan construction activities scheduled for this portion of the park.

## FIELD INVESTIGATION

On Monday, May 6, 1996, PTI personnel arrived at the site and met the drilling subcontractor, Cascade Drilling. Utility markings were checked and a general reconnaissance of the area was performed prior to commencing drilling. A phased sampling approach was used consisting of advancing one preliminary borehole (BS01) in approximately the same location as Test Pit #2, four second-tier boreholes (BS02, BS03, BS04, and BS05) approximately 30–50 ft from BS01, and five third-tier boreholes (BS06, BS07, BS08, BS10, and BS11) approximately 50–100 ft from BS01 (Figure 3). In addition, one borehole (BS09) was also advanced near the park's maintenance shed to assess the potential for this building to be a source of TPH contamination (Figure 3). Based on a brief reconnaissance conducted on the day of field activities, borehole BS09 was advanced on the presumed downgradient side of the maintenance shed (i.e., to the east toward Port Washington Narrows).

Sampling personnel wore clean nitrile gloves and changed gloves between each sampling interval to prevent cross-contamination of samples. Drilling equipment was steam-cleaned between each borehole, and dedicated plastic sampler tubes were used to collect soil samples from the Geoprobe® system. Stainless steel bowls and spoons were decontaminated using a detergent and water wash, a distilled water rinse, an acetone solvent rinse, and a second distilled water rinse. Sample handling and documentation from the time of collection to the point of data reporting was maintained throughout the study as described in the work plan (PTI 1996). Samples were stored on ice and delivered by PTI to North Creek Analytical in Bothell, Washington, within 24 hours of sample collection.

Under the supervision of PTI, Cascade Drilling advanced boreholes to approximately 9.5 ft below ground surface (bgs) using a truck-mounted Geoprobe® drilling rig. Soil samples were collected at approximately 2-ft intervals, unless the presence of rock or solid fill prevented collection of a sample.

A total of 27 soil samples were collected at depths ranging from 2.5 to 9.5 ft bgs. Soil directly beneath the asphalt cap was not sampled because of the presence of construction debris (i.e., rock and broken concrete). Soil samples were collected from the sampler tubes; field screened (using a sheen test, a photo ionization detector, and/or by odor and visual appearance) to evaluate the presence of gross TPH contamination; logged for lithology; homogenized using dedicated, clean stainless steel bowls and spoons; and packed into pre-cleaned and labeled 16-oz glass jars. In general, recovery at each sample interval was low; therefore, soil volume was generally not sufficient to allow a second 4-oz sample jar to be filled for analysis of TPH as gasoline and benzene, toluene, ethylbenzene, and xylenes (BTEX). Exceptions were samples BS05-3.5, which was collected from the 3.5-ft depth at borehole BS05 and had a mild hydrocarbon odor, and BS07-3.5, which was collected at the 3.5 ft depth of borehole BS07. Therefore, these samples were placed into labeled 4-oz glass jars immediately after opening the sampler tube to minimize the loss of volatile components. These soil samples were submitted for analysis of gasoline and BTEX using Washington State Method WTPH-G/BTEX. In addition, two soil samples were also submitted for analysis for metals (arsenic, cadmium, chromium, and lead) by U.S. Environmental Protection Agency (EPA) Method 6010, mercury by EPA Method 7471, and for polynuclear aromatic hydrocarbons (PAHs) by GC/MS-SIM.

Groundwater was encountered at every location except boreholes BS09 and BS10, with water levels ranging from 4 to 6 ft bgs. Additionally, field observations indicate that no groundwater seeps were evident along the northern portion of the shoreline on the day of sampling. Recharge was slow and groundwater samples were collected only from boreholes BS01 and BS07 based on field screening of soil samples collected from these locations (i.e., these locations exhibited evidence of TPH contamination). Groundwater samples were retrieved from the boreholes using dedicated polyethylene tubing and a peristaltic pump, and samples were collected directly into pre-cleaned containers. Groundwater samples were collected in 1-L amber glass bottles for analysis for TPH as diesel and heavy oil, 500 ml high density polyethylene (HDPE) bottles with nitric acid preservative for metals analysis, and 40 ml glass vials with no head space and hydrochloric acid preservative for TPH-G/BTEX analysis. Specific conductivity, dissolved oxygen, pH, and temperature were measured on the groundwater sample collected from borehole BS07 (BS07-W).

## RESULTS

Based on borehole logs recorded at the time of sampling, two generalized cross sections are provided in Figures 4 and 5. The location of the cross sections are illustrated in Figure 6. The field investigation indicated that shallow soils (0 to approximately 2.5 ft bgs) consisted of fill debris consisting of concrete, wood, asphalt, and brick. Deeper soils consisted of sands and gravels. Soil horizons were not uniform across the site.

At the conclusion of the field activities, nine soil samples were submitted for TPH quantification for diesel and heavy oil by Washington State Method WTPH-D extended. These samples were selected for analysis because field screening results indicated the presence of sheen or elevated concentrations of volatile organic compounds. Samples not exhibiting characteristics of TPH contamination through field screening were not submitted for analysis. The analytical results for the initial nine soil samples indicated the presence of TPH (as diesel or heavy oil) in concentrations exceeding MTCA Method A cleanup levels for TPH of 200 mg/kg. To further evaluate the extent of TPH contamination, an additional 11 soil samples were submitted for quantification for diesel and heavy oil by WTPH-D extended. The initial tier of nine samples was analyzed on a rush basis to allow the subsequent tier of analyses to be completed within the 14-day holding time. Seven samples were not submitted for analysis because field screening did not indicate the presence of petroleum hydrocarbons. All analytical results are presented in Tables 1-3. Laboratory reports are provided in Attachment.

The results of the field screening were generally consistent with the analytical results. Of the 20 samples submitted for analysis, 2 did not show evidence of hydrocarbon contamination through field screening, but were later determined, through analysis, to have concentrations of heavy oil exceeding MTCA Method A cleanup concentrations of 200 mg/kg. Field screening results are shown in Table 1.

Diesel concentrations in soil ranged from < 10 mg/kg to 515 mg/kg, and heavy oil concentrations in soil ranged from < 25 mg/kg to 1240 mg/kg. The soil sample submitted for WTPH- G/BTEX analysis (BS05-3.5) had no detected concentrations of gasoline or BTEX components. The two soil samples submitted for metals analysis (BS01-2.5 and BS03-7.0) contained low levels of chromium (24.7 and 39.4 mg/kg) and lead (16.5 and 41.0 mg/kg). Both metals were detected in concentrations below the MTCA Method A cleanup levels. In addition, the highest concentration of PAHs observed in the two soil samples submitted for PAH analysis (BS01-2.5 and BS03-7.0) was 0.414 mg/kg

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pyrene. The MTCA Method B cleanup level for carcinogenic PAHs is 2400 mg/kg (Ecology 1995). Chrysene and benzo(a)anthracene exceeded the MTCA Method B cleanup levels of 0.137 mg/kg with concentrations of 0.296 mg/kg, respectively.

Both groundwater samples (BS01-W and BS07-W) were submitted for gasoline and BTEX quantification by WTPH-G/BTEX and for diesel and heavy oil quantification by WTPH-D extended. These analytical results are presented in Table 4. Laboratory reports are provided in Attachment A. Neither of the groundwater samples submitted for analysis had any detected concentrations of TPH as gasoline, BTEX, diesel, or heavy oil.

## CONCLUSIONS

Based on the results of the subsurface investigation, the subject area is underlain by heterogeneous fill materials. Soils in the study area contain TPH as oil and diesel in concentrations exceeding MTCA Method A cleanup levels. No known onsite source of TPH to soils has been identified, which suggests that TPH contaminated fill material was used in this area prior to 1947. The subject area is currently covered by 2-3 ft of fill and an asphalt parking lot. This low permeable barrier reduces the impact of infiltration to the underlying material, and minimizes possible exposure pathways to the contaminated material below.

There is a large tidal fluctuation within the Port Washington Narrows, and the groundwater underlying the subject area is saline. Based on the analysis of the two groundwater samples collected, the groundwater does not appear to be impacted by petroleum hydrocarbons. In addition, no obvious groundwater seeps were identified along the shoreline in this portion of the park. This suggests that any contaminants in contact with groundwater have been flushed out of the soils in the past or are strongly sorbed to site soils and present no threat to surface water. Furthermore, the groundwater is saline and has no potential for use as potable water.

Based on these factors, PTI recommends that impacted soils be managed in place. Future park activities do not call for modifications to the asphalt surface. Any changes to upgradient drainage patterns or park use will incorporate contingences into the plan to protect the managed soils from disturbance, removal, or treatment, as appropriate for future activities. The City of Bremerton intends to conduct additional investigations as part of its park expansion activities. Should a source of TPH be identified during these activities, it will be removed or treated.

If you have any questions regarding the sampling results presented herein, please do not hesitate to contact me at (206) 643-9803.

Sincerely,



Shawn R.T. Severn, Ph.D.  
Senior Scientist

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## **REFERENCES**

PTI. 1996. Personal communication (letter work plan from Shawn Severn to J. Aitkin, Washington Department of Ecology, Bellevue, WA, dated April 11, 1996, regarding sampling for the northern portion of Evergreen Park). PTI Environmental Services, Bellevue, WA.

Ecology. 1995. Model toxics control act cleanup levels and risk calculations. CLARC II update. January 1995.

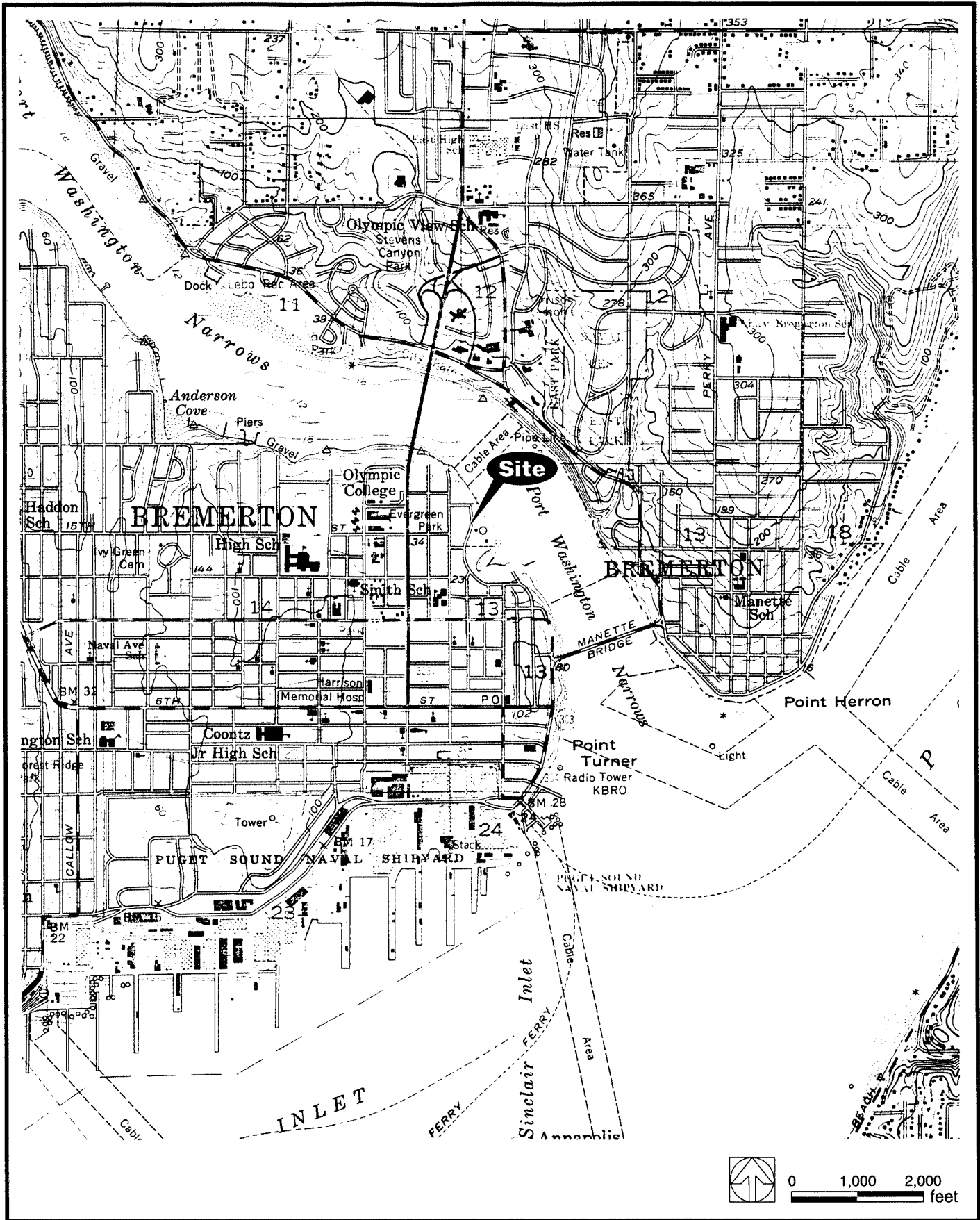


Figure 1. Location of Evergreen Park, Bremerton, Washington.

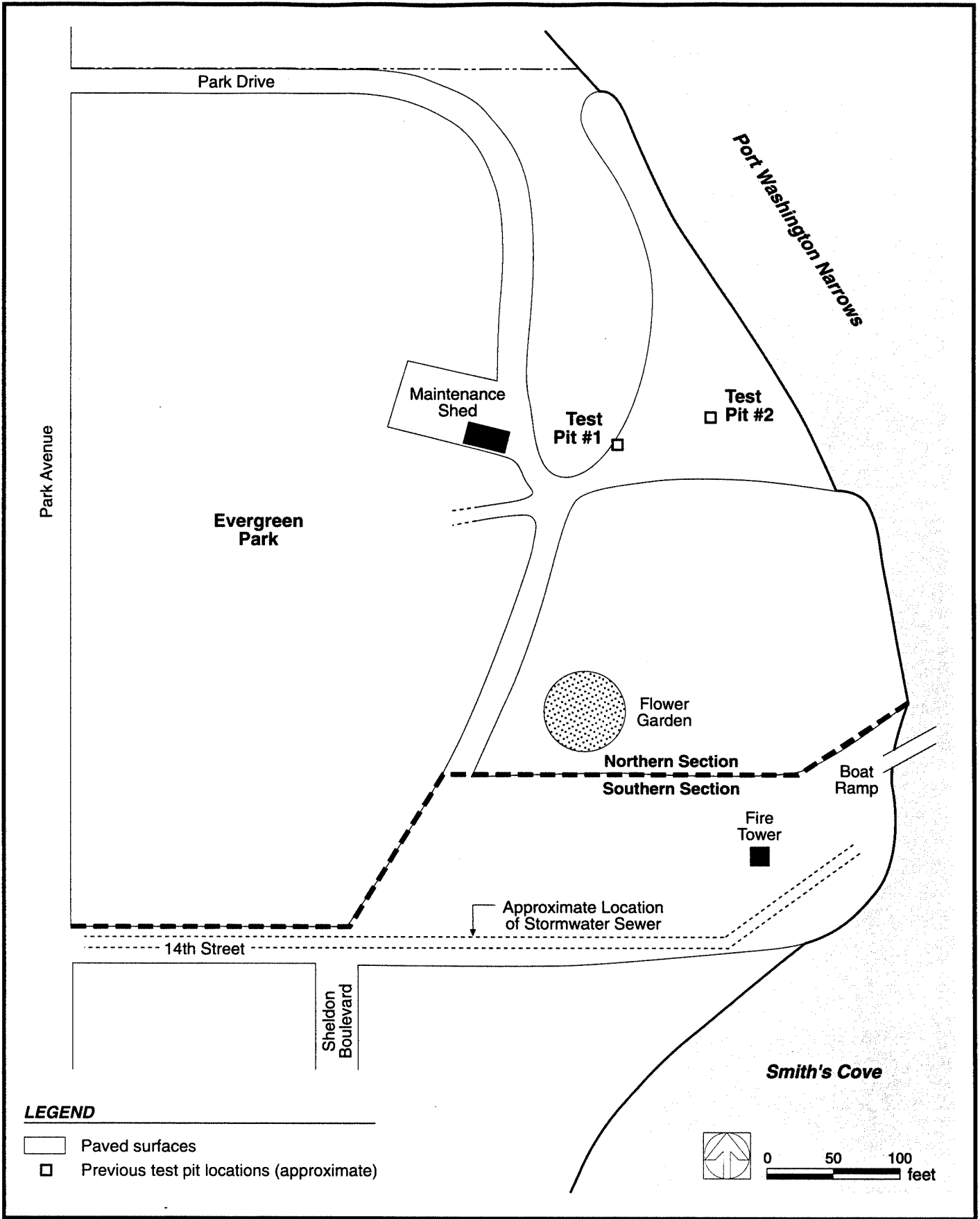


Figure 2. Historical sampling locations.

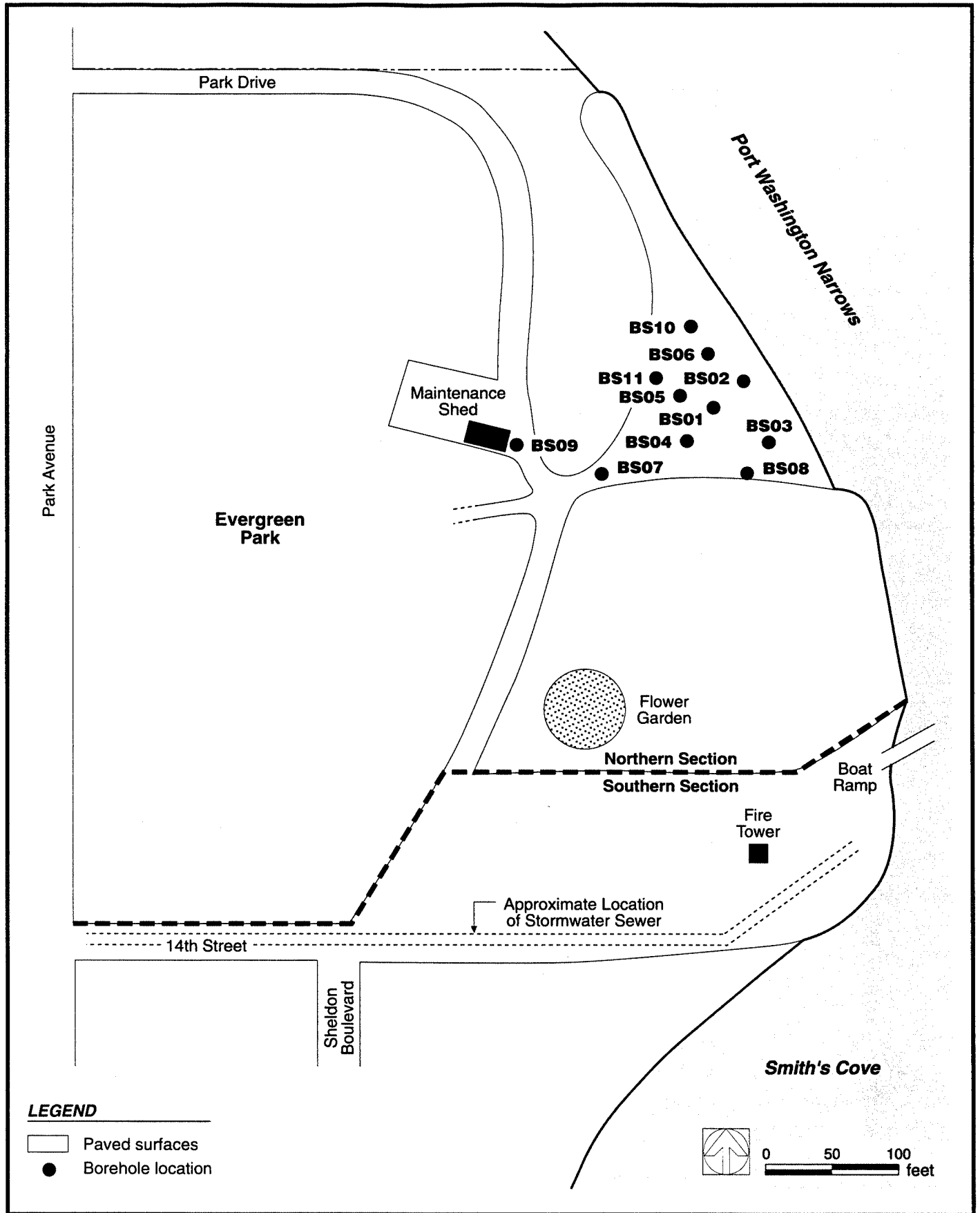
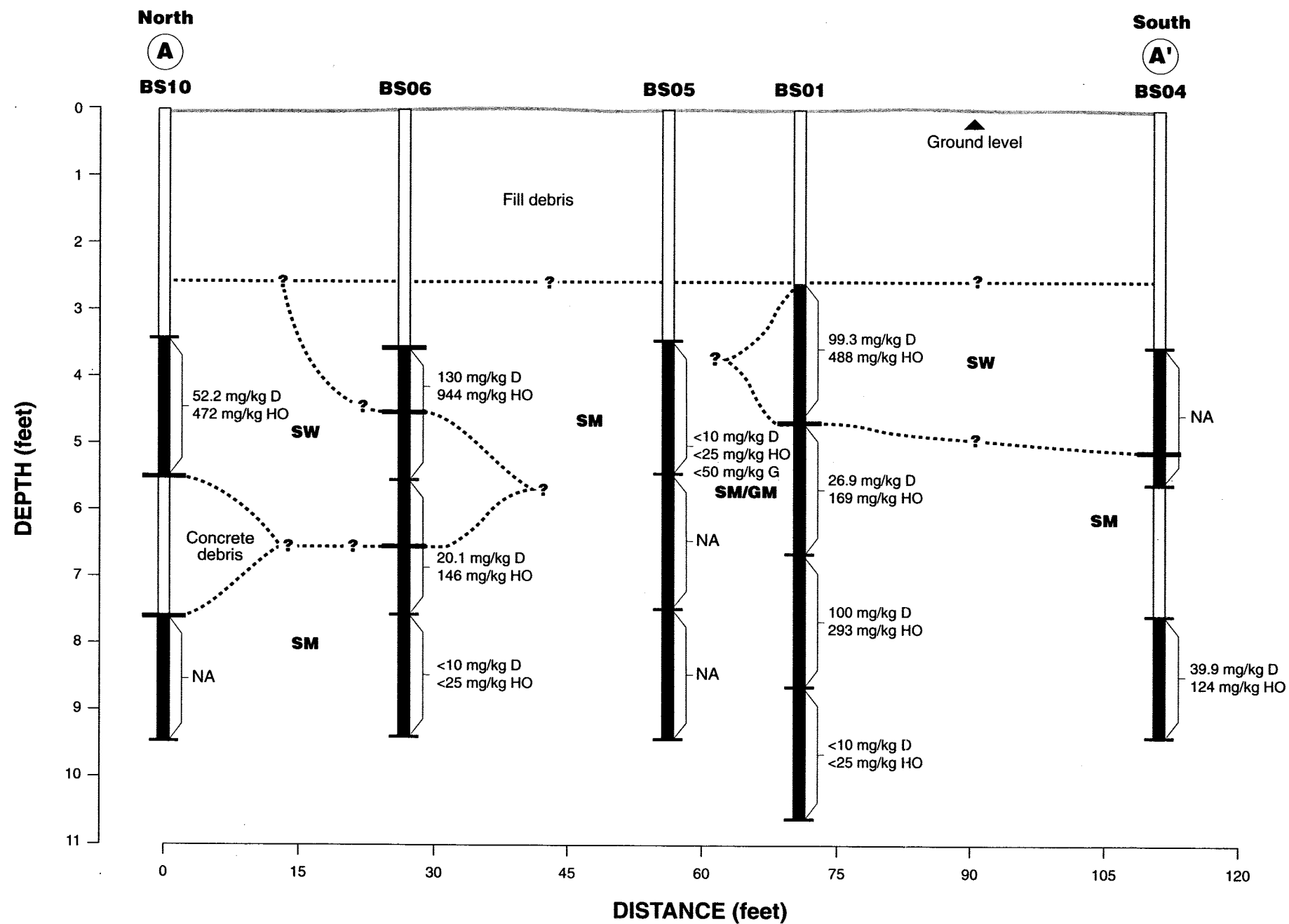


Figure 3. Borehole location map.



**LEGEND**

	Sample recovered or collected
	No sample collected
	Solid contact
	Estimated contact
377 mg/kg	Analytical result
NA	Not analyzed
G	Gasoline
D	Diesel
HO	Heavy oil
<b>SW</b>	Well graded sand
<b>SM</b>	Sand with fines
<b>GM</b>	Gravel with fines
<b>GW</b>	Well graded gravels

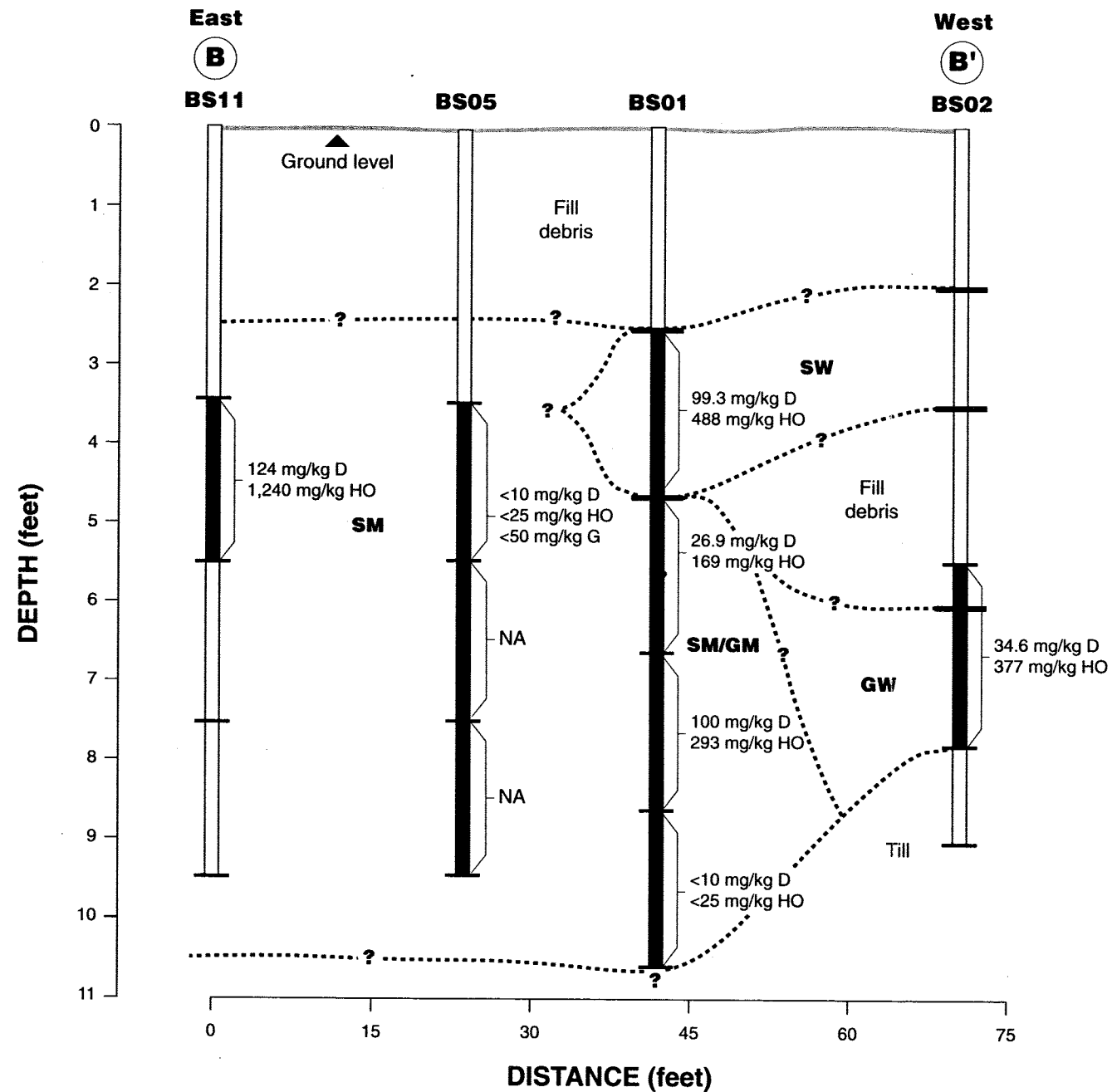
**Notes:**

Groundwater levels fluctuated from 4 to 6 feet below ground surface over an 8-hour tidal cycle.

Horizontal control was not surveyed; however, boreholes were advanced within relatively level asphalt parking lot.

No samples collected from 0 to 2.5 feet due to interference from fill and construction debris (except BS01).

Figure 4. Generalized cross section - north to south (A to A').



- LEGEND**
- Sample recovered or collected
  - No sample collected
  - Solid contact
  - Estimated contact
  - 377 mg/kg Analytical result
  - NA Not analyzed
  - G Gasoline
  - D Diesel
  - HO Heavy oil
  - SW** Well graded sand
  - SM** Sand with fines
  - GM** Gravel with fines
  - GW** Well graded gravels

**Notes:**

Groundwater levels fluctuated from 4 to 6 feet below ground surface over an 8-hour tidal cycle.

Horizontal control was not surveyed; however, boreholes were advanced within relatively level asphalt parking lot.

No samples collected from 0 to 2.5 feet due to interference from fill and construction debris (except BS01).

Figure 5. Generalized cross section - east to west (B to B').

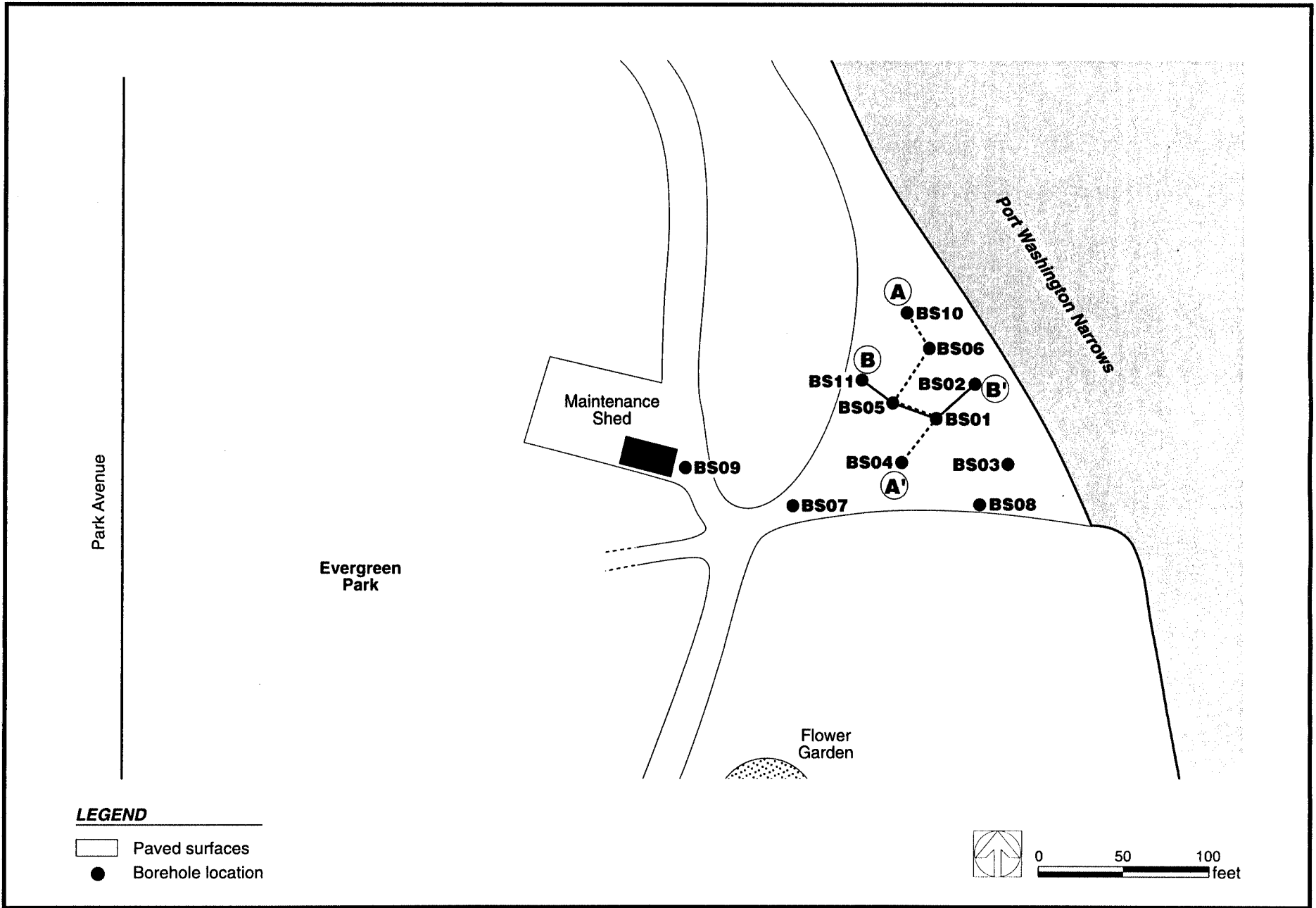


Figure 6. Cross section location.

**TABLE 1. PETROLEUM HYDROCARBON RESULTS - SOIL**

Sample	Collection		WTPH-G/BTEX		Sheen Test	WTPH-D extended	
	Depth (ft)	PID	Gasoline (mg/kg)	BTEX (mg/kg)		Diesel (mg/kg)	Heavy Oil (mg/kg)
BS01-2.5	2.5	7.1	NA	NA	slight	99.3	488
BS01-4.5	4.5	3	NA	NA	none	26.9	169
BS01-6.5	6.5	8.4	NA	NA	slight	100	293
BS01-8.5	8.5	0	NA	NA	none	< 10	< 25
BS02-5.5	5.5	0.5	NA	NA	slight	34.6	377
BS03-3.5	3.5	0	NA	NA	NT	NA	NA
BS03-7.0	7.0	0	NA	NA	slight	515	1200
BS04-3.5	3.5	0	NA	NA	NT	NA	NA
BS04-7.5	7.5	0	NA	NA	none	39.9	124
BS05-5.5	5.5	0	NA	NA	none	NA	NA
BS05-7.5	7.5	0	NA	NA	NT	NA	NA
BS05-3.5	3.5	204	< 5	ND	none	< 10	< 25
BS06-3.5	3.5	0	NA	NA	slight	130	944
BS06-5.5	5.5	0	NA	NA	none	20.1	146
BS06-7.5	7.5	0	NA	NA	none	< 10	< 25
BS07-3.5	3.5	35	< 5	ND	slight	60.1	650
BS07-5.5	5.5	NR	NA	NA	slight	25.6	245
BS07-7.5	7.5	NR	NA	NA	none	< 10	< 25
BS08-3.5	3.5	0	NA	NA	none	44.8	371
BS08-5.5	5.5	0	NA	NA	slight	29.1	220
BS08-7.5	7.5	0	NA	NA	slight	102	336
BS09-3.5	3.5	NR	NA	NA	none	< 10	< 25
BS09-5.5	5.5	NR	NA	NA	none	NA	NA
BS09-7.5	7.5	NR	NA	NA	none	NA	NA
BS10-3.5	3.5	0	NA	NA	none	52.2	472
BS10-7.5	7.5	0	NA	NA	NT	NA	NA
BS11-3.5	3.5	0	NA	NA	slight	124	1240

**Note:** BTEX - Benzene, toluene, ethylbenzene, xylene  
 NA - Not analyzed  
 ND - BTEX concentrations not detected as follows:  
     < .050 mg/kg benzene  
     < .050 mg/kg toluene  
     < .050 mg/kg ethylbenzene  
     < .100 mg/kg xylene  
 NR - No reading  
 NT - Not tested  
 PID - Photoionization detector

**TABLE 2. POLYNUCLEAR AROMATIC  
HYDROCARBON RESULTS - SOIL**

Sample	Method GC/MS SIM	
	BS01-2.5 (mg/kg)	BS03-7.0 (mg/kg)
Acenaphthene	< 0.0100	0.0193
Acenphthylene	< 0.0100	0.0655
Anthracene	< 0.0100	0.0352
Benzo(a)anthracene	< 0.0100	0.174
Benzo(a)pyrene	< 0.0500	0.116
Benzo(b)fluoranthene	< 0.0500	0.0732
Benzo(g,h,i)perylene	< 0.0500	0.085
Benzo(k)fluoranthene	< 0.0500	0.0687
Chrysene	0.0248	0.296
Dibenzo(a,h)anthracene	< 0.0500	< 0.0500
Fluoranthene	0.0149	0.169
Fluorene	< 0.0100	< 0.0100
Indeno(1,2,3-cd)pyrene	< 0.0500	0.0586
Naphthalene	< 0.0100	< 0.0100
Phenanthrene	0.0156	0.12
Pyrene	0.0223	0.414

**TABLE 3. METALS RESULTS - SOIL**

Sample	MTCA Method A Cleanup Level	EPA Methods 6010/7000	
		BS01-2.5 (mg/kg)	BS03-7.0 (mg/kg)
Arsenic	20	< 10.0	< 10.0
Cadmium	2	< 2.5	< 2.5
Chromium	100	39.4	24.7
Lead	250	41	16.5
Mercury	1	< 0.0500	< 0.0500

**TABLE 4. PETROLEUM HYDROCARBON  
RESULTS - GROUNDWATER**

Sample	WTPH-G/BTEX		WTPH-D extended	
	Gasoline (mg/l)	BTEX ( $\mu$ g/l)	Diesel (mg/l)	Heavy Oil (mg/l)
BS01-W	< .050	ND	< .250	< .750
BS07-W	< .050	ND	< .250	< .750

**Note:** BTEX - Benzene, toluene, ethylbenzene, xylene  
 ND - BTEX concentrations not detected as follows:  
     < .50  $\mu$ g/l benzene  
     < .50  $\mu$ g/l toluene  
     < .50  $\mu$ g/l ethylbenzene  
     < 1.0  $\mu$ g/l xylene

**Attachment A**

**North Creek Analytical  
Laboratory Reports**



PTI Environmental Services  
15375 SE 30th Place, Ste 250  
Bellevue, WA 98007

Project: Evergreen Park  
Project Number: CA5Q-0603  
Project Manager: Sherrill Doran

Sampled: 5/6/96  
Received: 5/7/96  
Reported: 6/7/96

**Polynuclear Aromatic Compounds by GC/MS with Selected Ion Monitoring**

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Note
<b>BS01-2.5/99701</b>				<b>B605109-15</b>		<b>Soil, dry wt.</b>		<b>1</b>
Acenaphthene	6050386	5/17/96	6/6/96		0.0100	ND	mg/kg (ppm)	
Acenaphthylene	6050386	5/17/96	6/6/96		0.0100	ND	mg/kg (ppm)	
Anthracene	6050386	5/17/96	6/6/96		0.0100	ND	mg/kg (ppm)	
Benzo (a) anthracene	6050386	5/17/96	6/6/96		0.0100	ND	mg/kg (ppm)	
Benzo (a) pyrene	6050386	5/17/96	6/6/96		0.0500	ND	mg/kg (ppm)	
Benzo (b) fluoranthene	6050386	5/17/96	6/6/96		0.0500	ND	mg/kg (ppm)	
Benzo (ghi) perylene	6050386	5/17/96	6/6/96		0.0500	ND	mg/kg (ppm)	
Benzo (k) fluoranthene	6050386	5/17/96	6/6/96		0.0500	ND	mg/kg (ppm)	
Chrysene	6050386	5/17/96	6/6/96		0.0100	<b>0.0248</b>	mg/kg (ppm)	
Dibenzo (a,h) anthracene	6050386	5/17/96	6/6/96		0.0500	ND	mg/kg (ppm)	
Fluoranthene	6050386	5/17/96	6/6/96		0.0100	<b>0.0149</b>	mg/kg (ppm)	
Fluorene	6050386	5/17/96	6/6/96		0.0100	ND	mg/kg (ppm)	
Indeno (1,2,3-cd) pyrene	6050386	5/17/96	6/6/96		0.0500	ND	mg/kg (ppm)	
Naphthalene	6050386	5/17/96	6/6/96		0.0100	ND	mg/kg (ppm)	
Phenanthrene	6050386	5/17/96	6/6/96		0.0100	<b>0.0156</b>	mg/kg (ppm)	
Pyrene	6050386	5/17/96	6/6/96		0.0100	<b>0.0223</b>	mg/kg (ppm)	
Surrogate: 2-FBP	6050386	5/17/96	6/6/96	37.0-149		81.4	%	
Surrogate: Nitrobenzene-d5	6050386	5/17/96	6/6/96	20.0-108		109	%	
Surrogate: p-Terphenyl-d14	6050386	5/17/96	6/6/96	34.0-143		51.1	%	
<b>BS03-7.0/99714</b>				<b>B605109-21</b>		<b>Soil, dry wt.</b>		<b>1</b>
Acenaphthene	6050386	5/17/96	6/6/96		0.0100	<b>0.0193</b>	mg/kg (ppm)	
Acenaphthylene	6050386	5/17/96	6/6/96		0.0100	<b>0.0655</b>	mg/kg (ppm)	
Anthracene	6050386	5/17/96	6/6/96		0.0100	<b>0.0352</b>	mg/kg (ppm)	
Benzo (a) anthracene	6050386	5/17/96	6/6/96		0.0100	<b>0.174</b>	mg/kg (ppm)	
Benzo (a) pyrene	6050386	5/17/96	6/6/96		0.0500	<b>0.116</b>	mg/kg (ppm)	
Benzo (b) fluoranthene	6050386	5/17/96	6/6/96		0.0500	<b>0.0732</b>	mg/kg (ppm)	
Benzo (ghi) perylene	6050386	5/17/96	6/6/96		0.0500	<b>0.0850</b>	mg/kg (ppm)	
Benzo (k) fluoranthene	6050386	5/17/96	6/6/96		0.0500	<b>0.0687</b>	mg/kg (ppm)	
Chrysene	6050386	5/17/96	6/6/96		0.0100	<b>0.296</b>	mg/kg (ppm)	
Dibenzo (a,h) anthracene	6050386	5/17/96	6/6/96		0.0500	ND	mg/kg (ppm)	
Fluoranthene	6050386	5/17/96	6/6/96		0.0100	<b>0.169</b>	mg/kg (ppm)	
Fluorene	6050386	5/17/96	6/6/96		0.0100	ND	mg/kg (ppm)	
Indeno (1,2,3-cd) pyrene	6050386	5/17/96	6/6/96		0.0500	<b>0.0586</b>	mg/kg (ppm)	
Naphthalene	6050386	5/17/96	6/6/96		0.0100	ND	mg/kg (ppm)	
Phenanthrene	6050386	5/17/96	6/6/96		0.0100	<b>0.120</b>	mg/kg (ppm)	
Pyrene	6050386	5/17/96	6/6/96		0.0100	<b>0.414</b>	mg/kg (ppm)	
Surrogate: 2-FBP	6050386	5/17/96	6/6/96	37.0-149		87.6	%	
Surrogate: Nitrobenzene-d5	6050386	5/17/96	6/6/96	20.0-108		111	%	

North Creek Analytical, Inc.

\*Refer to end of report for text of notes.

*Jack R. Cooper*  
Shannon J Stowell, Project Manager



# NORTH CREEK ANALYTICAL

Environmental Laboratory Services

BOTHELL ■ (206) 481-9200 ■ FAX 485-2992  
 SPOKANE ■ (509) 924-9200 ■ FAX 924-9290  
 PORTLAND ■ (503) 643-9200 ■ FAX 644-2202

PTI Environmental Services 15375 SE 30th Place, Ste 250 Bellevue, WA 98007	Project: Evergreen Park Project Number: CASQ-0603 Project Manager: Sherrill Doran	Sampled: 5/6/96 Received: 5/7/96 Reported: 6/7/96
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## Diesel Hydrocarbons (C12-C24) and Heavy Oil (C24-C40) by WTPH-D (extended)

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Note
<b><u>BS07-3.5/99729 (continued)</u></b>				<b><u>B605109-30</u></b>		<b><u>Soil, dry wt.</u></b>		
Surrogate: 2-FBP	6050177	5/10/96	5/14/96	50.0-150		70.3	%	
<b><u>BS07-5.5/99730</u></b>				<b><u>B605109-31</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050363	5/17/96	5/20/96		10.0	25.6	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050363	5/17/96	5/20/96		25.0	245	mg/kg (ppm)	
Surrogate: 2-FBP	6050363	5/17/96	5/20/96	50.0-150		78.6	%	
<b><u>BS07-7.5/99731</u></b>				<b><u>B605109-32</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050363	5/17/96	5/20/96		10.0	ND	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050363	5/17/96	5/20/96		25.0	ND	mg/kg (ppm)	
Surrogate: 2-FBP	6050363	5/17/96	5/20/96	50.0-150		75.0	%	
<b><u>BS08-3.5/99726</u></b>				<b><u>B605109-33</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050363	5/17/96	5/20/96		10.0	44.8	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050363	5/17/96	5/20/96		25.0	371	mg/kg (ppm)	
Surrogate: 2-FBP	6050363	5/17/96	5/20/96	50.0-150		77.7	%	
<b><u>BS08-5.5/99727</u></b>				<b><u>B605109-34</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050363	5/17/96	5/20/96		10.0	29.1	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050363	5/17/96	5/20/96		25.0	220	mg/kg (ppm)	
Surrogate: 2-FBP	6050363	5/17/96	5/20/96	50.0-150		74.7	%	
<b><u>BS08-7.5/99728</u></b>				<b><u>B605109-35</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050363	5/17/96	5/20/96		10.0	102	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050363	5/17/96	5/20/96		25.0	336	mg/kg (ppm)	
Surrogate: 2-FBP	6050363	5/17/96	5/20/96	50.0-150		75.0	%	
<b><u>BS09-3.5/99732</u></b>				<b><u>B605109-36</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050115	5/8/96	5/9/96		10.0	ND	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050115	5/8/96	5/9/96		25.0	ND	mg/kg (ppm)	
Surrogate: 2-FBP	6050115	5/8/96	5/9/96	50.0-150		77.8	%	

  
 Shannon J Stowell, Project Manager



PTI Environmental Services 15375 SE 30th Place, Ste 250 Bellevue, WA 98007	Project: Evergreen Park Project Number: CA5Q-0603 Project Manager: Sherrill Doran	Sampled: 5/6/96 Received: 5/7/96 Reported: 6/7/96
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**Diesel Hydrocarbons (C12-C24) and Heavy Oil (C24-C40) by WTPH-D (extended)**

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Not.
<b><u>BS02-5.5/99712</u></b>				<b><u>B605109-19</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050115	5/8/96	5/14/96		20.0	34.6	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050115	5/8/96	5/14/96		50.0	377	mg/kg (ppm)	
Surrogate: 2-FBP	6050115	5/8/96	5/14/96	50.0-150		67.5	%	
<b><u>BS03-7.0/99714</u></b>				<b><u>B605109-21</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050115	5/8/96	5/14/96		50.0	515	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050115	5/8/96	5/14/96		125	1200	mg/kg (ppm)	
Surrogate: Octacosane	6050115	5/8/96	5/14/96	50.0-150		80.3	%	2
Surrogate: 2-FBP	6050115	5/8/96	5/14/96	50.0-150		27.7	%	1
<b><u>BS04-7.5/99716</u></b>				<b><u>B605109-23</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050158	5/9/96	5/13/96		10.0	39.9	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050158	5/9/96	5/13/96		25.0	124	mg/kg (ppm)	
Surrogate: Octacosane	6050158	5/9/96	5/13/96	50.0-150		75.6	%	
Surrogate: 2-FBP	6050158	5/9/96	5/13/96	50.0-150		65.4	%	
<b><u>BS05-3.5/99717</u></b>				<b><u>B605109-24</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050115	5/8/96	5/9/96		10.0	ND	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050115	5/8/96	5/9/96		25.0	ND	mg/kg (ppm)	
Surrogate: 2-FBP	6050115	5/8/96	5/9/96	50.0-150		88.6	%	
<b><u>BS06-3.5/99720</u></b>				<b><u>B605109-27</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050363	5/17/96	5/19/96		50.0	130	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050363	5/17/96	5/19/96		125	944	mg/kg (ppm)	
Surrogate: 2-FBP	6050363	5/17/96	5/19/96	50.0-150		66.1	%	
<b><u>BS06-5.5/99721</u></b>				<b><u>B605109-28</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050363	5/17/96	5/19/96		10.0	20.1	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050363	5/17/96	5/19/96		25.0	146	mg/kg (ppm)	
Surrogate: 2-FBP	6050363	5/17/96	5/19/96	50.0-150		75.2	%	
<b><u>BS06-7.5/99722</u></b>				<b><u>B605109-29</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050363	5/17/96	5/20/96		10.0	ND	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050363	5/17/96	5/20/96		25.0	ND	mg/kg (ppm)	
Surrogate: 2-FBP	6050363	5/17/96	5/20/96	50.0-150		70.6	%	
<b><u>BS07-3.5/99729</u></b>				<b><u>B605109-30</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050177	5/10/96	5/14/96		50.0	60.1	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050177	5/10/96	5/14/96		125	650	mg/kg (ppm)	

North Creek Analytical, Inc.

\*Refer to end of report for text of no

for   
Shannon J Stowell, Project Manager



PTI Environmental Services  
15375 SE 30th Place, Ste 250  
Bellevue, WA 98007

Project: Evergreen Park  
Project Number: CA5Q-0603  
Project Manager: Sherrill Doran

Sampled: 5/6/96  
Received: 5/7/96  
Reported: 6/7/96

**Diesel Hydrocarbons (C12-C24) and Heavy Oil (C24-C40) by WTPH-D (extended)**

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes
<b><u>BS10-3.5/99724</u></b>				<b><u>B605109-01</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050363	5/17/96	5/19/96		20.0	52.2	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050363	5/17/96	5/19/96		50.0	472	mg/kg (ppm)	
Surrogate: 2-FBP	6050363	5/17/96	5/19/96	50.0-150		64.2	%	
<b><u>BS11-3.5/99740</u></b>				<b><u>B605109-03</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050363	5/17/96	5/19/96		50.0	124	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050363	5/17/96	5/19/96		125	1240	mg/kg (ppm)	
Surrogate: 2-FBP	6050363	5/17/96	5/19/96	50.0-150		61.8	%	
<b><u>BS01-W/99707</u></b>				<b><u>B605109-05</u></b>		<b><u>Water</u></b>		
Diesel Range Hydrocarbons	6050111	5/7/96	5/9/96		0.250	ND	mg/l (ppm)	
Heavy Oil Range Hydrocarbons	6050111	5/7/96	5/9/96		0.750	ND	mg/l (ppm)	
Surrogate: Octacosane	6050111	5/7/96	5/9/96	50.0-150		29.9	%	1
Surrogate: 2-FBP	6050111	5/7/96	5/9/96	50.0-150		19.2	%	1
<b><u>BS07-W/99738</u></b>				<b><u>B605109-10</u></b>		<b><u>Water</u></b>		
Diesel Range Hydrocarbons	6050198	5/10/96	5/14/96		0.250	0.676	mg/l (ppm)	
Heavy Oil Range Hydrocarbons	6050198	5/10/96	5/14/96		0.750	2.87	mg/l (ppm)	
Surrogate: 2-FBP	6050198	5/10/96	5/14/96	50.0-150		82.1	%	
<b><u>BS01-2.5/99701</u></b>				<b><u>B605109-15</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050115	5/8/96	5/14/96		50.0	99.3	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050115	5/8/96	5/14/96		125	488	mg/kg (ppm)	
Surrogate: 2-FBP	6050115	5/8/96	5/14/96	50.0-150		62.5	%	
<b><u>BS01-4.5/99702</u></b>				<b><u>B605109-16</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050115	5/8/96	5/10/96		10.0	26.9	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050115	5/8/96	5/10/96		25.0	169	mg/kg (ppm)	
Surrogate: 2-FBP	6050115	5/8/96	5/10/96	50.0-150		73.5	%	
<b><u>BS01-6.5/99703</u></b>				<b><u>B605109-17</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050115	5/8/96	5/14/96		20.0	100	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050115	5/8/96	5/14/96		50.0	293	mg/kg (ppm)	
Surrogate: 2-FBP	6050115	5/8/96	5/14/96	50.0-150		62.4	%	
<b><u>BS01-8.5/99704</u></b>				<b><u>B605109-18</u></b>		<b><u>Soil, dry wt.</u></b>		
Diesel Range Hydrocarbons	6050363	5/17/96	5/19/96		10.0	ND	mg/kg (ppm)	
Heavy Oil Range Hydrocarbons	6050363	5/17/96	5/19/96		25.0	ND	mg/kg (ppm)	
Surrogate: 2-FBP	6050363	5/17/96	5/19/96	50.0-150		75.2	%	

for   
Shannon J Stowell, Project Manager



PTI Environmental Services  
15375 SE 30th Place, Ste 250  
Bellevue, WA 98007

Project: Evergreen Park  
Project Number: CA5Q-0603  
Project Manager: Sherrill Doran

Sampled: 5/6/96  
Received: 5/7/96  
Reported: 6/7/96

**Gasoline Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8020A**

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Note
<b>BS01-W/99709</b>				<b>B605109-07</b>		<b>Water</b>		
Gasoline Range Hydrocarbons	6050132	5/8/96	5/8/96		50.0	ND	ug/l (ppb)	
Benzene	6050132	5/8/96	5/8/96		0.500	ND	ug/l (ppb)	
Toluene	6050132	5/8/96	5/8/96		0.500	ND	ug/l (ppb)	
Ethylbenzene	6050132	5/8/96	5/8/96		0.500	ND	ug/l (ppb)	
Xylenes (total)	6050132	5/8/96	5/8/96		1.00	ND	ug/l (ppb)	
Surrogate: 4-BFB (FID)	6050132	5/8/96	5/8/96	50.0-150		88.1	%	
Surrogate: 4-BFB (PID)	6050132	5/8/96	5/8/96	53.0-136		88.1	%	
<b>BS07-W/99738</b>				<b>B605109-10</b>		<b>Water</b>		
Gasoline Range Hydrocarbons	6050190	5/13/96	5/13/96		50.0	ND	ug/l (ppb)	
Benzene	6050190	5/13/96	5/13/96		0.500	ND	ug/l (ppb)	
Toluene	6050190	5/13/96	5/13/96		0.500	ND	ug/l (ppb)	
Ethylbenzene	6050190	5/13/96	5/13/96		0.500	ND	ug/l (ppb)	
Xylenes (total)	6050190	5/13/96	5/13/96		1.00	ND	ug/l (ppb)	
Surrogate: 4-BFB (FID)	6050190	5/13/96	5/13/96	50.0-150		96.9	%	
Surrogate: 4-BFB (PID)	6050190	5/13/96	5/13/96	53.0-136		95.0	%	
<b>BS05-3.5/99717</b>				<b>B605109-24</b>		<b>Soil, dry wt.</b>		
Gasoline Range Hydrocarbons	6050184	5/9/96	5/9/96		5.00	ND	mg/kg (ppm)	
Benzene	6050184	5/9/96	5/9/96		0.0500	ND	mg/kg (ppm)	
Toluene	6050184	5/9/96	5/9/96		0.0500	ND	mg/kg (ppm)	
Ethylbenzene	6050184	5/9/96	5/9/96		0.0500	ND	mg/kg (ppm)	
Xylenes (total)	6050184	5/9/96	5/9/96		0.100	ND	mg/kg (ppm)	
Surrogate: 4-BFB (FID)	6050184	5/9/96	5/9/96	50.0-150		97.9	%	
Surrogate: 4-BFB (PID)	6050184	5/9/96	5/9/96	49.0-142		85.1	%	
<b>BS07-3.5/99729</b>				<b>B605109-30</b>		<b>Soil, dry wt.</b>		
Gasoline Range Hydrocarbons	6050183	5/10/96	5/10/96		5.00	ND	mg/kg (ppm)	
Benzene	6050183	5/10/96	5/10/96		0.0500	ND	mg/kg (ppm)	
Toluene	6050183	5/10/96	5/10/96		0.0500	ND	mg/kg (ppm)	
Ethylbenzene	6050183	5/10/96	5/10/96		0.0500	ND	mg/kg (ppm)	
Xylenes (total)	6050183	5/10/96	5/10/96		0.100	ND	mg/kg (ppm)	
Surrogate: 4-BFB (FID)	6050183	5/10/96	5/10/96	50.0-150		82.3	%	
Surrogate: 4-BFB (PID)	6050183	5/10/96	5/10/96	49.0-142		97.3	%	

*Jack R. Cooper*  
Shannon J Stowell, Project Manager



**NORTH  
CREEK  
ANALYTICAL**  
Environmental Laboratory Services

BOTHELL ■ (206) 481-9200 ■ FAX 485-2992  
SPOKANE ■ (509) 924-9200 ■ FAX 924-9290  
PORTLAND ■ (503) 643-9200 ■ FAX 644-2202

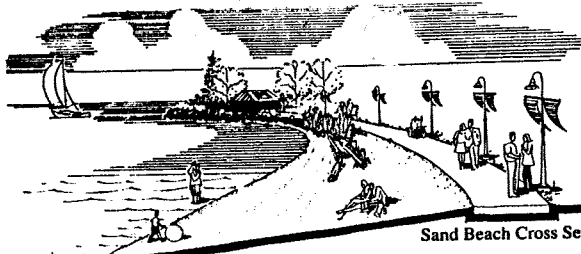
PTI Environmental Services 15375 SE 30th Place, Ste 250 Bellevue, WA 98007	Project: Evergreen Park Project Number: CASQ-0603 Project Manager: Sherrill Doran	Sampled: 5/6/96 Received: 5/7/96 Reported: 6/4/96
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**Metals by EPA 6010/7000 Series Methods**

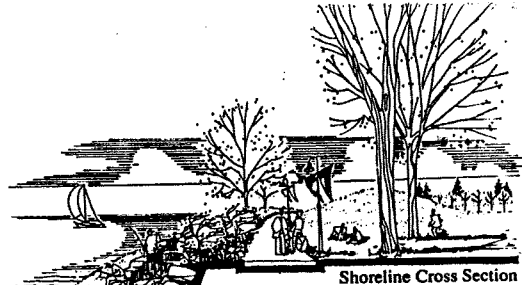
Analyte	Batch Number	Date Prepared	Date Analyzed	Specific Method	Reporting Limit	Result	Units	Note
<b><u>BS01-2.5/99701</u></b>				<b><u>B605109-15</u></b>		<b><u>Soil, dry wt.</u></b>		
Arsenic	6060044	5/29/96	6/4/96	EPA 6010A	10.0	ND	mg/kg (ppm)	
Cadmium	6050639	5/28/96	5/29/96	EPA 7130	2.50	ND	mg/kg (ppm)	
Chromium	6050639	5/28/96	5/28/96	EPA 7190	10.0	<b>39.4</b>	mg/kg (ppm)	
Lead	6050639	5/28/96	5/29/96	EPA 7420	10.0	<b>41.0</b>	mg/kg (ppm)	
Mercury	6050436	5/20/96	5/21/96	EPA 7471A	0.0500	ND	mg/kg (ppm)	
<b><u>BS03-7.0/99714</u></b>				<b><u>B605109-21</u></b>		<b><u>Soil, dry wt.</u></b>		
Arsenic	6060044	5/29/96	6/4/96	EPA 6010A	10.0	ND	mg/kg (ppm)	
Cadmium	6050639	5/28/96	5/29/96	EPA 7130	2.50	ND	mg/kg (ppm)	
Chromium	6050639	5/28/96	5/28/96	EPA 7190	10.0	<b>24.7</b>	mg/kg (ppm)	
Lead	6050639	5/28/96	5/29/96	EPA 7420	10.0	<b>16.5</b>	mg/kg (ppm)	
Mercury	6050436	5/20/96	5/21/96	EPA 7471A	0.0500	ND	mg/kg (ppm)	

*Shannon J Stowell*  
for Shannon J Stowell, Project Manager





Sand Beach Cross Section

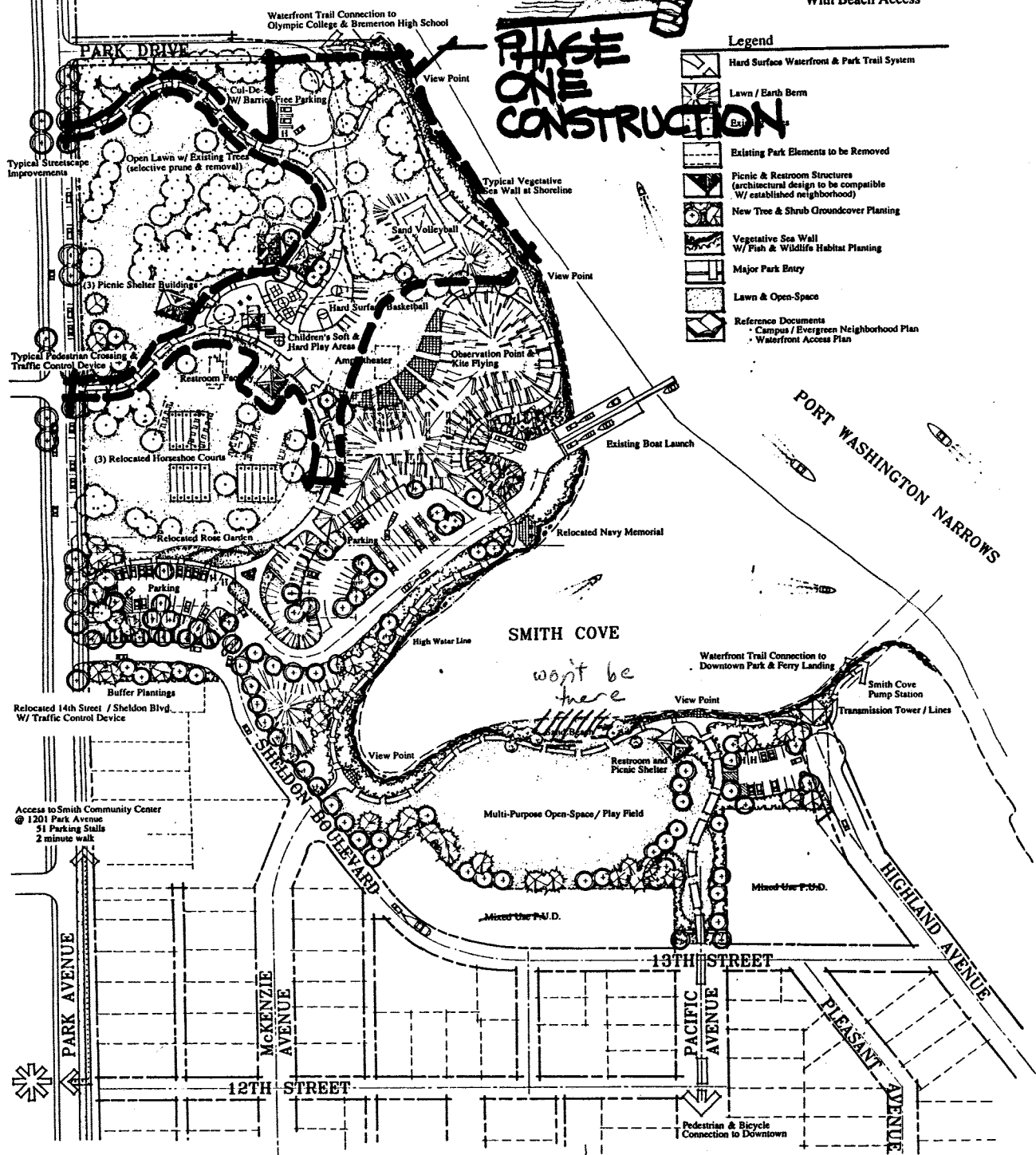


Shoreline Cross Section With Beach Access

**PHASE ONE CONSTRUCTION**

**Legend**

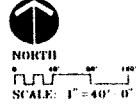
- Hard Surface Waterfront & Park Trail System
- Lawn / Earth Berm
- Existing Park Elements to be Removed
- Picnic & Restroom Structures (architectural design to be compatible w/ established neighborhood)
- New Tree & Shrub Groundcover Planting
- Vegetative Sea Wall w/ Fish & Wildlife Habitat Planting
- Major Park Entry
- Lawn & Open-Space
- Reference Documents
  - Campus / Evergreen Neighborhood Plan
  - Waterfront Access Plan



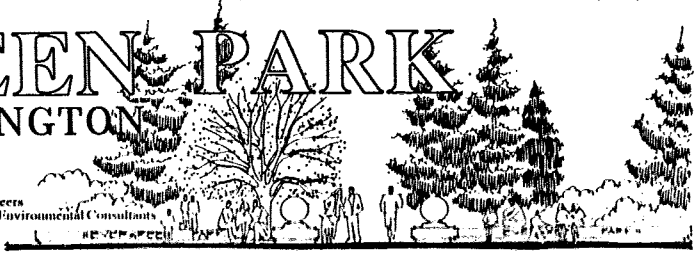
# EVERGREEN PARK

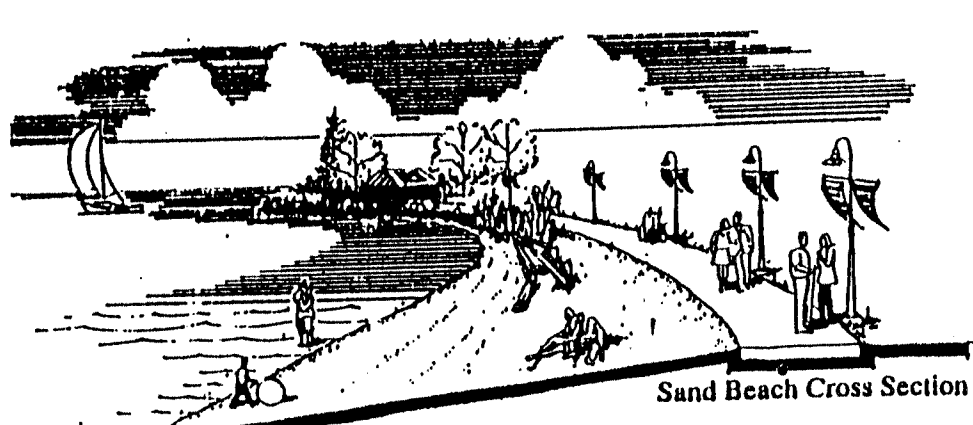
## BREMERTON, WASHINGTON

Hough Book & Baird Inc.  
 1201 Park Avenue  
 Bremerton, WA 98311  
 Phone: 360-835-1111

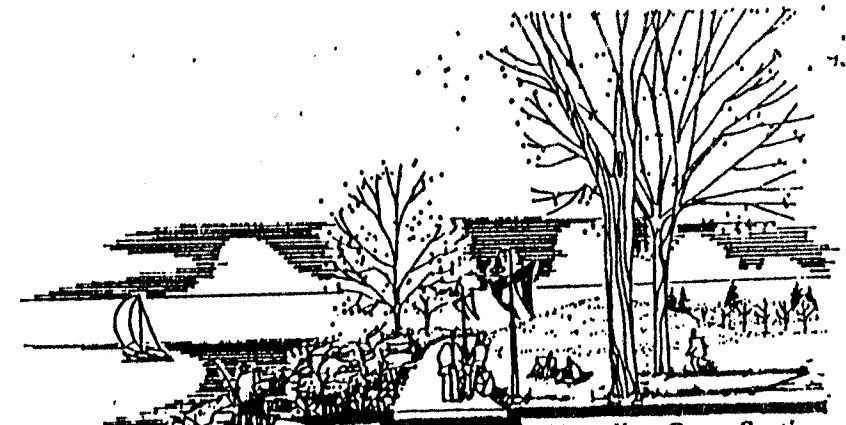


Consultants:  
 KPFF Consulting Engineers  
 Fish Pro Engineers and Environmental Consultants  
 Date: April 7, 1995

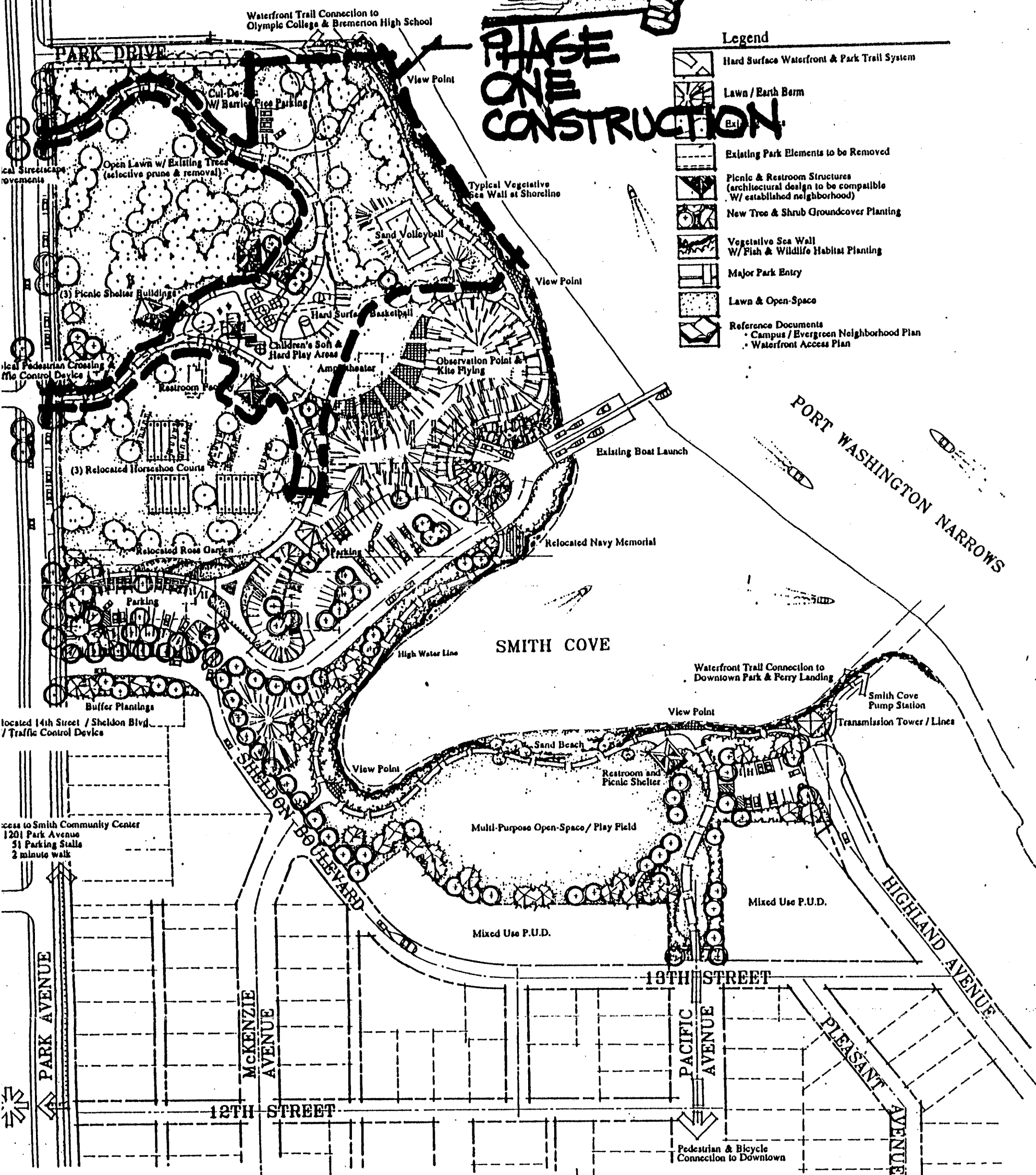




Sand Beach Cross Section



Shoreline Cross Section With Beach Access



# EVERGREEN PARK

## BREMERTON, WASHINGTON

Hough Beck & Baird Inc.  
 LANDSCAPE ARCHITECTURE  
 Planning  
 Design  
 Construction

**NORTH**

0 50' 100'

SCALE: 1" = 40'-0"

Consultants:  
 KPFF Consulting Engineers  
 Fish Pro Engineers and Environmental Consultants

Date: April 7, 1995

