

Revised by Ecology 12/6/96

**INDEPENDENT REMEDIAL ACTION REPORT
PARK 90/5 OFFICE PARK
SEATTLE, WASHINGTON**

Prepared for:
**Sabey Corporation and
The City of Seattle**

Dalton, Olmsted & Fuglevand, Inc. *Environmental Consultants*

December 1996



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EXECUTIVE SUMMARY

Current Uses: The Park 90/5 Office Park is approximately 10 acres and is located at 2203 Airport Way South in southern Seattle, Washington. Facilities on the site include five buildings used for office and warehouse space, biotechnology laboratories, coffee roasting, a doctors office and communications businesses. The areas surrounding the buildings are asphalt-paved parking lots.

Historical Uses: The site was originally part of the tide lands near the mouth of the Duwamish River that were filled near the turn of the century. Between the early 1900's and early 1980's, the site was used for meat packing purposes. Facilities that existed on the site prior to the mid-1980's included stock pens, killing rooms, rendering tanks, sausage factory, smokehouse, lard room, tank shed (containing rendering products such as tallow), saw shed, machine shop, engine and boiler rooms, oil house, steam plant, paint shop, and offices.

* In the mid-1980's the meat packing facilities were demolished except for the former slaughterhouse (Building A). Building A was remodeled in 1985 and the other four buildings (B to E) were constructed between 1985 and 1987.

During the historical review, it was found that five underground storage tanks (USTs) have existed on the property. Four of the tanks were associated with the meat packing facilities and were reportedly removed during site demolition and redevelopment. No tank removal data on the condition of the tanks or tank backfill was found to assess whether leakage had occurred, however oily materials were encountered during geotechnical investigations (in 1984) near the reported location of one of the tanks. The fifth UST, a waste oil tank used by a property tenant, was removed in 1994 in accordance with Washington State UST regulations.

Hydrogeology: Subsurface materials beneath the site consist of 10 to 18 feet of fill composed of sandy silts, silty sands, gravelly sands and sandy gravels with brick and slag-like fragments, concrete rubble and metal debris that overlie finer grained tidal flat deposits, 5 to 15 feet in thickness. The tidal flat deposits are generally underlain by very fine to fine sands to a depth of 70 feet.

The water table lies within the fill deposits at depths of between 6 to 10 feet. Water level elevations measured in July and October 1996 indicate that ground water flow within the fill deposits is in an easterly direction. However, regionally, ground water flows in a westerly direction towards the East Waterway.

Site Characterization: Based on historical information, soil and ground-water quality testing was completed to further assess the environmental conditions beneath the site. This testing included the drilling and sampling of 11 soil probes and 4 monitoring wells. Analyses were

made for petroleum hydrocarbons and metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver).

Comparison of soil and ground-water quality data with potential cleanup levels indicates that petroleum hydrocarbons, chromium and arsenic are of potential concern at the Park 90/5 Office Park. Soil data was compared to Method A (where available) and Method C industrial site cleanup levels under the Model Toxics Control Act (MTCA). This comparison indicated that diesel range or heavy-oil range hydrocarbons exceeded the MTCA cleanup level of 200 mg/kg at three locations. A concentration of over 20,000 mg/kg of diesel range hydrocarbons was measured at location P-2, and over 10,000 mg/kg of heavy-oil hydrocarbons were measured at locations P-4 and P-5.

Soil analyses for metals indicated that the analyzed constituents were below MTCA cleanup levels except for chromium. Chromium was measured at a concentration of 990 mg/kg at location P-3 which exceeds the MTCA industrial cleanup level of 500 mg/kg.

Cleanup levels for ground water were based on Washington State Surface Water Quality Standards (Chapter 173-201A WAC), where available, and on MTCA Method A or Method B cleanup levels when surface water cleanup levels were not available. Petroleum hydrocarbons and metals meet the potential cleanup levels except at location P-2 (petroleum hydrocarbons) and P-8 (arsenic). At P-2 the relatively high concentration of diesel range hydrocarbons (219 mg/l) is attributed to free product being entrained in the sample sent to the laboratory.

At location P-8, a total arsenic concentration of 0.051 mg/l was measured which exceeds the ground-water cleanup level of 0.036 mg/l. However, the available data suggest that the source of arsenic in ground water is "background" concentration arsenic in soil that is being leached in low concentrations because of the geochemical conditions in ground water. Arsenic concentrations in soil beneath the site are typical for the Puget Sound region based on work published by Ecology. Low dissolved oxygen concentrations were measured in ground water samples. Arsenic is relatively soluble in low oxygen (reducing) ground water conditions.

Remedial Actions: A cleanup plan to remediate petroleum containing soils was developed and implemented at three locations (P2, P4 and P5). Remediation consisted of excavating (to a practical extent) and disposing of soils off-site that exceeded cleanup levels. Remedial actions were not completed at location P-3 where chromium was detected above cleanup levels. Additional remedial actions are not necessary at this location, in our opinion, because of the localized extent of the exceedance, ground water meets the chromium cleanup level, and because the P-3 area is paved.

At location P-2, diesel range hydrocarbon concentrations were reduced from over 20,000 mg/kg to less than 250 mg/kg in the bottom, and east/south sidewalls. Higher petroleum hydrocarbon concentrations (greater than 2,000 mg/kg) remain in the north and west sidewalls where excavation was restricted by a electrical power transformer and lines, and by Building C.

At location P-4, heavy-oil range hydrocarbon concentrations were reduced from over 10,000 mg/kg to less than 200 mg/kg in sidewall samples. Higher heavy-oil petroleum hydrocarbon concentrations remain in the excavation bottom where a sample concentration of 813 mg/kg was measured. Deeper excavation was restricted because of geotechnical considerations.

At location P-5, heavy-oil range hydrocarbon concentrations were reduced from over 10,000 mg/kg to less than 500 mg/kg in sidewalls and to less than 1,000 mg/kg in the excavation bottom. The confirmation bottom sample also had diesel range hydrocarbon concentration of approximately 440 mg/kg. Additional excavation in both the sidewalls and bottom was restricted because of geotechnical considerations.

Request for No Further Action. Remediation of site soils has been completed to a practical extent. Available ground-water quality data indicate that ground water meets cleanup levels except for petroleum hydrocarbons in the immediate vicinity of location P-2 and arsenic. Water quality data from soil probes and wells indicate that petroleum constituents are not migrating from location P-2. No source of arsenic has been discovered at the site and the arsenic concentrations in ground water appear to be representative of regional conditions. Because the data indicate little risk to human health and the environment, the site should be classified as a "No Further Action Site" by Ecology.

INDEPENDENT REMEDIAL ACTION REPORT

Park 90/5 Office Park
Seattle, Washington

INTRODUCTION

This report presents a compilation and analysis of site history, hydrogeologic conditions, environmental quality data and remedial actions for the Park 90/5 Office Park located in Seattle, Washington (Figure 1). The purpose of the analysis was to assess the available data to determine whether conditions at the site warrant further action. The report is being submitted to the Washington State Department of Ecology (Ecology) under the Independent Remedial Reporting provisions of the Model Toxics Control Act (MTCA) and to support a request for a "No Further Action Letter".

Data presented in this report was collected by Shannon & Wilson, Inc. (S&W) and Dalton, Olmsted & Fuglevand, Inc. (DOF) as part of a real estate property transfer between David and Sandra Sabey (seller) and the City of Seattle (buyer). The property transaction closed on August 1, 1996 and the City of Seattle is now the owner of the Park 90/5 Office Park. The data collected by S&W and DOF was supplemented with data collected by Earth Consultants who completed geotechnical and environmental assessments when the Sabeyes purchased and developed the property in the mid-1980's and by Delta Environmental Consultants who removed an underground storage tank (UST) in 1994.

SITE DESCRIPTION

Site Name: The subject property is known as the Park 90/5 Office Park.

Location: The site is approximately 10 acres and is located in southern Seattle, Washington (Figure 1), in Section 8, Township 24 North, Range 4 East. The tax identification number for the property is 766620-3240, and the street address is 2203 Airport Way South.

Project Owner and Contact: On August 1, 1996 the City of Seattle purchased the property. The City contact, mailing address and phone number are as follows:

→ **Property Representatives:** Joe Garcia
Building Operations Director

Phone Number: 425 (206) 233-2784

Mailing Address: City of Seattle, Department of Administrative Services
Facility Services Division
Alaska Building, 14th. Floor
618 Second Avenue
Seattle, WA 98104

1386

362
169
5311
225
206

Property Use: Facilities on the site include five buildings (Figure 2) currently used for office space, warehouse space, biotechnology laboratories, a coffee roasting facility, a doctor's office and communications businesses. The areas surrounding the buildings are asphalt-paved parking lots.

HISTORY AND LANDUSE

The site's history was researched by Earth Consultants (1987b) and Shannon & Wilson (1996a) as part of Environmental Site Assessments (ESAs). Their reports are included as Appendices A and B. A summary of the site history and former landuse, based on these reports, is presented below.

The site was originally part of the tide lands near the mouth of the Duwamish River that were filled between 1895 and 1902. Airport Way South was built on planking 15-feet high in 1904. Between the early 1900's and early 1980's, the site was used for meat packing purposes. Companies that occupied the site included the Frye & Company Slaughter House, Polpar Livestock Company, Frye Packing Company, Frye Investment Company, Frye-Bruhn Company, Seattle Packing Company, Cudahy Packing Company, and Bar-S Foods Company.

Facilities that existed on the site prior to the mid-1980's included stock pens, killing rooms, rendering tanks, sausage factory, smokehouse, lard room, tank shed (containing rendering products such as tallow), saw shed, machine shop, engine and boiler rooms, oil house, steam plant, paint shop, and offices. A historical site plan that shows the site prior to demolition in 1984 is presented as Figure 3. Shannon & Wilson (1996a) indicates that this historical site plan was prepared from a drawing by Triad Associates, dated 10-22-84. Earth Consultants (1987b) reports that the 1984 configuration (Figure 3) is *"essentially the same configuration as it appears in photographs dated 1969 as well as in a site plan prepared by Triad Associates in 1984"*.

In 1984, David and Sandra Sabey purchased the property and demolished all buildings except the former slaughterhouse (Building A). Building A was remodeled in 1985. The remaining buildings were constructed between 1985 and 1987. Buildings C and D are reportedly supported by conventional shallow footings while buildings A, B and E are reportedly pile supported (Earth Consultants 1996).

During the historical review, it was found that five underground storage tanks have existed on the property. The estimated potential locations of the four tanks associated with the meat packing facilities and reportedly removed during site demolition are shown on Figure 3. The location of the fifth tank (removed by Delta Environmental) is shown on Figure 2. Pertinent tank data is summarized in Table 1.

TOPOGRAPHY/GEOLOGY

Topography

The site is relatively level. Land surface elevations are about 12 to 13 feet above mean sea level (MSL).

Geology

The site lies within a former tide flat that has been filled and extensively modified. Borings and test pits (Figure 4) completed by Earth Consultants, Inc. (1984, 1985, and 1987a), probes by Shannon & Wilson (1996a,b) and wells installed by Dalton, Olmsted & Fuglevand, Inc. (this report) indicate that the site is underlain by fill that overlies fine grained tidal flat deposits. Geologic section A-A' (Figure 5) shows our interpretation of the geologic conditions beneath the site. The trend of the section is shown on Figure 4. The geologic logs of borings, probes and wells drilled on the site are contained in Appendix D.

The surficial geologic unit beneath the site is Fill that varies in thickness from approximately 10 to 18 feet. The Fill is variable in nature being comprised of sandy Silts, silty Sands, gravelly Sands and sandy Gravels with bricks, concrete rubble, scrap iron, and slag-like fragments.

Fined grained tidal flat deposits underlie the Fill. These deposits consist of silty Clays to clayey Silts that range in thickness from approximately 5 to 15 feet. The tidal flat deposits are generally underlain by very fine to fine Sands to a depth of approximately 70 feet (based on the log of B-7). Interbedded silty Sand and sandy Silt deposits were logged in B-7 between depths of 70 to 100 feet. A very fine sandy Silt layer was also logged in B-5 between a depth of approximately 45 and 50 feet.

Depth to Ground Water and Ground-Water Flow Directions

Shannon & Wilson (1996a,b) probe logs reported that the depth to ground water ranged between approximately 6 and 10 feet on April 23, 1996 (in probes P-1 to P-5) and between approximately 7 and 9.5 feet on June 11, 1996 (in probes P-6 to P-9). These measurements were made at the time the probes were advanced.

Water level measurements were made in wells MW-1 to MW-4 (screened in the Fill deposits) on June 27, July 2, and October 18, 1996 by DOF. These measurements are summarized in Table 2. The depth to water ranged between approximately 6 to 10 feet below ground surface.

Water level elevations for July 1996, based on measurements made in wells MW-1 to MW-4, are shown on Figure 6. As shown on the figure, ground-water elevations indicate that in early

summer 1996, ground water flowed in a generally easterly direction within the Fill deposits, beneath the site.

On October 18, 1996 (near the end of the summer season) water level elevations also indicated that ground-water flow was in an easterly direction. The October measurement in well MW-2 appears to be anomalously high compared to previous measurements and the October water level measurement made in MW-3.

RELEASE INFORMATION/SITE CHARACTERIZATION

Summary of Site Investigations

Earth Consultants - 1987. Earth Consultants completed a Preliminary Environmental Audit (Earth Consultants 1987b) of the site. A copy of their report is included as Appendix A. Their report indicates the presence of buried fuel tanks that were removed to prepare the site for redevelopment in the mid-1980's. No sampling or observation data of the condition of the tank excavations was found. However, the report notes that "*oil was noted in a borehole drilled in 1984 near the former location of the fuel oil tank at the south end of the now demolished mechanical building.*" Oily materials are not noted on any of the 1984 borings (see Appendix D), however, the description suggests the boring to be B-1.

when
removed

The report notes that "*slag of unknown composition*" was encountered beneath some of the site. A review of the geotechnical borings indicate that material described as "slag" was encountered in boring B-6.

Delta Environmental Consultants - 1994. A waste oil tank was installed next to building E in 1985 that was used by U.S. WEST for vehicle maintenance (Figure 2). The tank was removed in 1994 (Delta Environmental 1994). Delta Environmental observed the tank removal and collected samples of sidewall, bottom and stockpiled soils for analysis. Samples were analyzed for heavy oils using WTPH-418.1. In addition, the bottom and stockpile samples were analyzed for petroleum hydrocarbons using WTPH-HCID and for PCBs using EPA Method 8080. The results are summarized in Table 3. Sample locations are shown on Figure 7.

one
TANK

No petroleum hydrocarbons or PCBs were detected in the bottom and stockpile soil samples. Heavy-oil hydrocarbon concentrations of 57 mg/kg and 120 mg/kg were detected in the sidewall samples that are below the MTCA Method A cleanup level of 200 mg/kg (WAC 173-340-740). Based on these results, it was concluded that "*Further assessment or remediation of the excavation does not appear necessary*" (Delta Environmental 1994).

Shannon & Wilson - 1996. In the period March to May, 1996 Shannon & Wilson (S&W) completed an Environmental Site Assessment (ESA)(S&W 1996a) for the City of Seattle as

part of a real estate transaction. A copy of their ESA report is included as Appendix B. S&W's work included reviewing site history (previously discussed), completing a geophysical survey to search for buried tanks; and collecting soil and ground water samples at the suspected former locations of USTs and where slag was reportedly encountered.

The work completed by S&W indicated that at least five USTs had been present on the site (Table 1). Earth Consultants (1987b) indicated that the tanks associated with the meat packing facilities were removed during site demolition. The geophysical survey provided no evidence of USTs beneath the eastern half of the site, or on the east side of Building C at the location of the former gas pumps (Figure 3). Based on the data, S&W concluded that there was a slight possibility that a tank was still present beneath Building C and that a tank could be located under Building B.

In April 1996 as part of the ESA (S&W 1996a), S&W sampled soil and ground water at five locations (P-1 to P-5; Figures 4 and 8). The results of this testing are described in later sections of this report.

In the normal course of completing the real estate transaction, S&W completed additional historical research and testing (in June and July). This work is summarized in a supplemental report (S&W 1996b) that is included as Appendix C. The additional historical research focused on collecting information to further assess whether several USTs were removed from the site during demolition. This research further supports the finding that the USTs were removed. The supplemental work also included soil and ground-water sampling at locations P-6 to P-9, and ground-water sampling at locations P-10 and P-11. The results of the additional site testing are described in later sections of this report.

Dalton, Olmsted & Fuglevand, Inc. - 1996. In April 1996, Dalton, Olmsted & Fuglevand, Inc. (DOF) was contracted by the Sabeys to provide technical support to the real estate transaction. DOF provided oversight of the soil and ground-water sampling by S&W; developed a cleanup plan for the site; completed confirmation soil sampling during the remedial activities; and installed and sampled four monitoring wells. Work completed by DOF is presented in this report.

Results of Soil and Ground-Water Sampling

Soil Quality

S&W completed soil sampling at nine locations (P-1 to P-9 on Figures 4 and 8) in April and June, 1996. Soil samples were collected using a truck-mounted hydraulic (Stratoprobe) sampling rig provided by Transglobal Environmental Geosciences Northwest, Inc. (TEG). Sampling procedures are summarized in the S&W reports (Appendices B and C). Briefly, soil samples were obtained in an uncased hole using a split-spoon sampler. Sampling locations

were selected based on the Earth Consultant field logs (oil at B-1 and slag at B-6) and the site history findings that suggested the former locations of underground storage tanks.

Soil analyses were made for petroleum hydrocarbons and metals. Analyses were made for the following constituents:

- Gasoline range hydrocarbons (WTPH-G);
- Benzene, toluene, ethylbenzene, and xylenes (EPA Method 8020);
- Diesel/heavy-oil hydrocarbons (WTPH-D-extended);
- Metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver).

As part of the remedial activities, DOF collected soil samples from three remedial excavations (discussed later in this report) for analysis of chromium. These samples were collected from discrete depth intervals using the excavator bucket and stainless steel spoons. The locations of these samples are shown on Figures 10 (P2-Met), 13 (P4-Met), and 14 (P5-Met).

Petroleum Hydrocarbons. The results of the petroleum hydrocarbon analyses are summarized in Table 4.

- Petroleum hydrocarbons were not detected in samples from locations P-1, P-6, P-7, P-9, MW-1, MW-2, MW-3 and MW-4.
- Relatively low concentrations of diesel and heavy-oil range hydrocarbons were detected in samples from P-3 (83 mg/kg heavy-oil at 3'-6') and P-8 (37 mg/kg diesel range; 42 mg/kg heavy-oil range at 3'-6').
- Relatively high concentrations (greater than 10,000 mg/kg) of diesel range hydrocarbons were detected at P-2 (6'-9') and heavy-oil range hydrocarbons were detected at locations P-4 and P-5 (8'-10').
- Low concentrations of gasoline range hydrocarbons (25 mg/kg), ethylbenzene (0.13 mg/kg), and xylenes (1.1 mg/kg) were detected at location P-4 and a low concentration of toluene (0.84 mg/kg) was detected at location P-5.

Metals. The results of the soil metal analyses are summarized in Table 5. The range of reported concentrations are listed below:

	Range (mg/kg)
Arsenic	1.6 to 6.7
Barium	94 to 290
Cadmium	<0.26 to <1.3
Chromium	7.4 to 990
Lead	5.8 to 57
Mercury	<0.1 to 0.23
Selenium	<17 to <27
Silver	<1 to <1.3

Ground-Water Quality

Ground-water samples were obtained by S&W from well points inserted into the open soil probe borings at locations P-1 to P-11 and by DOF from four monitoring wells (MW-1 to MW-4). The sampling locations are shown on Figures 4 and 8. Analyses were made for petroleum hydrocarbons and metals.

Petroleum Hydrocarbons. The results of ground water petroleum hydrocarbon analyses are summarized in Table 6.

- Petroleum hydrocarbons were not detected in water samples from well points installed in soil probes P-1, P-3, P-4, P-6, P-7, P-8, P-9, P-10, and P-11 or in wells MW-1, MW-2, MW-3 and MW-4.
- Relatively low concentrations of diesel range hydrocarbons (233 ug/l), toluene (1.75 ug/l) and xylenes (9.4 ug/l) were measured in a water sample from soil probe P-5.
- High concentrations of diesel range hydrocarbons (219 mg/l) and heavy oil range hydrocarbons (0.538 mg/l) were measured in a water sample from soil probe P-2. However, the relatively high concentrations reported for the ground-water sample, the presence of heavy-oil range hydrocarbons in the sample, and the note on the log that a "sheen" was evident during soil sampling indicates that free-phase product may have been entrained in the ground water sample sent to the laboratory.

Metals. The results of the ground-water metals analyses are summarized in Table 7. Analyses were made for both total and dissolved metals. Dissolved metals analyses were made on

samples that were filtered through a nominal 0.45 micron filter prior to preservation. The total metal ground-water analyses from the soil probes should be considered conservative "screening" analyses and are biased high because of high sample turbidity. Low flow/low turbidity sampling procedures were used to collect samples from the monitoring wells and provide a more representative analysis of total metal concentrations that can migrate in ground water. The range of metal concentrations measured in the ground-water samples is summarized below.

	Total Metals (mg/l)		Dissolved Metals (mg/l)	
	Soil Probes	Mon. Wells	Soil Probes	Mon. Wells
Arsenic	0.011-0.051	<0.004-0.023	<0.004-0.017	<0.004-0.021
Barium	0.36 - 5.6	0.089-0.136	0.025-0.19	0.099-0.158
Cadmium	<0.001-0.004	<0.0001	<0.005	<0.0001
Chromium	<0.01 - 0.05	<0.01	<0.01	<0.01
Lead	<0.05-6.1	<0.002	<0.0005-0.004	<0.002
Mercury	<0.0004-0.015	<0.001	<0.0005	<0.001
Selenium	<0.15	<0.005	<0.0063-<0.2	<0.005
Silver	<0.01	<0.02	<0.01	<0.02

Selection of Cleanup Standards

Cleanup standards referenced in this report are based on the framework presented in the Model Toxics Control Act (MTCA) Chapter 173-340 WAC.

Soil Cleanup Standards

Soil cleanup levels are based on Method A and Method B cleanup levels for industrial sites. The site is located in an industrial area, is generally used for industrial/commercial purposes, and is expected to be so used for the foreseeable future. Adjacent properties are also used for industrial/commercial purposes. The site is zoned by the City of Seattle as IG1 U85'/IG2 U85'. This zoning classification allows the site to be used for light/heavy manufacturing, commercial/retail office, warehouse and utility uses.

Soil cleanup standards for those constituents analyzed as part of the environmental assessment are summarized below:

	Soil Cleanup Level (mg/kg)	Basis
Diesel/Heavy-Oil Range Hydrocarbons	200	MTCA - Method A(a)
Gasoline Range Hydrocarbons	100	MTCA - Method A(a)
Benzene	0.5	MTCA - Method A(a)
Toluene	40	MTCA - Method A(a)
Ethylbenzene	20	MTCA - Method A(a)
Xylenes	20	MTCA - Method A(a)
Arsenic	200	MTCA - Method A(b)
Barium	245,000	MTCA - Method B(b)
Cadmium	10	MTCA - Method A(a)
Chromium	500	MTCA - Method A(c)
Lead	1,000	MTCA - Method A(b)
Mercury	1	MTCA - Method A(a)
Selenium	17,500	MTCA - Method B(b)
Silver	17,500	MTCA - Method B(b)

Notes: (a) WAC 173-340-745; based on protection of ground-water quality

(b) WAC 173-340-745; based on soil ingestion exposure pathway

(c) WAC 173-340-745; based on soil inhalation exposure pathway

Ground-Water Cleanup Standards

Ground-water cleanup standards are primarily based on Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A WAC) for marine waters, where available. MTCA Method A or Method B cleanup levels were used when surface water quality standards are not available.

Ground-water cleanup standards were developed based on protection of surface water quality consistent with WAC 173-340-720(1)(c) based on the following considerations:

WAC 173-340-720(1)(c)(i) - There are known or projected points of entry of the ground water into surface water.

- As discussed earlier in this report, well water level measurements indicate that ground water flows in a easterly direction. However, the position of the site on a portion of the filled in Duwamish River tide flats, approximately 4,500 feet from the East Waterway indicates that regional ground-water flow is to the west towards the East Waterway (Figure 1).

WAC 173-340-720(1)(c)(ii) - The surface water is not classified as a suitable domestic water supply source under Chapter 173-201 WAC.

- WAC 173-201A-130(37) classifies the reach of the Duwamish River (East Waterway) where ground water from the site likely discharges as Class B waters. Class B waters are generally not used for domestic water supplies. In addition, the East Waterway is within the tidal influence of Puget Sound where mixing of fresh and salt water would make the surface water unsuitable for domestic water supply purposes.

WAC 173-340-720(1)(c)(iii) - Ground water flows into surface waters will result in no exceedances of surface water cleanup levels at the point of entry are at any downstream location where it is reasonable to believe the hazardous substances may accumulate.

- The proposed ground-water cleanup levels are primarily based on protection of surface waters.

WAC 173-340-720(1)(c)(iv) - The department determines it is unlikely that hazardous substances will be transported from the contaminated ground water to ground water that is a current or potential future source of drinking water, as defined in (b) of this subsection, at concentrations which exceed ground water criteria published in Chapter 173-200 WAC.

- The available data indicate that ground water in the surficial fill deposits is separated from lower zones by a silty Clay/clayey Silt aquitard.

Other Considerations:

- It is highly unlikely that ground-water in the surficial fill deposits would be used for domestic purposes. The Park 90/5 site is in an industrial area that is served by municipal water supplies. Because of the shallow depth of this zone, it would not be possible to install wells in accordance with Chapter 173-160 WAC without a variance.

Ground-water cleanup standards for those constituents analyzed as part of the environmental assessment are summarized below:

Ground-Water Cleanup		
	Level (mg/l)	Basis
Total Petroleum Hydrocarbons	1	MTCA - Method A(a)
Benzene	0.005	MTCA - Method A(a)
Toluene	0.040	MTCA - Method A(a)
Ethylbenzene	0.030	MTCA - Method A(a)
Xylenes	0.020	MTCA - Method A(a)
Arsenic	0.036	Surface Water Quality(b)
Barium	1.1	MTCA - Method B(a)
Cadmium	0.008	Surface Water Quality(b)
Chromium	0.050	Surface Water Quality(b)
Lead	0.0058	Surface Water Quality(b)
Mercury	0.000025	Surface Water Quality(b)
Selenium	0.071	Surface Water Quality(b)
Silver	0.0012	Surface Water Quality(c)

Notes: (a) WAC 173-340-720; based on drinking water use.

(b) WAC 173-201A-040; based on marine chronic criteria

(c) WAC 173-201A-040; based on marine acute criteria (chronic criteria not available)

Comparison of Soil/Ground-Water Quality Data With Cleanup Standards

Soil Quality Comparisons

Tables 4 and 5 summarize soil quality data and possible cleanup levels under the MTCA. For comparison purposes, both "residential" and "industrial" cleanup levels are shown. A review of the data indicates that concentrations of gasoline range hydrocarbons, benzene, toluene, ethylbenzene, xylenes, arsenic, barium, cadmium, lead, mercury, selenium and silver meet both residential and industrial soil cleanup levels.

The following constituents exceeded the residential and industrial soil cleanup levels:

- Diesel range hydrocarbons exceeded the cleanup level at location P-2
- Heavy-oil range hydrocarbons exceeded the cleanup level at locations P-4 and P-5

Of the ten total chromium analyses, one sample (P-3, 990 mg/kg) exceeded the residential (100 mg/kg) and industrial cleanup level (500 mg/kg) that are based on the inhalation exposure pathway. The Ecology statistical program Mtcstat-2.0 was initially used to estimate the mean concentration for comparison to the chromium cleanup level. However, the sample concentrations are neither normally or log-normally distributed. Because the number of sample analyses are limited, it was assumed that the chromium soil concentration at location P-3 exceeded the industrial cleanup level.

Ground-Water Quality Comparisons

Tables 6 and 7 summarize ground-water quality data and possible cleanup levels under the MTCA. For comparison purposes, both "drinking water" and "surface water" cleanup levels are shown. No cleanup levels were exceeded in the sampling locations located on the downgradient (east) side of the site (locations MW-1, P-3, P-4, P-7, and P-11).

A review of the data indicates that concentrations of gasoline and heavy-oil range hydrocarbons, benzene, toluene, ethylbenzene, xylenes, and total and dissolved concentrations of cadmium, mercury, selenium and silver meet ground water cleanup levels at the sampling locations. Diesel range hydrocarbons (P-2), total arsenic (P-8), total barium (P-7 and P-8) and total lead (P-6, P-7, and P-8) appear to exceed cleanup levels. The results of these constituents are discussed below:

Diesel Range Hydrocarbons at P-2. A diesel-range hydrocarbon concentration of 219 mg/l was measured in a ground-water sample obtained from the P2 borehole using a well point. The relatively high concentration reported for the ground-water sample and the note on the log that a "sheen" was evident during soil sampling indicates that free-phase product may have been entrained in the ground water sample sent to the laboratory.

 Ground-water quality data from other wells indicates that petroleum hydrocarbons are not migrating at concentrations that exceed cleanup levels. No petroleum hydrocarbons were detected in ground water samples from wells MW-2, MW-3, and MW-4 located on the west site boundary or in probe P-1 located immediately north of P-2 (Figure 6). Petroleum hydrocarbons were also not detected in samples from well MW-1 and probes P-3, P-4, P-9, P-10, and P-11 that are located generally downgradient of location P-2. Relatively low concentrations of diesel range hydrocarbons, toluene and xylenes were measured at location P-5, however, the detection of these constituents is attributed to the soil contamination measured at this location and, in any case, the measured concentrations are well below cleanup levels.

where is piezo? map?

Total Arsenic at P-8. Total arsenic (0.051 mg/l) in a screening ground-water sample from soil probe P-8 exceeded the ground-water cleanup level of 0.036 mg/l. Both total (0.011 to 0.023 mg/l) and dissolved (0.011 to 0.021 mg/l) arsenic were also detected in samples from other locations (Figure 9) including upgradient wells MW-2 and MW-4.

The source of arsenic is unclear. Soil concentrations in samples from the soil probes (Table 5) ranged between 1.6 mg/kg and 6.7 mg/kg. This compares with a Puget Sound background concentration of 7 mg/kg (Ecology 1994b). The available data suggest that the source of arsenic may be leaching of arsenic from soil caused by the ground-water geochemical conditions and that the measured ground-water arsenic concentrations are likely regional in nature. This finding is based on the following:

- The solubility of arsenic is, in part, effected by the pH and Eh (redox potential) of water (Welch et al, 1988). In water, arsenic is generally present as arsenate, arsenite, or both depending on the pH and Eh conditions. Under reducing (low oxygen) conditions, arsenite would be the predominant species present. Arsenite compounds are reported to be four to ten times more soluble in water than arsenate compounds (Bodek et al, 1988). Low dissolved oxygen concentrations (less than 1 mg/l) were measured in wells MW-1 to MW-4 which indicate favorable conditions for the leaching of arsenic.
- Arsenic was detected in upgradient wells MW-2 and MW-4. — level ??

Total Barium (P-7 and P-8) and Total Lead (P-6, P-7 and P-8). Total concentrations of barium and lead exceeded cleanup levels in several of the "screening" ground-water samples collected from the soil probes. These sample concentrations are attributed to the turbidity of the samples sent to the laboratory and are not considered representative of actual ground water quality in terms of dissolved barium and lead concentrations with the potential to migrate in ground water. This finding is supported by a resampling of the P-7 location by S&W for dissolved metals (Table 7). The results of the P-7 sampling are summarized below:

	Total Conc. (mg/l)	Dissolved Conc. (mg/l)
Barium	3.2	0.15
Lead	6.1	<0.002

Handwritten notes: 1.2 x 10⁻³ mg/l, ABOVE Method A, .005 mg/l

The dissolved concentrations are substantially lower than the total concentrations and are well below the ground-water cleanup levels.

Site Characterization Summary and Contaminant Sources

Characterization Summary: Comparison of soil and ground-water quality data with potential cleanup levels indicates that petroleum hydrocarbons, chromium and arsenic are of potential concern at the Park 90/5 Office Park. Relatively high concentrations of petroleum hydrocarbons in soil were discovered at three locations (P-2, P-4 and P-5). Over 20,000 mg/kg concentrations of diesel range hydrocarbons were measured at location P-2 and over 10,000 mg/kg of heavy-oil hydrocarbons were measured at locations P-4 and P-5.

Soil analyses for metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver) were below soil cleanup levels except for chromium at location P-3. Chromium was measured at a concentration of 990 mg/kg that exceeds the MTCA industrial cleanup level of 500 mg/kg.

Petroleum hydrocarbons were not detected in ground-water samples except at locations P-2 and P-5. At location P-2, diesel and heavy-oil range hydrocarbons were detected in a soil

probe ground-water sample. The diesel range hydrocarbon concentration exceeded the ground-water cleanup level. However, the data suggest that free product was entrained in the sample submitted to the laboratory and the result is not representative of dissolved hydrocarbon concentrations with the ability to migrate in ground water. At location P-5, diesel range hydrocarbons were detected in a soil probe sample but at concentrations well below the ground water cleanup level.

Ground-water analyses for metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver) met cleanup levels (based on protection of marine ambient water quality) except for arsenic at soil probe location P-8. At location P-8, a total arsenic concentration of 0.051 mg/l was measured which exceeds the ground-water cleanup level of 0.036 mg/l.

Contaminant Sources: The sources of petroleum hydrocarbons measured in soil appear to be related to underground storage tanks that were formerly used on the site. The available data indicate that the tanks have been removed. On behalf of Sabey Corporation, DOF notified Joe Hickey (Ecology) of the petroleum hydrocarbon releases in a letter dated May 29, 1996. While the sources of petroleum hydrocarbons were not definitively established, site history data suggested the sources were related to former underground storage tanks.

The source of the chromium measured at location P-3 appears to be fill that was placed on the site decades ago. Historic site drawings show several railroad spurs that extended into the site. There is a possibility that the sample with high chromium was part of a slag-like road bed ballast used to support the rail tracks.

The available data suggest that the source of arsenic in ground water is "*background concentration arsenic*" in soil that is being leached in low concentrations because of the geochemical conditions in ground water. Arsenic concentrations in soil are typical for Puget Sound based on work published by Ecology (1994b). Low dissolved oxygen concentrations were measured in ground-water samples from wells MW-1, MW-3 and MW-4. Arsenic is relatively soluble in low oxygen (reducing) ground-water conditions.

REMEDIAL ACTIONS

As discussed above, soil and ground-water sample analyses indicated the presence of petroleum hydrocarbons above Model Toxics Control Act (MTCA) cleanup levels at locations P2, P4 and P5. Based on these results and discussions between the Sabey Corp. and the City of Seattle, it was decided to remediate the areas, to the extent practical, where cleanup levels were exceeded.

Remedial actions were not completed at location P-3 where chromium was detected above cleanup levels. Additional remedial actions are not necessary at this location, in our opinion, because of the localized extent of the exceedance; ground water meets the chromium cleanup

level; and because the area is paved. The chromium cleanup level is based on soil inhalation and site paving effectively mitigates this exposure pathway.

Cleanup Plan

A Cleanup Plan was prepared by DOF for the Sabey Corporation that was agreed to by the City of Seattle (DOF 1996). The remediation areas discussed in this report are designated by the soil probe number where petroleum hydrocarbons were encountered, area P2, area P4 and area P5 (Figure 4). The remedial approach consisted of excavating soils above cleanup levels and disposing of the soil off-site at the Regional Disposal Company's facility in Roosevelt, Washington.

Geotechnical Constraints. It was recognized in the Cleanup Plan that some soil above cleanup levels might extend beneath the existing buildings. Earth Consultants was contacted to provide recommendations on how to complete the excavations without causing settlement of building foundations. Their recommendations are presented in a June 12, 1996 letter to DAS Construction (Appendix E) and are repeated below:

"Due to the unstable nature of the site's subsurface conditions, it is our professional opinion the excavations should not extend closer than ten feet from the building at the ground surface, then slope down to the bottom of the excavation at a 1:1 gradient. We also recommend this setback distance for pile supported buildings in order to maintain lateral support of the piles."

The cleanup plan also calls for pumping of water below the existing water table in order to allow excavation of contaminated soils below the water.

We strongly recommend not lowering the water table below its present level. The settlements due to the surcharge fills were high and most likely due to a deep compressible layer. Lowering the water table may cause settlements of the existing structures. The shallow foundations of Buildings C and D are most susceptible to settlement. The pile supported structures may also experience minor settlements due to downdrag on the piles."

Testing for Soil Disposal

The purpose of the remediation was to remove soil that contains petroleum hydrocarbons above the MTCA cleanup level of 200 mg/kg. The results of testing completed by S&W at locations P-2, P-4 and P-5 were submitted to the Regional Disposal Company (RDC) to determine whether they would accept the material for disposal. Based on this information, RDC

requested that samples from locations P-2 and P-5 be testing for semivolatile organic compounds using EPA Method 8270.

Additional sampling was completed at locations P-2 and P-5 by Matt Dalton on June 6, 1996 in backhoe test pits excavated for this purpose. Soil samples were obtained from the depth interval between 6 and 8 feet (P-2), and 6 and 9 feet (P-5) below existing grade from the backhoe bucket using stainless steel spoons. The samples were placed in glass jars that were submitted to Sound Analytical of Tacoma, Washington on the same day the samples were obtained. Standard chain-of-custody procedures were used to document the sample handling. The analytical results are summarized in Table 8. Laboratory data sheets are presented in Appendix F.

Remediation Area P2

Description of Area P2. Area P2 is adjacent to the east-central portion of Building C that is supported by shallow conventional footings. The borehole log for P2 indicated that fill extends from the surface to a depth of at least 15-feet and generally consists of silty sand and gravel with brick and rock fragments, slag and asphalt rubble. Ground-water was encountered at a depth of approximately 6 to 7 feet below the existing grade at the time of drilling (April 1996).

Indications of petroleum hydrocarbons in soil were found below a depth of approximately 4 feet. A "slight oil/petroleum odor" was logged between 4 and 6 feet while a "strong diesel odor; hydrocarbon sheen" was logged between approximately 6 and 13.5 feet. Analysis of soil samples collected between 6 and 9 feet, and 9 and 11 feet confirm the presence of the petroleum hydrocarbons. The results of the laboratory analyses are summarized below:

Petroleum Hydrocarbon Conc. in Soil (mg/kg)			
Depth	Gasoline Range	Diesel Range	Heavy Oil Range
6 to 9	NA	20900	<40
9 to 11	<10	118	52

The analytical results indicate that the petroleum related materials consist predominantly of diesel-range hydrocarbons present near and below the water table. The MTCA cleanup level of 200 mg/kg appeared to be exceeded in the depth interval between 6 and 9 feet.

As previously discussed, a diesel-range hydrocarbon concentration of 219 mg/l was measured in a ground-water sample obtained from the P2 probe hole using a well point. The relatively high concentration reported for the ground-water sample and the note on the log that a "sheen" was evident during soil sampling suggests that free-phase product may have been entrained in the ground water sample sent to the laboratory.

Area P2 Remedial Actions. The extent of excavation and confirmation sampling locations are shown on Figures 10 to 12. The data indicate that predominately diesel range hydrocarbons were present in a smear zone near the water table at location P-2.

Approximately 450 (in-place) cubic yards were removed from the excavation that measured approximately 40 feet long by 32 feet wide by 9.5 feet deep. The water table was encountered at a depth of approximately 7 to 8 feet during excavation.

During excavation, a concrete slab was encountered at a depth of approximately 3.5 to 4.5 feet. This slab was removed within the excavation area. Materials removed from above and immediately below the slab (to approximately 7 feet) generally consisted of gravelly, silty Sand with metal, and brick, concrete and asphalt fragments. Below 7 feet, to a depth of approximately 9 feet, the materials consisted of wet oily gravelly Sand. Below approximately 9 feet, the bottom of the excavation consisted of finer grained silty Sand to sandy Silt.

After excavation was complete, the hole was backfilled. Imported, quarry spalls were placed in the excavation bottom to just above the water table. A compacted sand and gravel was placed above the quarry spalls to near the existing grade. Asphalt paving was placed above the compacted sand and gravel.

Table 9 shows the analytical results for "*information*" and "*confirmation*" samples collected during the remedial activities. Sample locations are shown on Figures 10 and 11. The results of the information samples were used to guide the excavation activities. Soil represented by these samples was removed. As shown on Table 9, diesel-range hydrocarbon concentrations of excavated soil ranged between <20 mg/kg and 20,900 mg/kg.

Confirmation samples were obtained at the extent (bottom and sidewalls) of excavation. The sample analyses indicate that the MTCA cleanup level of 200 mg/kg was achieved on the south, east and bottom sides of the excavation. However, the analyses indicate that the soil cleanup level was not achieved on the north and west sides of the excavation as outlined below:

- On the north sidewall, sample P2-N2 had a diesel-range petroleum hydrocarbon concentration of 2,300 mg/kg in the depth interval of 7 to 8 feet. Additional excavation in a northward direction could not be completed because of an electrical power line and transformer that provide power to the Starbucks coffee roasting facility.
- On the west sidewall, sample P2-W1 had a diesel-range petroleum hydrocarbon concentration of 689 mg/kg obtained from approximately 6.5 feet. It is likely that soils between a depth of 7 to 9 feet have a higher petroleum hydrocarbon concentration (greater than 2,000 mg/kg) as compared to P2-W1. Additional excavation in a westward direction could not be completed because of foundation concerns associated with Building C.

During excavation a sheen was observed on the water surface. However, with exception of probe P5, as discussed below, petroleum hydrocarbons were not detected in ground-water samples from wells and soil probes completed outside of the P-2 area. While location P-5 is downgradient of location P-2, the petroleum hydrocarbons detected at P-5 are attributed to contamination that was present when the P5 soil probe was sampled and since has been remediated. Based on the available data, petroleum hydrocarbons are not migrating from the P-2 area in ground water.

Remediation Area P4.

Description of Area P4. Area P4 is adjacent to the east property line near Building D and E. The foundation support for the adjacent "off-property" building is piling based on conversations with SABEY representatives. The probe hole log for P4 indicates that fill extends from the surface to a depth of at least 12-feet and generally consists of silty Sand and gravely sandy Silt with metal, rock, wood and brick fragments. Ground-water was encountered at a depth of approximately 9 to 10 feet below the existing grade at the time of drilling (April 1996).

Indications of petroleum hydrocarbons in soil were found below a depth of approximately 8 feet. A "slight solvent odor" was logged between approximately 8 and 12 feet. Analysis of a soil sample collected between 8 and 10 feet indicate the presence of heavy-oil petroleum hydrocarbons. The results of the laboratory analyses are summarized below:

Depth	Petroleum Hydrocarbon Conc. in Soil (mg/kg)		
	Gasoline Range	Diesel Range	Heavy Oil Range
8 to 10	25	<20	12774

A ground-water sample was obtained from a depth interval of 9 to 10.5 feet in the P4 boring using a well point. No petroleum hydrocarbons were detected in the ground-water sample.

Area P4 Remedial Actions. The extent of excavation and confirmation sampling locations are shown on Figure 12. Approximately 70 cubic yards (in-place) were removed from the excavation approximately 20 feet long by 9 feet wide by 10.5 feet deep in size. Materials removed from the excavation generally consisted of gravely, silty Sand with metal, and brick, concrete and asphalt fragments. Excavation sidewalls remained nearly vertical while the excavation was open. Water seepage was encountered at a depth of approximately 9 to 10 feet.

After excavation was complete, the hole was backfilled. Sand and gravel was placed in the excavation and compacted to near the existing grade. Asphalt paving was placed above the compacted sand and gravel.

Table 10 shows the analytical results for "*information*" and "*confirmation*" samples collected during the remedial activities. Sample locations are shown on Figure 13. The results of the information samples were used to guide the excavation activities. Soil represented by these samples was removed. As shown on Table 10, heavy-oil range hydrocarbon concentrations of excavated soil ranged between 636 mg/kg and 12,774 mg/kg.

Confirmation samples were obtained at the extent (bottom and sidewalls) of the excavation. The sidewall sample analyses indicate that the MTCA cleanup level of 200 mg/kg was achieved. Sidewall samples collected from the depth interval of 8 to 10 feet had heavy-oil petroleum hydrocarbon concentrations between <40 mg/kg and 192 mg/kg. No diesel range petroleum hydrocarbons were detected above the reporting limit of 20 mg/kg in the sidewall samples.

No diesel range petroleum hydrocarbons were detected in confirmation bottom sample P4-B3 that was collected at a depth of approximately 11 feet. However, heavy-oil range hydrocarbons were detected in the bottom sample at a concentration of 813 mg/kg which exceeds the MTCA cleanup level of 200 mg/kg. Deeper excavation was not continued at location P-4 because of geotechnical concerns for foundation stability of the adjacent off-site building.

Heavy-oil range petroleum hydrocarbons were measured in soil at location P-4. These types of hydrocarbons have low solubility and mobility in ground-water. This is confirmed by the available ground-water quality data. Petroleum hydrocarbons were not detected in a "*pre-remediation*" ground-water sample from soil probe P-4.

Remediation Area P5

Description of Area P5. Area P5 is adjacent to the south side of Building D that is supported by shallow conventional footings. The probe hole log for P5 indicates that fill extends from the surface to a depth of at least 12-feet and generally consists of silty sand and gravel, and silt with metal, rock, wood and brick fragments. The depth to ground-water was not reported on the borehole log, however Table 5 of the Shannon & Wilson (Appendix B) report (S&W 1996a) indicates a ground-water sample was collected with a screen set at approximately 9 to 11.5 feet in April 1996.

Indications of petroleum hydrocarbons in soil were not reported on the probe log. However, "*slight manure/animal odor*"; "*animal odor*"; or "*slight organic/animal odor*" were reported for samples obtained from below the asphalt surface to the final boring depth of 12-feet. Analysis of a soil sample collected between 8 and 10 feet indicate the presence of heavy-oil petroleum hydrocarbons. The analytical procedure (WTPH-D, extended) included using silica-gel cleanup to minimize including non-petroleum materials in the analyses. The results of the laboratory analyses are summarized below:

Petroleum Hydrocarbon Conc. in Soil (mg/kg)			
Depth	Gasoline Range	Diesel Range	Heavy Oil Range
8 to 10	<10	<20	21700

A ground-water sample was obtained from a depth interval of 9 to 11.5 feet in the P5 boring. Diesel range hydrocarbons (233 ug/l), toluene (1.8 ug/l) and xylenes (9.4 ug/l) were detected in the sample. The reported concentrations are below MTCA ground-water cleanup levels.

Area P5 Remedial Action. The extent of excavation and confirmation sampling locations are shown on Figure 14. Approximately 235 cubic yards (in-place) were removed from the excavation measuring approximately 28 feet long by 19 feet wide by 12 feet deep. Materials removed from the excavation generally consisted of gravely, silty Sand with metal, and brick, concrete and asphalt fragments. Excavation sidewalls remained nearly vertical while the excavation was open. Water seepage was encountered at a depth of approximately 9 to 10 feet.

After excavation was complete, the hole was backfilled. Sand and gravel was placed in the excavation and compacted to near the existing grade. Asphalt paving was placed above the compacted sand and gravel.

Table 10 shows the analytical results for "information" and "confirmation" samples collected during the remedial activities. Sample locations are shown on Figure 14. The results of the information samples were used to guide the excavation activities. Soil represented by these samples was removed. As shown on Table 10, heavy-oil range hydrocarbon concentrations of excavated soil ranged between 527 mg/kg 21,700 mg/kg.

Confirmation samples were obtained at the extent (bottom and sidewalls) of excavation. Concentrations of diesel range petroleum hydrocarbons ranged between <20 mg/kg and 82 mg/kg in the sidewall samples. The east sidewall sample (P5-E3) analysis (heavy-oil concentration of 186 mg/kg) also indicated that the MTCA cleanup level of 200 mg/kg was achieved. Heavy-oil petroleum hydrocarbon concentrations in sidewall samples from the north, south and west walls ranged between 238 mg/kg and 473 mg/kg, somewhat above the target cleanup level. Lateral excavation was discontinued because of geotechnical concerns for foundation stability of Building D and a storm sewer line (Figure 14).

Diesel range petroleum hydrocarbons (437 mg/kg) and heavy-oil petroleum hydrocarbons (929 mg/kg) were detected in confirmation bottom sample P5-B2 that was collected at a depth of approximately 12 feet. These concentrations exceed the MTCA cleanup level of 200 mg/kg. Deeper excavation was not continued at location P-5 because of geotechnical concerns for foundation stability of the adjacent building and storm sewer line.

At P-5, petroleum hydrocarbons primarily consisted of heavy-oil range hydrocarbons that have a low solubility and mobility in ground water. Lower concentrations of diesel range hydrocarbons were measured (highest concentration 437 mg/kg). A pre-remediation ground-water sample from soil probe P-5 met the ground-water cleanup level. Petroleum hydrocarbons were not detected in soil probes and wells located downgradient of location P-5. The available data indicate that petroleum hydrocarbons are not migrating from the P-5 area in ground water.

SAMPLING AND ANALYSIS

Sampling Procedures

Soil Probes: Sampling of soil and ground water using the soil probes was completed by Shannon & Wilson. The procedures associated with the sampling of the soil probes are outlined in the 1996 Shannon & Wilson reports that are attached as Appendices B and C. The logs of the soil borings are presented in the reports and in Appendix D.

Well Installation and Ground-Water Sampling: Wells MW-1 to MW-4 were installed by Holt Drilling, Inc. using a Mobile Drill B59 hollow-stem auger drilling rig on July 26, 1996. Dave Cooper, a geologist representing Dalton, Olmsted & Fuglevand, Inc., observed the drilling and well installations. During drilling, soil samples were obtained using a 2-inch to 3-inch split spoon sampler. The number of blows required to drive the samplers a distance of three successive 6-inch intervals were recorded.

Once the final drilling depth was reached, the wells were installed by lowering 2-inch diameter, Schedule 40 PVC screen and riser pipe through the auger center. A sand pack was installed around and above the screen as the auger was extracted. The well was finished by placing a bentonite chip and concrete seal above the sand pack and installing a flush-to-ground monument. The geologic logs and well construction diagrams are presented in Appendix D.

Wells MW-1, MW-3 and MW-4 were sampled on July 27, 1996 using low flow/low turbidity sampling procedures. Purging and sampling was conducted with a peristaltic pump at an approximate discharge rate of 0.5 liters per minute. All tubing was replaced prior to sampling each well. During sampling, temperature, pH, electrical conductivity, dissolved oxygen and turbidity were measured in the field. Samples were obtained after the field procedures stabilized to within 10 percent. Well MW-2 was sampled with a bailer to obtain sufficient volume. The field data for samples submitted to the laboratory are summarized below.

Summary of Field Measurements - July 27, 1996

Well	Temp. (C)	pH	Conductivity (uS)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Casing Volumes Removed
MW-1	13	6.5	654	1.8	0.3	3
MW-2(a)	nm	nm	nm	104	nm	(a)
MW-3	13.9	6.5	560	4.2	0.3	4.4
MW-4	13.6	6.7	833	4.9	0.9	4.5

Note: nm - not measured.

(a) - Well bailed dry. Sample obtained after water level recovery using a bailer.

Samples for dissolved metals analysis were passed through an in-line 0.45 micron filter (GWV High Capacity In-Line Groundwater Sampling Capsule by Gelman Sciences) using the peristaltic pump. Samples for petroleum hydrocarbon analyses were placed in containers provided by the receiving laboratory. After each sample was filled, it was placed into chilled coolers and were transported to the laboratory the same day using standard chain-of-custody procedures.

North Creek Analytical, Inc. of Bothell, Washington analyzed the samples for metals using EPA 6010/7000 Series Methods. Transglobal Environmental Geosciences Northwest (TEG) analyzed the ground-water samples for petroleum hydrocarbons using Washington State Method WTPH-D/extended. Laboratory data sheets are presented in Appendix G.

Confirmation Sampling. During the remedial excavation, confirmation soil samples were obtained. The samples were obtained by Dave Cooper or Matt Dalton, representing Dalton, Olmsted & Fuglevand, Inc. Samples were obtained from portions of the soil within the excavator bucket after the operator scraped the target area. Samples were obtained and placed into glass sample jars using stainless steel spoons.

The confirmation samples were analyzed for petroleum hydrocarbons by Transglobal Environmental Geosciences Northwest (TEG) using an on-site mobile laboratory. Washington State Method WTPH-D/extended was used to analyze the samples. Laboratory data sheets are presented in Appendix F.

CLOSING

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Dalton, Olmsted & Fuglevand, Inc.
Independent Remedial Action Report
Park 90.5 Office Park
December 1996

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

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Independent Remedial Action Report
Park 90/5 Office Park
December 1996

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TABLE 1- Historical Evidence of Underground Storage Tanks (USTs)Park 90/5 Office Building
Seattle, Washington

Support Evidence	Size	Probable Location
1927 Tax Assessor Card	6,000 gallons	Office building on northeast corner
1950 Permit (DCLU)	20,000 gallons	Gas pumps
1979 Permit (DCLU)	4,000 gallons	Northeast portion
1987 Earth Consultants, Inc. Report	Unknown	Engine and boiler rooms
1985 DCLU Permit and 1994 Delta Environmental Consultants Report	300 gallons	Building E

Notes:

DCLU - Department of Construction and Land Use (City of Seattle)

Source - Table 2 of Shannon & Wilson Report (1996a)

TABLE 2 - Summary of Ground-Water Elevations in Wells MW-1 to MW-4Park 90/5
Seattle, Washington

Well No.	Elevation Top PVC	June 27, 1996		July 2, 1996		Oct. 18, 1996	
		Depth to Water	Elevation	Depth to Water	Elevation	Depth to Water	Elevation
MW-1	13.21	9.95	3.26	9.92	3.29	10.1	3.11
MW-2	13.43	9.7	3.73(1)	9.22	4.21	6.09	7.34
MW-3	12.79	9.15	3.64	9.15	3.64	9.28	3.51
MW-4	12.68	8.55	4.13	8.53	4.15	nm	---

Notes: All measurements in feet

Depth to water measured from top of PVC casing

Elevation - City of Seattle datum

nm - well head was covered with fill and could not be located

(1) Elevation may be bias low. Because of the finer grained soils encountered at the MW-2 well location, the water level may not have fully stabilized by the time of the measurement on June 27 one day after the well was installed.

TABLE 3 - Soil Sample Analytical Results - Delta UST Removal

Park 90/5 Office Park
Seattle, Washington

Sample Number	Type	Depth (feet)	Date Sampled	WTPH-418.1 (mg/kg)	WTPH-HCID (mg/kg)			PCBs (mg/kg)
					Gasoline Range	Diesel Range	Heavy-Oil Range	
USED OIL TANK EXCAVATION								
WO-B	bottom	9	3-9-94	<25	<20	<50	<100	<0.1
WO-NS	north sidewall	6	3-9-94	57	na	na	na	na
WO-SS	south sidewall	6	3-9-94	120	na	na	na	na
WO-SP	stockpile	-----	3-9-94	<25	<20	<50	<100	<0.1

Notes: < - less than indicated value

na - not analyzed

Source of analytical results - Delta Environmental Consultants (1994)

See Figure 7 for sample locations

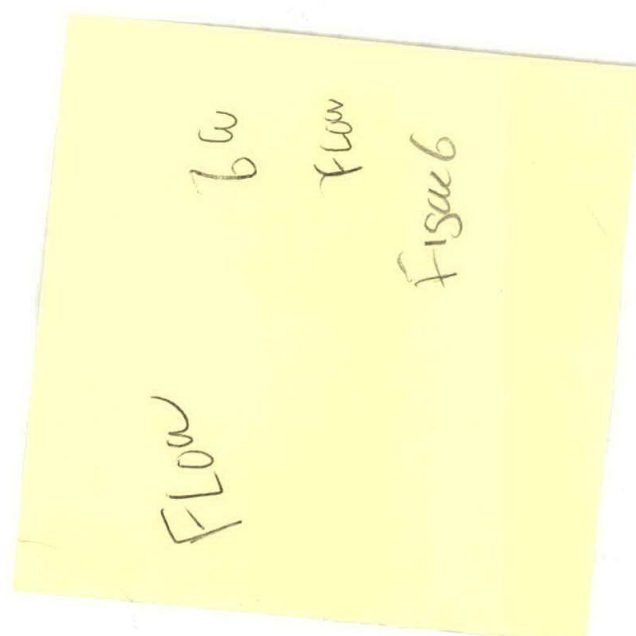


TABLE 4 - Summary of Petroleum Hydrocarbon Soil Characterization Analyses

Park 90/5 Office Park
Seattle, Washington

Sample Location	Sample Interval (ft)	Date Collection	Source	Diesel Range(a)	Heavy-Oil Range(a)	Gasoline Range(b)	Benzene (b)	Toluene (b)	Ethylbenzene (b)	Xylenes (b)
P-1	9-11	4-23-96	S&W	<20	<40	<10	<0.05	<0.05	<0.05	<0.05
P-2	6-9	4-23-96	S&W	20900	<40	na	na	na	na	na
P-2	9-11	4-23-96	S&W	118	52	<10	<0.05	<0.05	<0.05	<0.05
P-3	1-4	4-23-96	S&W	<20	<40	<10	<0.05	<0.05	<0.05	<0.05
P-3	3-6	4-23-96	S&W	<20	83	<10	<0.05	<0.05	<0.05	<0.05
P-4	8-10	4-23-96	S&W	<20	12774	25	<0.05	<0.05	0.13	1.1
P-5	8-10	4-23-96	S&W	<20	21700	<10	<0.05	0.84	<0.05	<0.05
P-6	6-9	6-11-96	S&W	<20	<40	na	na	na	na	na
P-7	9-12	6-11-96	S&W	<20	<40	na	na	na	na	na
P-8	3-6	6-11-96	S&W	37	42	na	na	na	na	na
P-8	6-9	6-11-96	S&W	<20	<40	na	na	na	na	na
P-9	9-12	6-11-96	S&W	<20	<40	na	na	na	na	na
MW-1	10-11.5	6-26-96	DOF	<20	<40	na	na	na	na	na
MW-2	10-11.5	6-26-96	DOF	<20	<40	na	na	na	na	na
MW-3	10-11.5	6-26-96	DOF	<20	<40	na	na	na	na	na
MW-4	10-11.5	6-26-96	DOF	<20	<40	na	na	na	na	na
MTCA Cleanup Levels - Method A (c)				200	200	100	0.5	40	20	20

Notes: All concentrations in mg/kg-ppm

< - less than indicated value

S&W - Shannon & Wilson, Inc. (1996b) - Fax dated 7/9/96

na - not analyzed

(a) - Method WTPH-D(extended)

(b) - Method WTPH-G w/ BTEX distinction

(c) - WAC 173-340-740/745 (Ecology 1996)

Laboratory analyses by Transglobal Environmental Geosciences Northwest, Inc., Lacey, Washington

TABLE 5 - Summary of Metal Soil Characterization AnalysesPark 90/5 Office Park
Seattle, Washington

Sample Location	Sample Interval (ft)	Date Collection	Source	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
P-2	9-11	4-23-96	S&W(e)	4	290	<0.34	7.4	41	<0.13	<27	<1.3
P2-Met(Exc)	1-4	6-12-96	DOF(f)	na	na	na	13.6	na	na	na	na
P-3	3-6	4-23-96	S&W(e)	2.7	260	<0.26	990	8.5	<0.09	<21	<1
P-4	1-4	4-23-96	S&W(e)	4.8	200	0.36	23	47	0.1	<21	<1.1
P4-Met(Exc)	1-5	6-12-96	DOF(f)	na	na	na	32.9	na	na	na	na
P5-Met(Exc)	1-5	6-12-96	DOF(f)	na	na	na	18.8	na	na	na	na
P-6	6-9	6-11-96	S&W(e)	5.2	100	<1.3	44	5.8	0.23	<19	<1.3
P-7	9-12	6-11-96	S&W(e)	2.5	94	<1.2	27	8.4	0.18	<18	<1.2
P-8	3-6	6-11-96	S&W(e)	6.7	140	<1.2	38	10	0.2	<19	<1.2
P-9	9-12	6-11-96	S&W(e)	1.6	110	<1.1	8.4	57	<0.1	<17	<1.1
MTCA Cleanup Levels - Residential				20 (a)	5600(c)	2 (a)	100(a)	250(a)	1(a)	400(c)	400(c)
MTCA Cleanup Levels - Industrial				200(b)	245000(d)	10(b)	500(b)	1000(b)	1(b)	17500(d)	17500(d)

Notes: All concentrations in mg/kg

< - less than indicated value

S&W - Shannon & Wilson, Inc. (1996b) - Fax dated 7-9-96

DOF - Dalton, Olmsted & Fuglevand, Inc.

(Exc) - Samples obtained from remedial excavation

Soil samples were analyzed for total metals by EPA Methods 6010 (barium, chromium, selenium and silver); 6020 (arsenic, cadmium, and lead); and 7471 (mercury).

(a) - MTCA Method A - WAC 173-340-740 (Ecology 1996)

(b) - MTCA Method A - WAC 173-340-745 (Ecology 1996)

(c) - MTCA Method B - WAC 173-340-740 (Ecology 1994)

(d) - MTCA Method C - WAC 174-340-745 (Ecology 1994)

(e) - Laboratory analyses by Transglobal Environmental Geosciences Northwest, Inc., Lacey, Washington

(f) - Laboratory analyses by North Creek Analytical Inc., Bothell, Washington

TABLE 6 - Summary of Petroleum Hydrocarbon Ground-Water Quality AnalysesPark 90/5 Office Park
Seattle, Washington

Sample Location	Screen Interval (ft)	Date Collection	Source	Diesel Range(a)	Heavy-Oil Range(a)	Gasoline Range(b)	Benzene (b)	Toluene (b)	Ethylbenzene (b)	Xylenes (b)
P-1	6-8.5	4-23-96	S&W	<0.2	<0.4	<0.1	<0.001	<0.001	<0.001	<0.001
P-2	6.5-9	4-23-96	S&W	219	0.538	<0.1	<0.001	<0.001	<0.001	<0.001
P-3	7-9.5	4-23-96	S&W	<0.2	<0.4	<0.1	<0.001	<0.001	<0.001	<0.001
P-4	9-10.5	4-23-96	S&W	<0.2	<0.4	<0.1	<0.001	<0.001	<0.001	<0.001
P-5	9-11.5	4-23-96	S&W	0.233	<0.4	<0.1	<0.001	0.0018	<0.001	0.0094
P-6	9-12	6-11-96	S&W	<0.2	<0.4	na	na	na	na	na
P-7	9-12	6-11-96	S&W	<0.2	<0.4	na	na	na	na	na
P-8	6-9	6-11-96	S&W	<0.2	<0.4	na	na	na	na	na
P-9	9-12	6-11-96	S&W	<0.2	<0.4	na	na	na	na	na
P-10	8.5-11.5	7-5-96	S&W	<0.5	<1	na	na	na	na	na
P-11	8.5-11.5	7-5-96	S&W	<0.5	<1	na	na	na	na	na
MW-1	5-15	6-27-96	DOF	<0.2	<0.4	na	na	na	na	na
MW-2	5-15	6-27-96	DOF	<0.2	<0.4	na	na	na	na	na
MW-3	5-15	6-27-96	DOF	<0.2	<0.4	na	na	na	na	na
MW-4	5-15	6-27-96	DOF	<0.2	<0.4	na	na	na	na	na

Ground-Water Cleanup Levels - MTCA Method A (c)	1	1	1	0.005	0.04	0.03	0.02
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Notes: All concentrations in mg/l-ppm

< - less than indicated value

na - not analyzed

S&W - Shannon & Wilson, Inc. (1996b) - Fax dated 7-9-96

DOF - Dalton, Olmsted & Fuglevand, Inc.

(a) - Method WTPH-D(extended)

(b) - Method WTPH-G w/ BTEX distinction

(c) - WAC 173-340-720 (Ecology 1996)

Laboratory analyses by Transglobal Environmental Geosciences Northwest, Inc., Lacey, Washington

TABLE 7 - Summary of Metal Ground-Water Quality Analyses

Park 90/5 Office Park
Seattle, Washington**Total Metals**

Sample Location	Screen Interval (ft)	Date Collection	Source	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
P-6(a)	9-12	6-11-96	S&W	0.012	0.94	<0.001	0.02	0.16	<0.0004	<0.13	<0.01
P-7(a)	9-12	6-11-96	S&W	0.011	3.2	0.003	0.04	6.1	<0.028	<0.15	<0.01
P-8(a)	6-9	6-11-96	S&W	0.051	5.6	0.004	0.05	1.1	0.015	<0.15	<0.01
P-9(a)	9-12	6-11-96	S&W	<0.001	0.36	<0.001	<0.01	<0.05	<0.0004	<0.15	<0.01
MW-1	5-15	6-27-96	DOF	<0.004	0.136	<0.0001	<0.01	<0.002	<0.001	<0.005	<0.02
MW-2	5-15	6-27-96	DOF	na	na	na	na	na	na	na	na
MW-3	5-15	6-27-96	DOF	<0.004	0.089	<0.0001	<0.01	<0.002	<0.001	<0.005	<0.02
MW-4	5-15	6-27-96	DOF	0.023	0.125	<0.0001	<0.01	<0.002	<0.001	<0.005	<0.02

DETERMINED
LIMITS
TOO
HIGH!

Dissolved Metals (b)

Sample Location	Screen Interval (ft)	Date Collection	Source	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
P-2(a)	6.5-9	4-23-96	S&W	0.003	0.19	<0.0005	<0.01	0.002	<0.0002	<0.2	<0.01
P-3(a)	7-9.5	4-23-96	S&W	0.017	0.025	<0.0005	<0.01	<0.0005	<0.0002	<0.2	<0.01
P-4(a)	9-10.5	4-23-96	S&W	0.011	0.14	<0.0005	<0.01	0.004	<0.0002	<0.2	<0.01
P-7(a)	9-12	7-5-96	S&W	<0.0035	0.15	<0.005	<0.01	<0.002	<0.0005	<0.0063	<0.01
MW-1	5-15	6-27-96	DOF	<0.004	0.158	<0.0001	<0.01	<0.002	<0.001	<0.005	<0.02
MW-2	5-15	6-27-96	DOF	0.019	0.115	<0.0001	<0.01	<0.002	<0.001	<0.005	<0.02
MW-3	5-15	6-27-96	DOF	<0.004	0.099	<0.0001	<0.01	<0.002	<0.001	<0.005	<0.02
MW-4	5-15	6-27-96	DOF	0.021	0.158	<0.0001	<0.01	<0.002	<0.001	<0.005	<0.02

Ground-Water Cleanup Levels	0.036(c)	1.1(d)	0.008(c)	0.05(c)	0.0058(c)	0.0002(c,f)	0.071(c)	0.0012(e)
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Notes: All concentrations in mg/l-ppm

< - less than indicated value

na - not analyzed

S&W - Shannon & Wilson, Inc. (1996b) - Fax dated 7-9-96

DOF - Dalton, Olmsted & Fuglevand, Inc.

S&W ground-water samples were analyzed by Transglobal Environmental Geosciences Northwest, Inc., Lacey, WA. using the following methods:

Ground-water samples were analyzed for dissolved metals by EPA Methods 200.7 (barium, chromium, selenium and silver); 200.8 (arsenic, cadmium, and lead); and 245.2 (mercury); and total metals by EPA Methods 6010 (barium, chromium, lead, selenium and silver); 200.8 (arsenic and cadmium); and 245.1 (mercury).

DOF ground-water samples were analyzed by North Creek Analytical, Inc., Bothell, WA using EPA 6010/7000 Series Methods

(a) Sample obtained from well point placed in open (undeveloped) probe hole.

(b) S&W samples were filtered in the laboratory using a 0.45 micron filter; DOF samples were field filtered using an in-line 0.45 micron filter by Gelman Sciences.

(c) - Wash. State Surface Water Standards (WAC 173-201A-040 - marine chronic criteria)

(d) - MTCA Method B - WAC 173-340-720 (Ecology 1994)

(e) - Wash. State Surface Water Standards (WAC 173-201A-040 - marine acute criteria - marine chronic criteria not available)

(f) - Cleanup level adjusted based on analytical considerations.

TABLE 8 - Summary of Semivolatile Organic Compound Analyses - P-2 and P-5 (1)Park 90/5 Office Park
Seattle, Washington

Compound	Location P-2 (mg/kg)	Location P-5(2) (mg/kg)
Phenol	<2.8	1.2
Benzoic Acid	<14	1.1
Naphthalene	<2.8	1.7
2-Methylnaphthalene	9.4	0.64
Dimethylphthalate	<2.8	0.22
Acenaphthene	4.7	0.76
Dibenzofuran	1.8J	0.47
Fluorene	12	0.69
Phenanthrene	15	4.6
Anthracene	1.9J	2.2
Di-n-butylphthalate	<2.8	0.28
Fluoranthene	<2.8	4.4
Pyrene	<2.8	3.3
Benzo(a)anthracene	<2.8	1.2
Chrysene	<2.8	0.95
bis(2-Ethylhexyl)phthalate	1.7JB1	0.38B1
Benzo(b)fluoranthene	<2.8	1.3
Benzo(k)fluoranthene	<2.8	0.39
Benzo(a)pyrene	<2.8	1.1
Indeno(1,2,3-cd)pyrene	<2.8	0.65
Benzo(g,h,i)perylene	<2.8	0.65

Notes:

- (1) - These analyses were completed for soil disposal purposes.
- (2) - Soils represented by these analytical results were largely removed during soil remediation
- < - less than indicated value
- J - The analyte was analyzed and positively identified, but the associated numerical value is an estimated quantity.
- B1 - This analyte was detected in the associated method blank.

TABLE 9 - Soil Quality Data - Excavation P-2

Park 90/5
Seattle, Washington

Excavation P-2

Sample No.	Type	Depth (feet)	Extractable Petroleum Hydrocarbons(WTPH-DX)	
			Diesel Range(mg/kg)	Heavy Oil Range(mg/kg)
Confirmation Samples				
P2-N1	sidewall	6.5	<20	<40
P2-N2	sidewall	7-8	2300	<40
P2-E4	sidewall	7-8	<20	<40
P2-E5	sidewall	7-9	133	<40
P2-E6	sidewall	7-9	58	<40
P2-S3	sidewall	7-8	<20	<40
P2-W1	sidewall	6.5	689	<40
P2-B2	bottom	9	248	<40
P2-B3	bottom	9	<20	<40
P2-B4	bottom	9-10	86	<40
P2	probe(1)	9-11	118	52
Information Samples				
P2-NE1	sidewall	7-8	2840	<40
P2-E1	sidewall	6.5	<20	<40
P2-E2	sidewall	7-8	8600	<40
P2-E3	sidewall	7-8	21	<40
P2-S1	sidewall	6.5	409	<40
P2-S2	sidewall	7-8	14900	<40
P2-SE1	sidewall	6.5	149	<40
P2-SE2	sidewall	7-8	5690	<40
P2-SE3	sidewall	7-8	7460	<40
P2-SE4	sidewall	7-8	806	<40
P2-SW1	sidewall	7-8	1420	<40
P2-B1	bottom	8	11600	<40
P2	probe(1)	6-9	20900	<40

Notes: < - less than indicated value

(1) - Sample obtained during site characterization

Laboratory analyses by Transglobal Environmental Geosciences Northwest, Inc., Lacey, Washington

TABLE 10 - Soil Quality Data - Excavations P4 and P5

Park 90/5
Seattle, Washington

Excavation P-4

Sample No.	Type	Depth (feet)	Extractable Petroleum Hydrocarbons(WTPH-DX)	
			Diesel Range(mg/kg)	Heavy Oil Range(mg/kg)
Confirmation Samples				
P4-N1	sidewall	8-10	<20	<40
P4-E1	sidewall	8-10	<20	152
P4-S1	sidewall	8-10	<20	192
P4-W1	sidewall	9	<20	120
P4-B3	bottom	11	<20	813
Information Samples				
P4-B1	bottom	9	<20	636
P4-B2	bottom	10	68	3510
P4	probe(1)	8-10	<20	12774

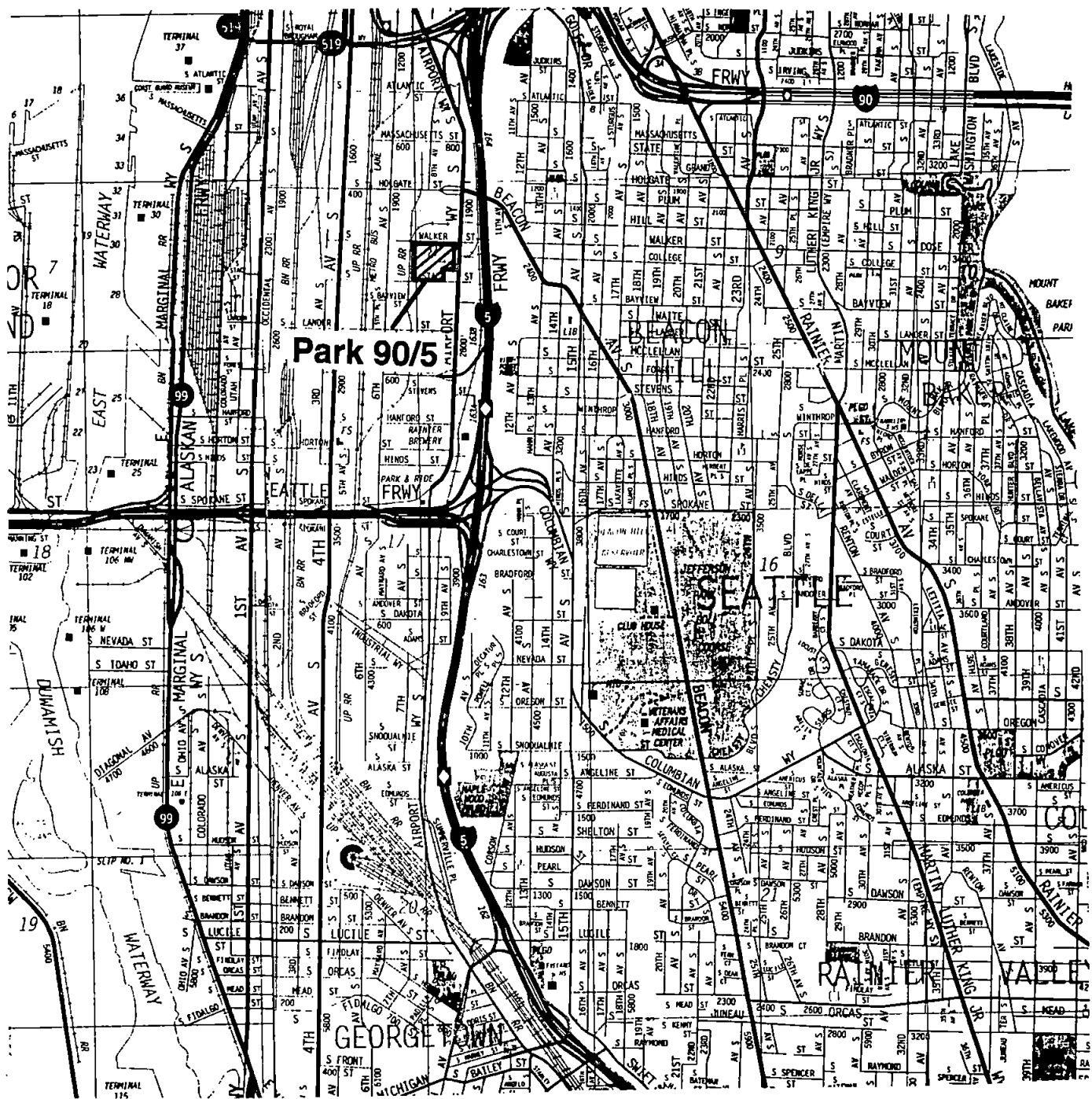
Excavation P-5

Sample No.	Type	Depth (feet)	Extractable Petroleum Hydrocarbons(WTPH-DX)	
			Diesel Range(mg/kg)	Heavy Oil Range(mg/kg)
Confirmation Samples				
P5-N2	sidewall	8-10	<20	473
P5-E3	sidewall	8-10	<20	186
P5-S1	sidewall	8-10	<20	238
P5-W2	sidewall	8-10	82	327
P5-B2	bottom	12	437	929
Information Samples				
P5-N1	sidewall	8-10	<20	1333
P5-E1	sidewall	8-10	<20	527
P5-E2	sidewall	8-10	29	1040
P5-W1	sidewall	8-10	52	537
P5-B1	bottom	10	178	1950
P5	probe(1)	8-10	<20	21700

Notes: < - less than indicated value

(1) - Sample obtained during site characterization

Laboratory analyses by Transglobal Environmental Geosciences Northwest, Inc., Lacey, Washington



0 2400
Scale in Feet

North

Map Source: Thomas Guide 1997

Park 90/5 Office Park
Seattle, Washington

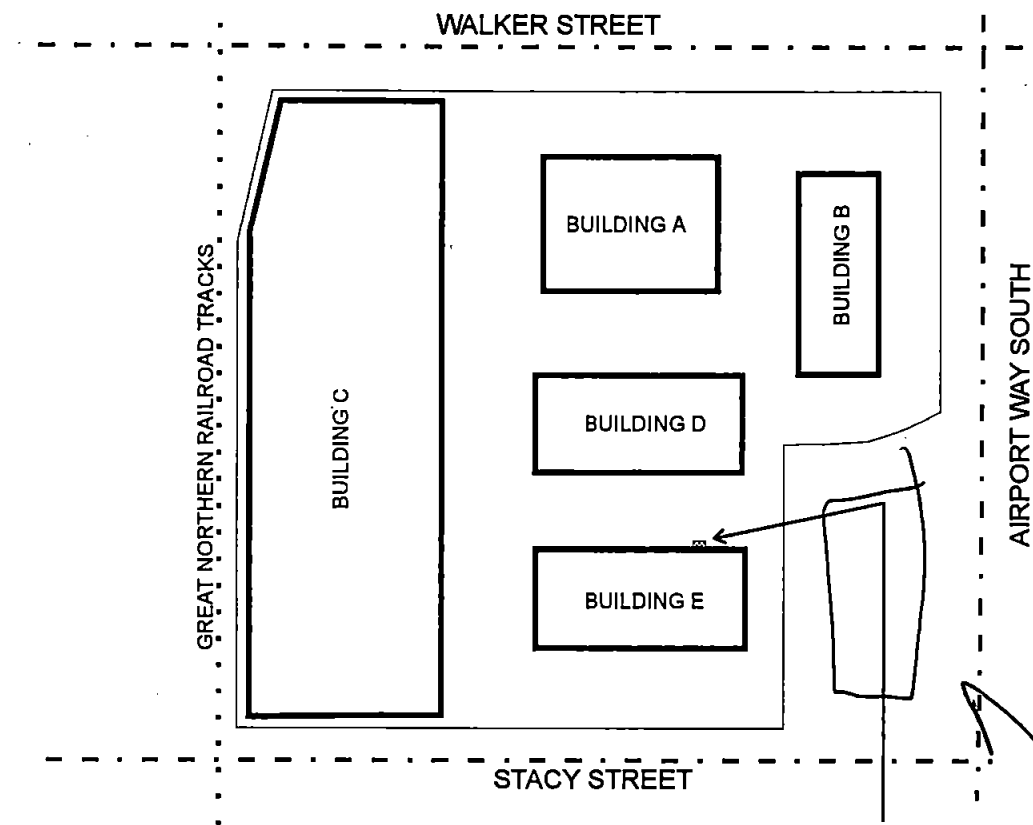
**SITE VICINITY
MAP**

SAB-004

FIGURE 1

October 1996

Dalton, Olmsted & Fuglevand, Inc.



Approximate location of
300 gallon waste oil tank
removed in 1994.

Building C

0 100 200 400
Approx. Scale in Feet

Park 90/5
Seattle, Washington

SITE PLAN

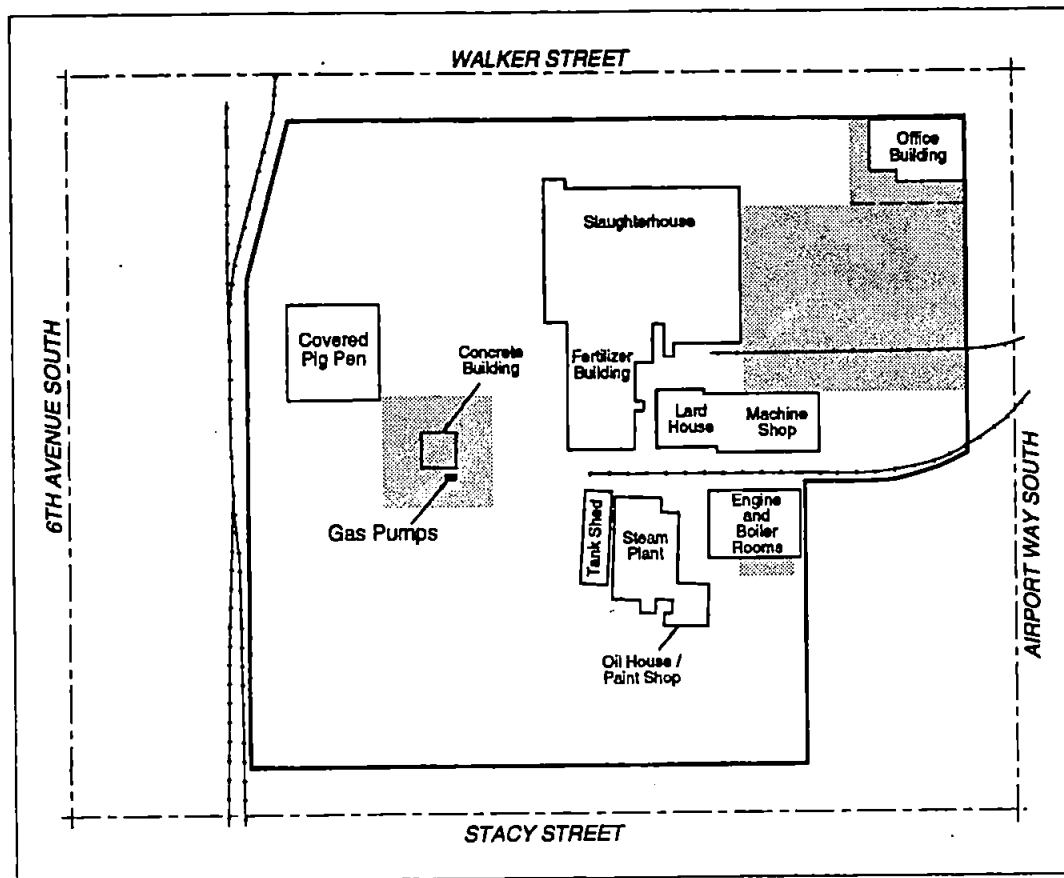
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SAB-004

FIGURE 2

October 1996

Dalton, Olmsted & Fuglevand, Inc.



0 100 200 400

Scale in Feet

North

 Potential Location of Former
Underground Storage Tanks (USTs)
Based on Historical Information

Source Map: Shannon & Wilson (Figure 2 - 1996)

ref: oldsite.cdr

Park 90/5 Office Park
Seattle, Washington

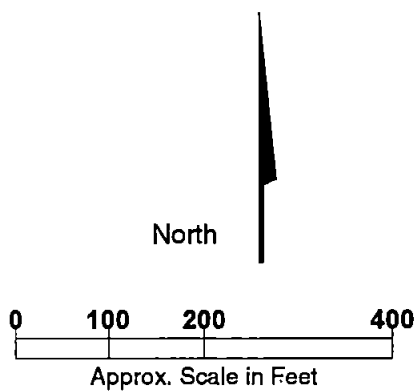
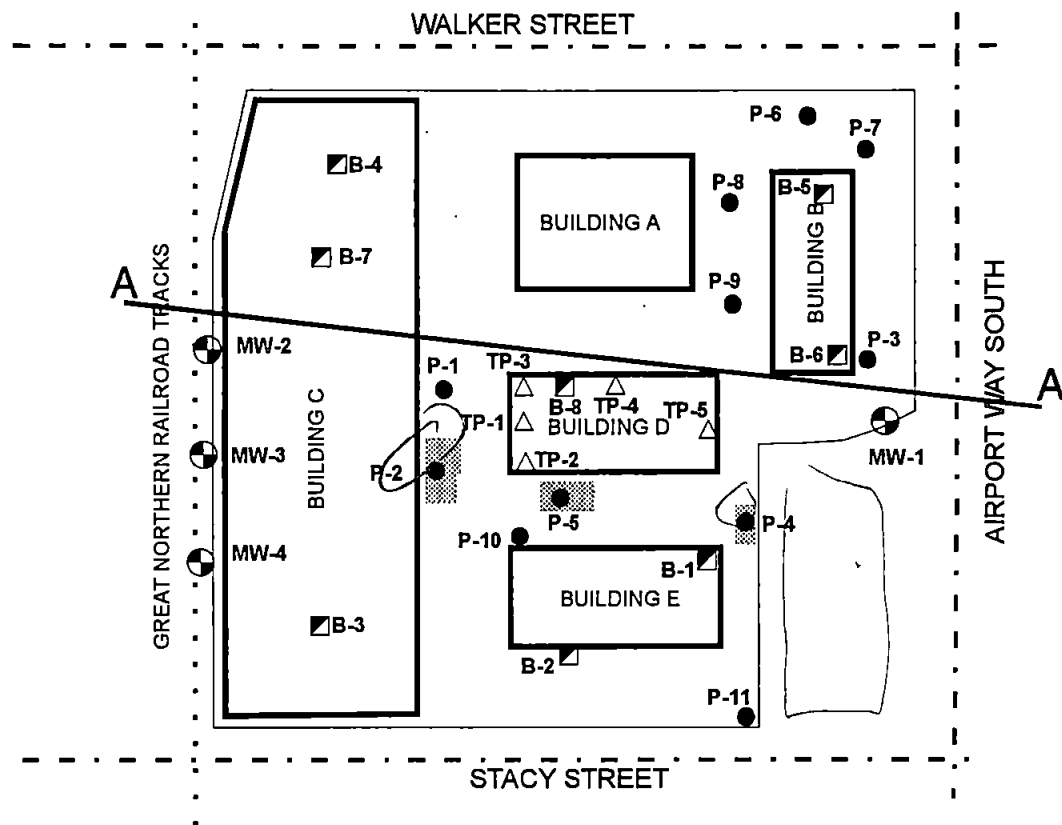
HISTORICAL SITE PLAN

SAB-004

FIGURE 3

October 1996

Dalton, Olmsted & Fuglevand, Inc.



P-2 Stratoprobe Location (Completed by Shannon & Wilson, April and July 1996)

Remedial Excavation (Completed in June 1996)

MW-1 Monitoring Well Location and Number (installed by Dalton, Olmsted & Fuglevand, June 1996)

B-1 Geotechnical Boring Location (By Earth Consultants; 1984 and 1985)

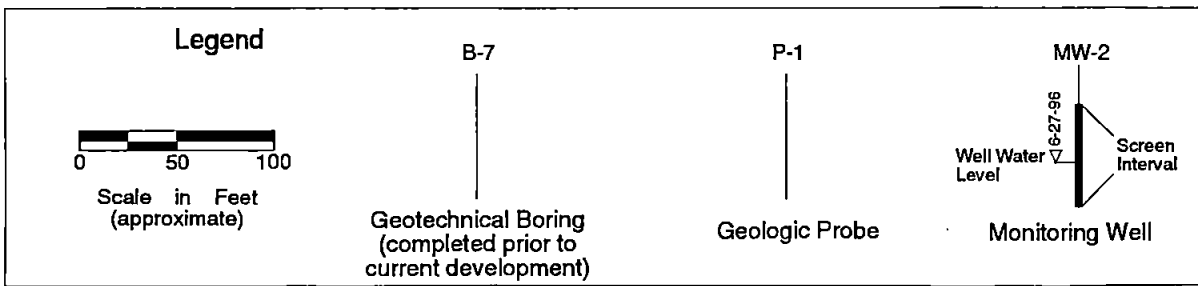
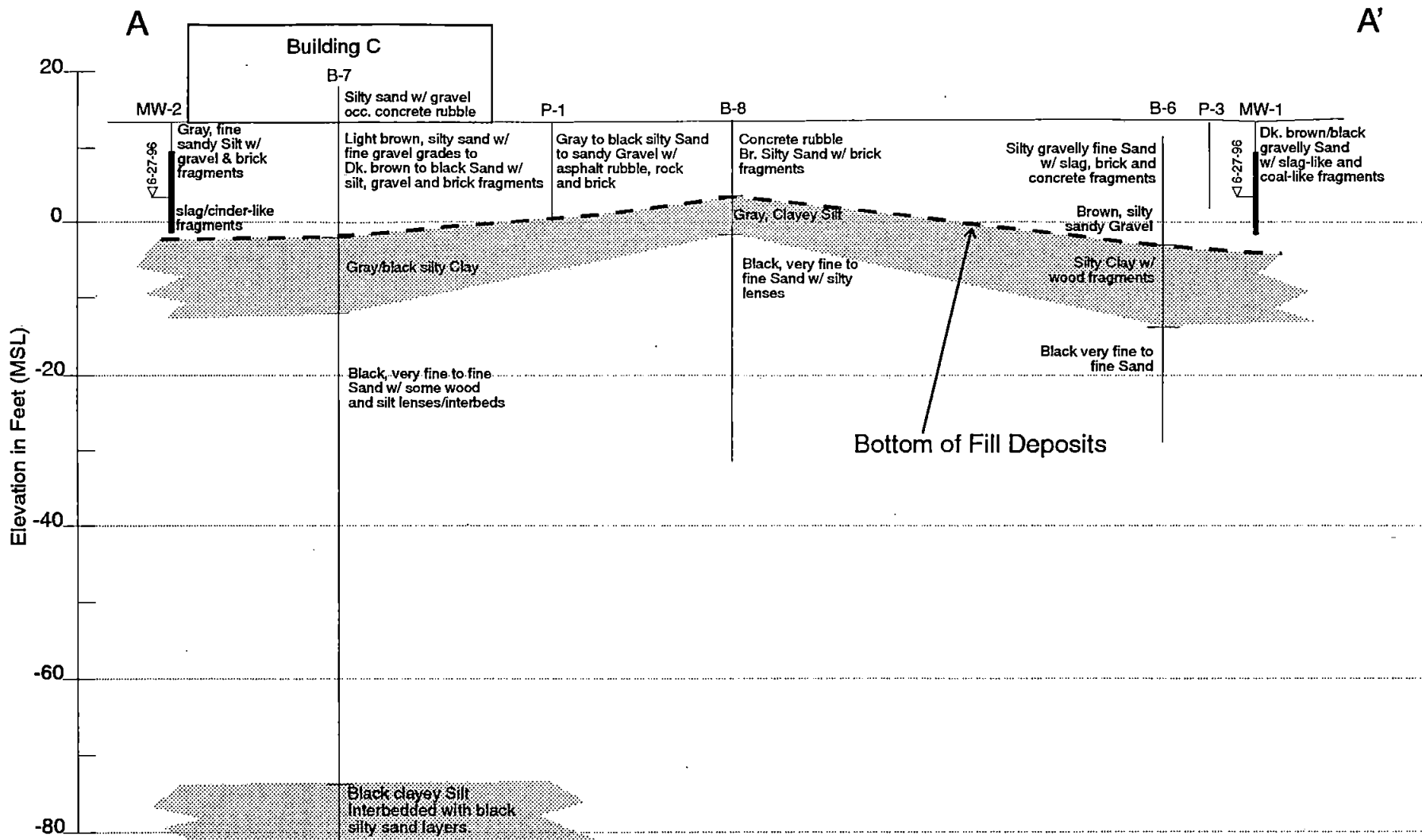
TP-1 Geotechnical Test Pit Location (By Earth Consultants; 1987)

A A' Trend of Geologic Section A-A'

Park 90/5
Seattle, Washington

**SITE PLAN SHOWING
REMEDIAL EXCAVATIONS AND
BORING, PROBE AND WELL LOCATIONS**

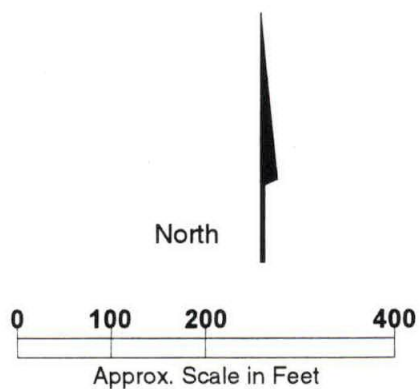
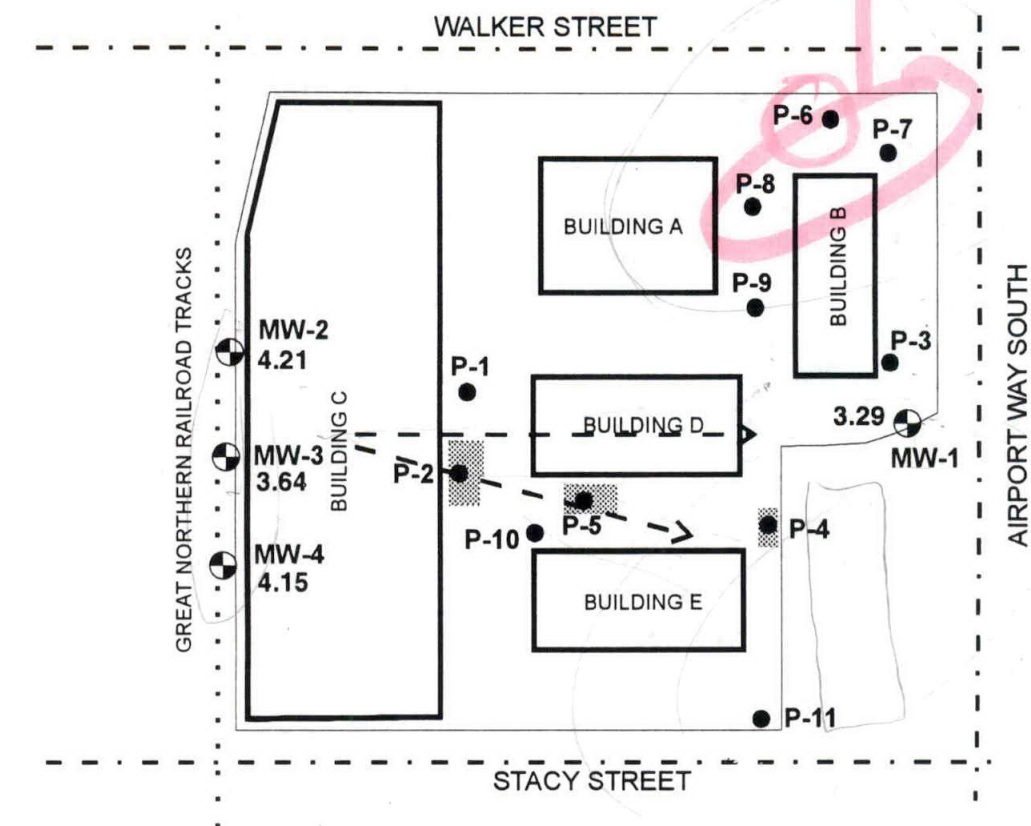
SAB-004 **FIGURE 4** October 1996
Dalton, Olmsted & Fuglevand, Inc.



Park 90/5 Office Park
Seattle, Washington

GEOLOGIC SECTION A-A'

SAB-004 **FIGURE 5** October 1996
Dalton, Olmsted & Fuglevand, Inc.



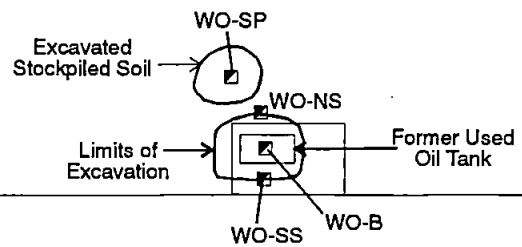
- P-2** ● Stratoprobe Location (Completed by Shannon & Wilson, April and June/July 1996)
- Remedial Excavation (Completed in June 1996)
- **MW-1** Monitoring Well Location and Number (installed by Dalton, Olmsted & Fuglevand, June 1996)
- 3.29** Ground-Water Elevation July 2, 1996
- - -> Estimated Ground-Water Flow Direction

Park 90/5
Seattle, Washington

**ESTIMATED GROUND-WATER
FLOW DIRECTION - JULY 2, 1996**

SAB-004 **FIGURE 6** October 1996
Dalton, Olmsted & Fuglevand, Inc.

Building D



Building E

North

Legend

■ Soil Sample Location
and number
WO-B

Not To Scale

Source: Figure 2 Delta Environmental (1994)

ref: deltank.cdr

Park 90/5 Office Park
Seattle, Washington

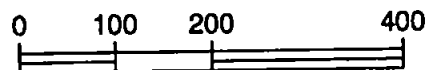
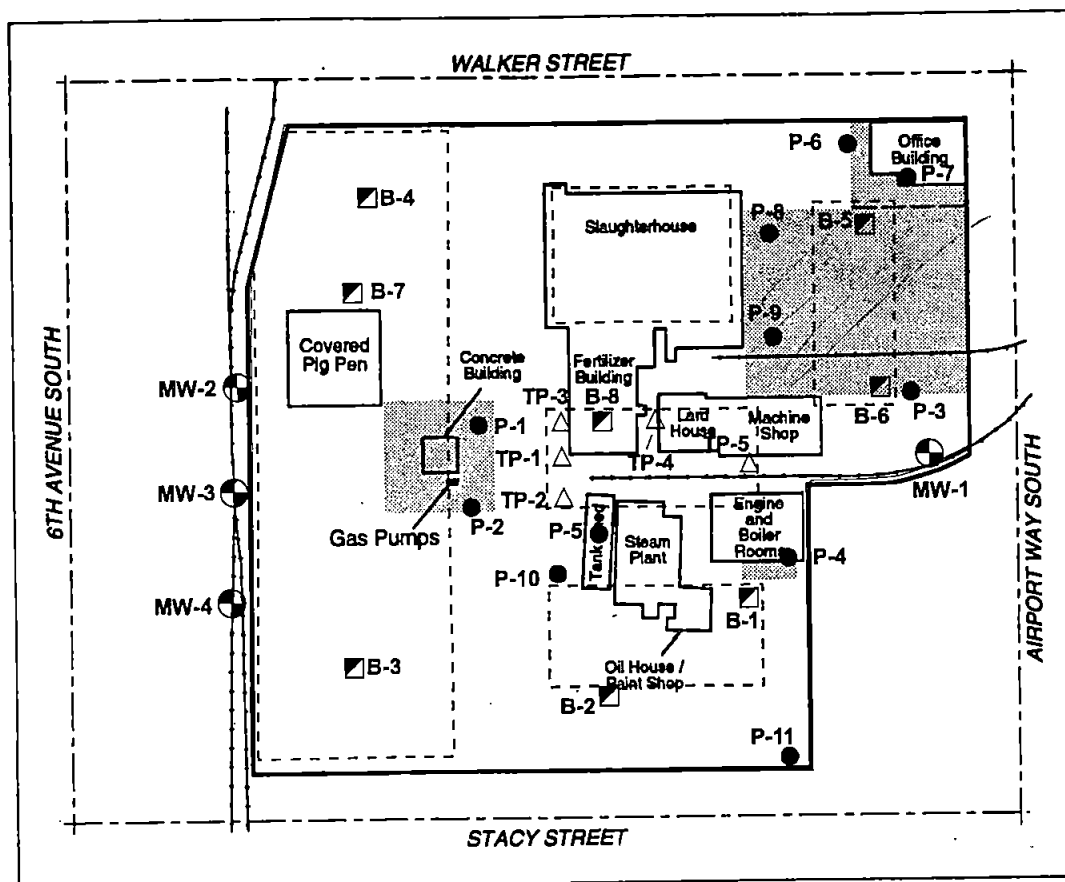
Site Map 300 Gallon UST Removal

SAB-004

FIGURE 7

October 1996

Dalton, Olmsted & Fuglevand, Inc.



Scale in Feet



Outline of Existing Buildings



Potential Location of Former Underground Storage Tanks (USTs) Based on Historical Information

P-2 Stratoprobe Location (Completed by Shannon & Wilson, April and July 1996)

MW-1 Monitoring Well Location and Number (installed by Dalton, Olmsted & Fuglevand, June 1996)

B-1 Geotechnical Boring Location (By Earth Consultants; 1984 and 1985)

TP-1 Geotechnical Test Pit Location (By Earth Consultants; 1987)

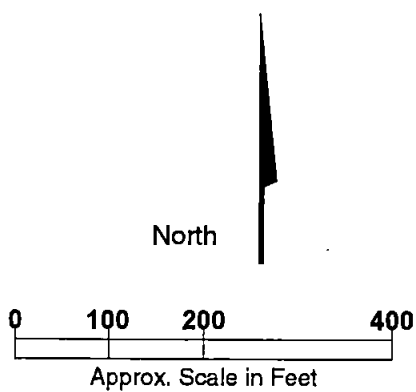
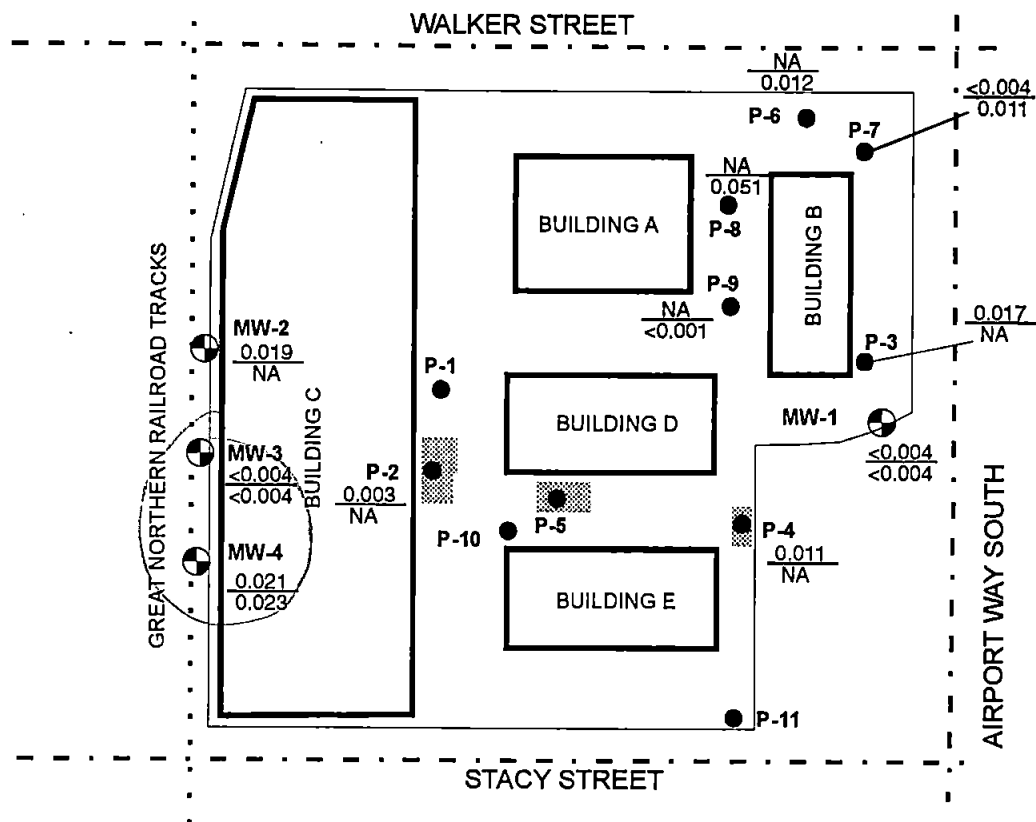
Source Map: Shannon & Wilson (Figure 2 - 1996)

ref: oldsite1.cdr

Park 90/5 Office Park
Seattle, Washington

HISTORICAL SITE PLAN and Exploration Locations

SAB-004 **FIGURE 8** October 1996
Dalton, Olmsted & Fuglevand, Inc.



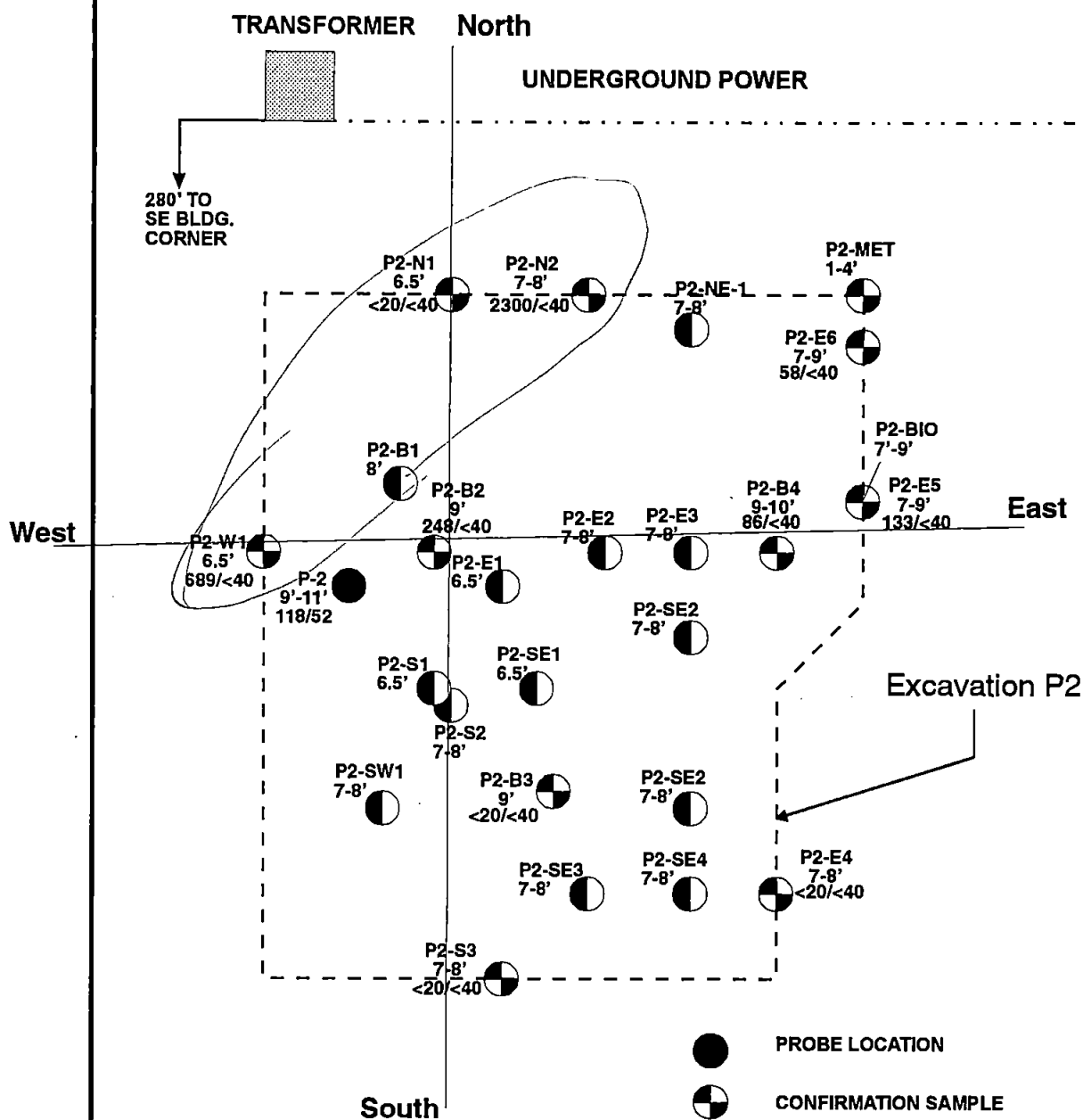
- P-2** Stratoprobe Location (Completed by Shannon & Wilson, April and June/July 1996)
- Remedial Excavation (Completed in June 1996)
- MW-1** Monitoring Well Location and Number (installed by Dalton, Olmsted & Fuglevand, June 1996)
- <0.004 Dissolved As Conc. (mg/l)
- <0.004 Total As Conc. (mg/l)
- NA Not Analyzed

Park 90/5
Seattle, Washington

**TOTAL AND DISSOLVED
ARSENIC CONCENTRATIONS
IN GROUND WATER**

SAB-004 **FIGURE 9** October 1996
Dalton, Olmsted & Fuglevand, Inc.

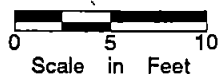
BUILDING C



- PROBE LOCATION
- ◐ CONFIRMATION SAMPLE
- ◑ INFORMATION SAMPLE (excavated)
- P2-E4 7-8' SOIL SAMPLE NUMBER AND DEPTH
- <40/<40 Diesel Range Hydrocarbons/ Heavy Oil Range Hydrocarbons] in mg/kg - ppm

West East Trend of Sections on Figure 11

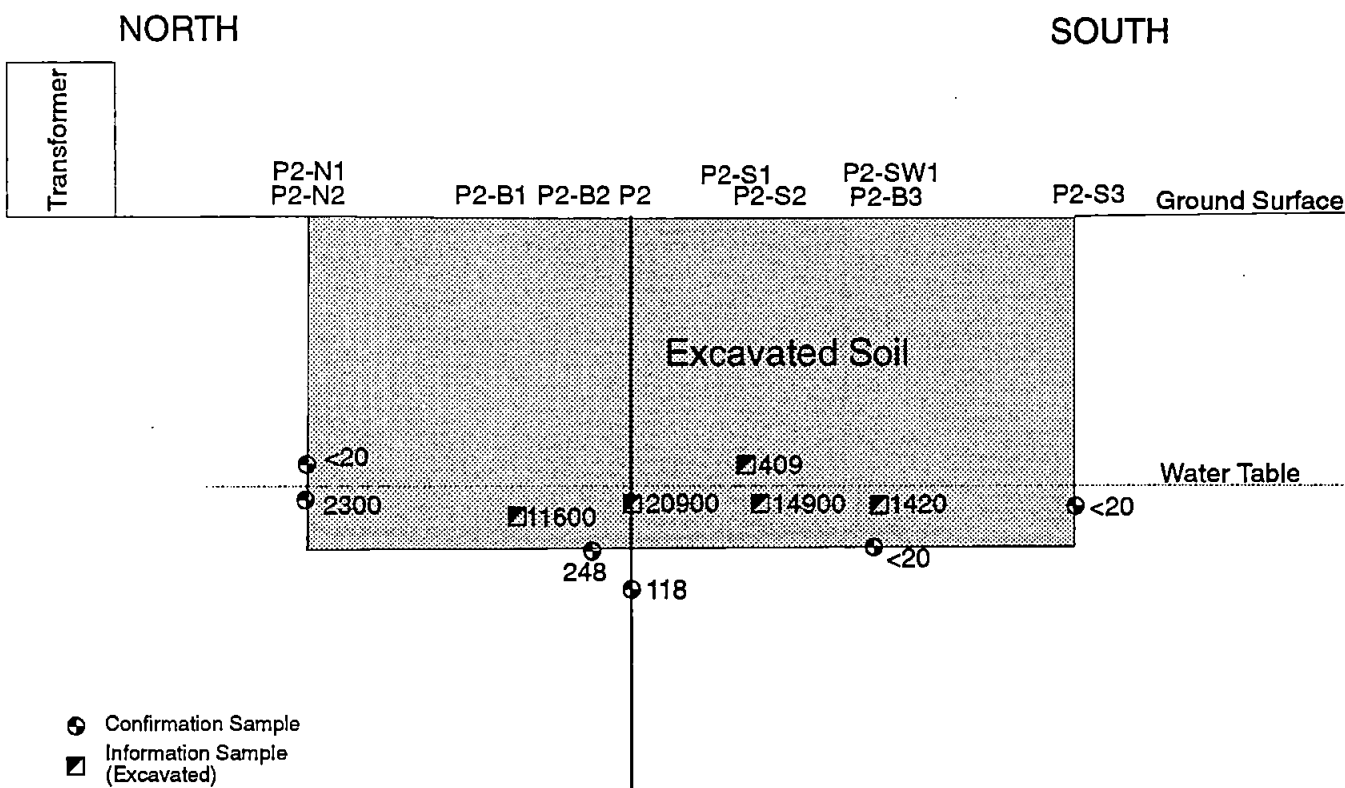
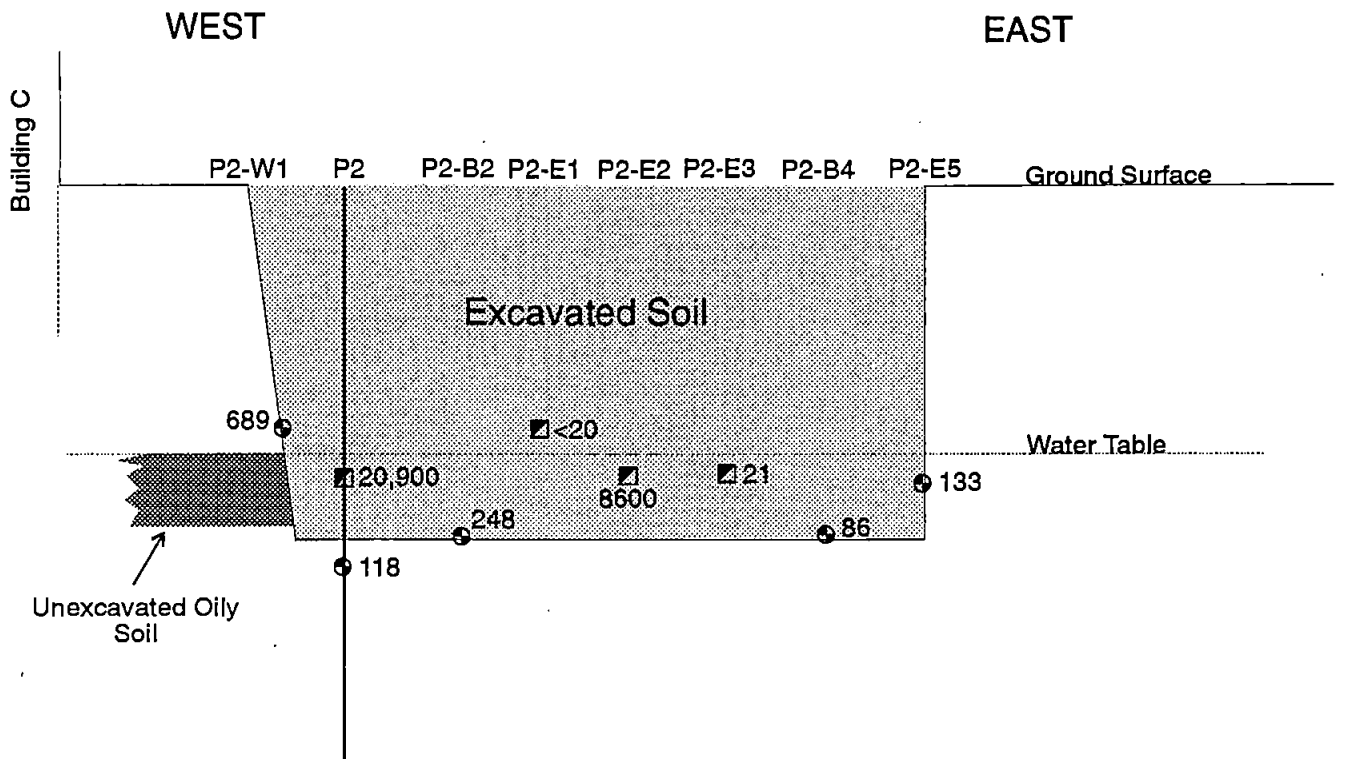
North



Park 90/5
Seattle, Washington

SOIL SAMPLE LOCATIONS EXCAVATION P2

SAB-004 **FIGURE 10** October 1996
Dalton, Olmsted & Fuglevand, Inc.



- Confirmation Sample
 - Information Sample (Excavated)
- 118 Diesel Range Hydrocarbons in mg/kg - ppm (WTPH-DX)

0 5 10
Horizontal
Scale in Feet

0 2.5 5
Vertical
Scale in Feet

ref: secp2.cdr

Park 90/5
Seattle, Washington

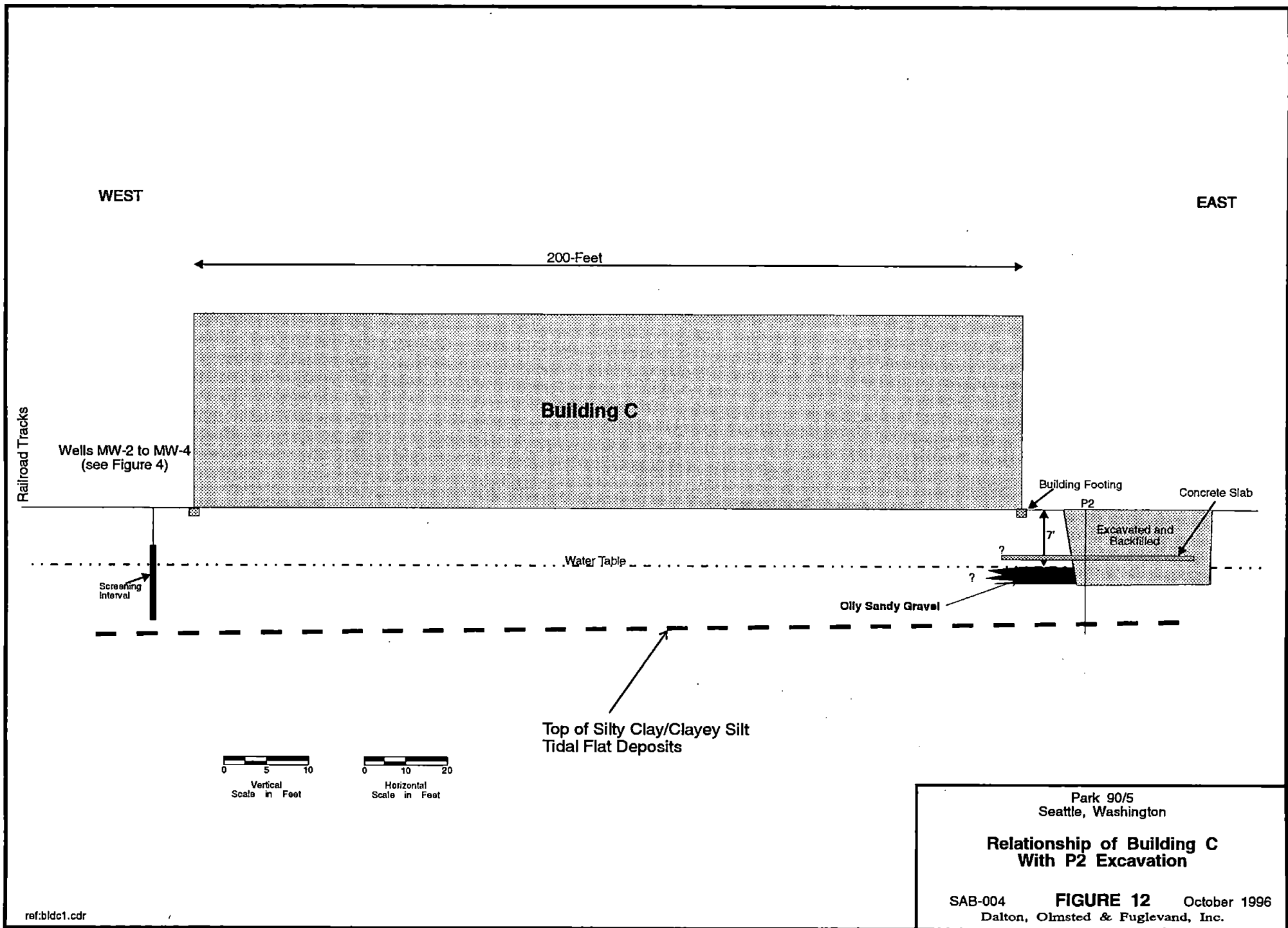
Sections Through Excavation P2

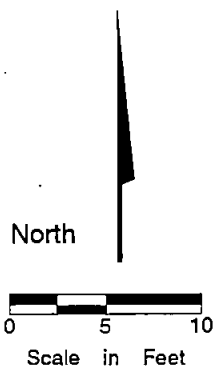
SAB-004

FIGURE 11

October 1996

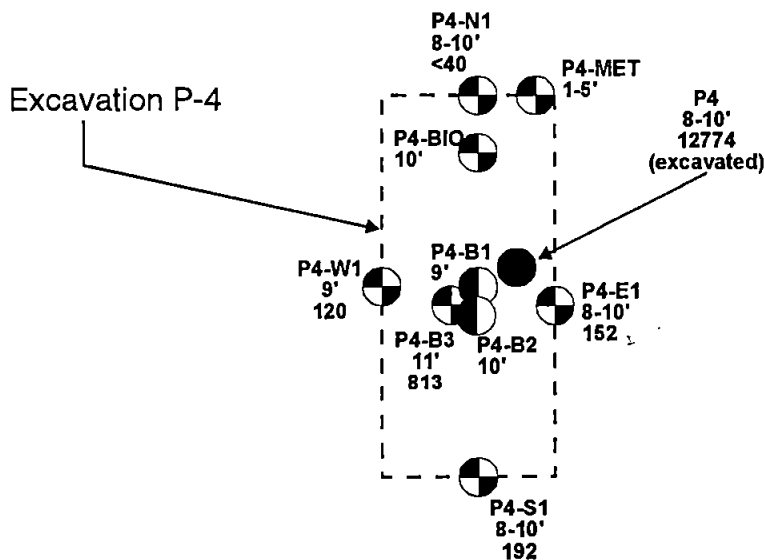
Dalton, Olmsted & Fuglevand, Inc.





- PROBE LOCATION
- ◐ CONFIRMATION SAMPLE
- ◑ INFORMATION SAMPLE (excavated)
- P4-S1**
8-10'
120
HEAVY OIL RANGE
HYDROCARBONS
IN MG/KG-PPM(WTPH-DX)

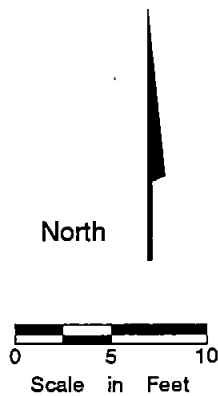
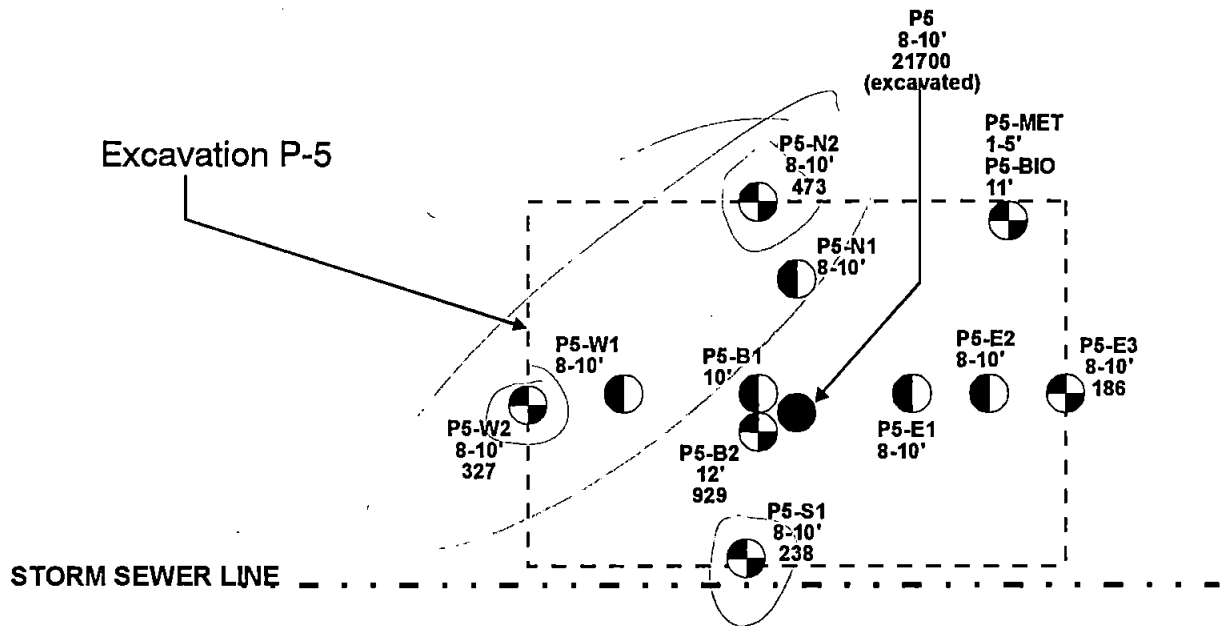
OFF-SITE
BUILDING



Park 90/5
Seattle, Washington

**SOIL SAMPLE LOCATIONS
EXCAVATION P-4**

BUILDING D



- PROBE LOCATION
- CONFIRMATION SAMPLE
- INFORMATION SAMPLE (excavated)
- P5-N2 8-10' SOIL SAMPLE NUMBER AND DEPTH
- 186 HEAVY OIL RANGE HYDROCARBONS IN MG/KG-PPM (WTPH-DX)

Park 90/5
Seattle, Washington

SOIL SAMPLE LOCATIONS EXCAVATION P-5

SAB-004 **FIGURE 14** October 1996
Dalton, Olmsted & Fuglevand, Inc.

APPENDIX A
PRELIMINARY ENVIRONMENTAL AUDIT REPORT
EARTH CONSULTANTS 1987



October 14, 1987

E-2453-3

Sabey Corporation
201 Elliot Avenue W.
Seattle, Washington 98119
Attention: Doug Kaiser

Subject: Preliminary Environmental Audit
Park 90/5 Site (a.k.a. Bar-S)
Airport Way S. and S. Stacey Street
Seattle, Washington

Dear Mr. Kaiser,

In response to your recent request, Earth Consultants, Inc. (ECI) has completed a preliminary environmental audit of the referenced property. This brief report summarizes our approach to the project along with preliminary findings.

METHODOLOGY/SCOPE OF WORK

The scope of work for this assessment consisted of the following tasks:

- Review of available information from various sources with respect to historical use of the property.
- Visual reconnaissance of the subject property including building interiors and grounds.
- Sampling and analysis of selected materials from building interiors for asbestos.
- Preparation of the written report.

FINDINGS

Site Use History

Information regarding developmental history of the site was obtained through interviews with individuals having specific knowledge of development activity, interpretation of a series of aerial photographs dating back to 1936, and review of geotechnical field notes from earlier studies conducted by ECI.

From our telephone conversation with Mr. Al Samuelson of Ticor Title Insurance we learned that Mr. Charles Frye assembled the various parcels comprising the subject property during the period of 1910 to 1913. Frye and Company owned the site until 1950 at which time it was purchased by the Seattle Packing Company. Title records did not disclose how the site was used during the period from 1910 to 1936.

Aerial photographs dated 1936 document the presence of a slaughterhouse and meat packing facility in essentially the same configuration as it appears in photographs dated 1969 as well as in a site plan prepared by Triad Associates in 1984, furnished by Berkeley Engineering and Construction. The site plan depicts the subject site prior to its renovation which commenced in 1985. Prior to demolition of most of the old buildings in 1985 the site was occupied by a two-story concrete office building, a three-story mechanical plant, an aluminum sided steam plant, a two-story brick building, and the newly renovated three-story concrete and brick building that once served as a slaughter house and bacon processing plant.

The site plan mentioned in the preceding paragraph indicates the presence of a variety of underground and surface tanks on the old site, and a covered pig pen located near the northwest corner of the site. The plan documents the presence of gas pumps near the west central part of the old site, and buried fuel storage tanks were presumably located nearby. ~~A fuel oil tank was reported by Mr. Al Clow of Berkeley Engineering and Construction to have been removed from the ground directly south of the now demolished, three-story mechanical building.~~ Additionally, an unknown number of surface tanks (approximately five) are reported by Mr. Clow to have contained rendering products such as tallow, and were located west of the steam plant.

Records suggest the property changed hands several times in the years from 1950 to 1984 during which time it was owned by the Cudahy Company and the Bar-S Company, both meat-packing businesses. In December, 1984, the Sabey Corporation bought the property from the Bar-S Company, and demolition of all buildings with the exception of the old slaughter-house was completed by late 1985. Following demolition of the old buildings, the slaughter-house was renovated and three new buildings (discussed in the following section) were constructed.

During demolition of the buildings in 1985 it was discovered that some of the pipes in the mechanical and steam plant buildings were insulated with materials containing asbestos. According to Mr. Clow the pipes and asbestos insulation were removed by the Sunset Demolition Company. Additionally, a review of geotechnical field notes compiled during a 1984, ECI study of soil conditions on the site indicates that some areas of the site are underlain by fill

comprised of bricks, concrete, scrap iron, and possibly slag of unknown composition. Oil was noted in a borehole drilled in 1984 near the former location of the fuel oil tank at the south end of the now demolished mechanical building.

In summary for this section, our brief review of the site use history disclosed that asbestos insulation was used in buildings that were demolished in 1985, and that the asbestos was removed from the site as part of the demolition effort. Buried storage tanks, as discussed above, were removed from the site during site excavation and preparation. Oil and "slag" of unknown compositions or concentration was noted in a borehole drilled in 1984 on the site. Our investigation disclosed no information that would indicate that the property had been exposed to any activities involving the manufacture or use of hazardous, dangerous, or toxic substances.

Site Reconnaissance

The Site Layout Sketch, Plate 1, provides a schematic illustration of the position of the various buildings and business concerns in the Park 90/5 complex in relation to various cultural features including roadways and property boundaries. The scale of the sketch was determined from a City of Seattle Key Plan and is not to scale. The following table provides identification of each of the tenants noted by letter in Plate 1:

LETTER DESIGNATION	TENANT
A	Unitech
B	AT & T Network Systems
C	Pacific NW Bell
D	Kaman Bearing and Supply
E	Abodio (interior furnishings)
F	Port of Seattle Dry Storage
G	Multiple tenants:
G	SeaAir Express
G	Pinkerton's
G	AT&T
G	Goodwill Games
G	Berkeley Engineering & Const.
G	Nelson Iron Works
G	ECOS Corporation
G	Chempro

The commercial and service nature of the businesses outlined in the foregoing listing would generally exclude them from use or generation of toxic or dangerous substances or by-products. Goods

stored in the Port of Seattle warehousing area consist of dry goods such as shoes, clothing, canned foods, and common household electrical appliances. According to Mr. Al Clow, Chempro is the environmental arm of Sabey Corporation and is not involved in the manufacture, use, or storage of chemicals at this facility.

During our site inspection we learned that all known buried tanks on the property had been removed in 1985 during site construction activities. The slaughter-house building was stripped of walls and plumbing leaving only the foundation and a web of concrete posts and a few floors. The remains of the former structure were pressure washed and sealed with "ZeroLoc" paint in order to encapsulate residual odors resulting from bacon smoking and any residual asbestos not removed by pressure washing. Renovation of the building then proceeded to completion incorporating the skeleton of the old building into the remodeled facility.

The grounds of the Park 90/5 office and warehouse complex are entirely paved for parking spaces. Three new buildings constructed in 1986 are of tilt-up concrete wall construction.

Three samples collected from the renovated slaughter-house building were subjected to laboratory analysis by polarized light and dispersion staining. Analyses confirm that there is no asbestos in the renovated building.

CONCLUSIONS/RECOMMENDATIONS

Verification of the integrity of the tanks formerly buried on the site, and their potential for having leaked prior to their removal from the site could not be confirmed by visual inspection of the subject site. The nature of material encountered in our earlier geotechnical site study described as "slag" could not be determined by visual inspection either. If greater confidence regarding the possible contamination of soils by hydrocarbons or other contaminants is required, supplemental drilling and soil sampling would be necessary.

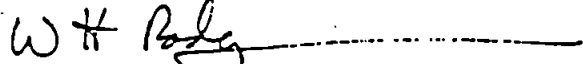
Based on available information, with the exceptions of the buried tanks, oil and possible slag in exploratory boreholes, and asbestos pipe insulation which is reported to have been removed by Sunset Demolition, it would appear that the site is free from hazardous or toxic substances, and that such substances as defined under the Resource Conservation and Recovery Act (RCRA-42 USC - 6901, et seq.), the Federal Water Pollution Control Act (33 USC 1257, et seq.), the Clean Air Compensation and Liability Act (42 USC 2001, et seq.), and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA: 42 USC 9601, et seq.), have not been generated on the property.

LIMITATIONS

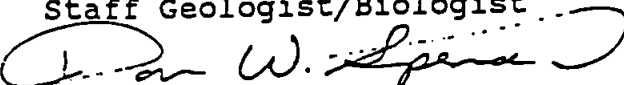
This report has been prepared for specific application to this project in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in our proposal dated October 12, 1987. This report is for the exclusive use of the Sabey Corporation and their representatives. No other warranty, expressed or implied, is made. If new information is developed in future site work, which may include excavations, borings, studies, etc., Earth Consultants, Inc. should be allowed to reevaluate the conclusions of this report, and to provide amendments as required.

We trust that the information presented in this brief report will be adequate for your current needs. We appreciate the opportunity of providing environmental consulting services to the project. If you have any questions or if we may be of further service, please do not hesitate to contact us.

Respectfully submitted,
EARTH CONSULTANTS, INC.

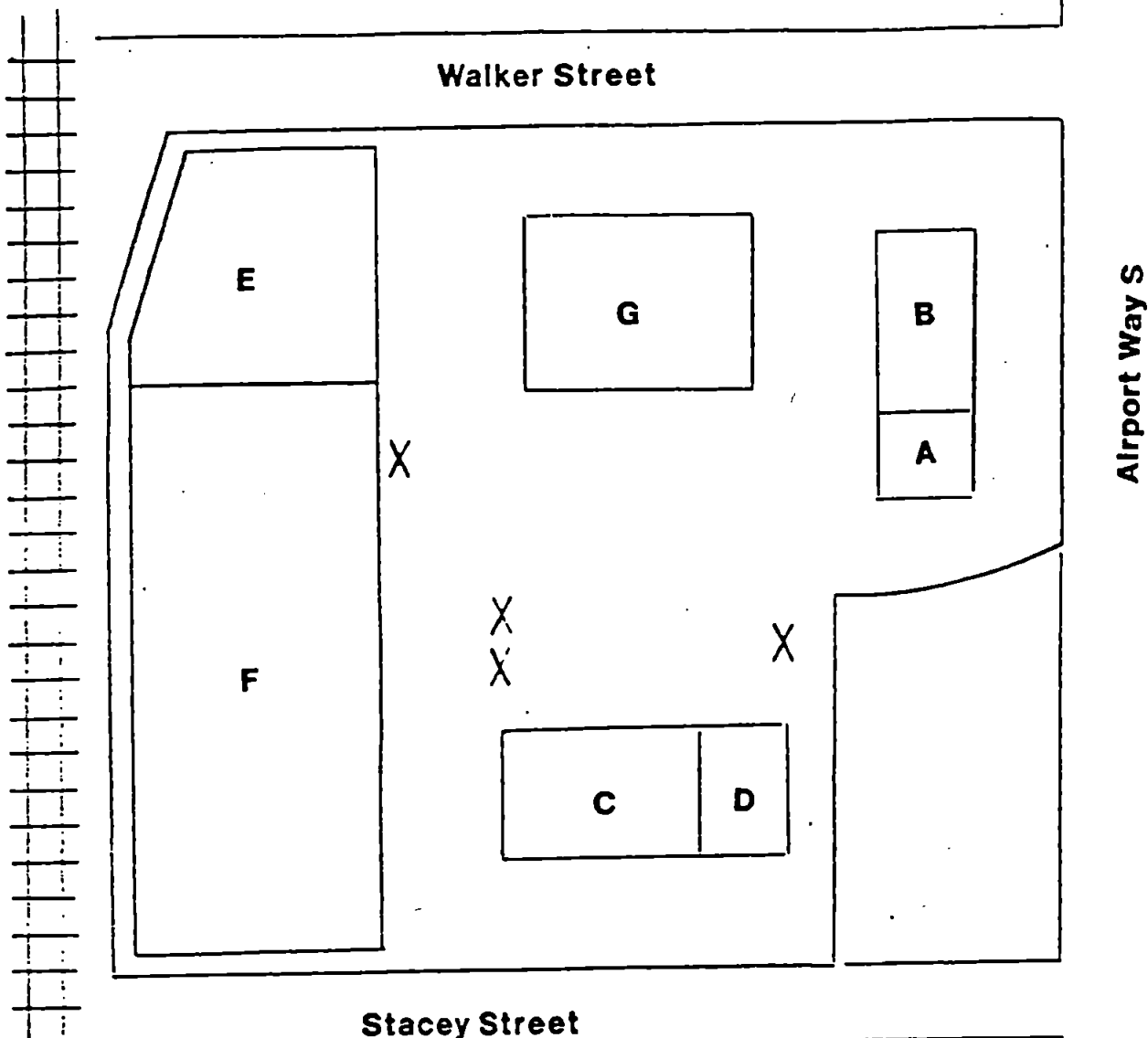


William Rodgers
Staff Geologist/Biologist



Don W. Spencer, M.Sc.
Director-Environmental Services

DWS/whr



LETTER DESIGNATION

TENANT

A
B
C
D
E
F
G

Unitech
AT & T Network Systems
Pacific NW Bell
Kanan Bearing and Supply
Abodio (interior furnishings)
Port of Seattle Dry Storage
Multiple tenants:
SeaAir Express
Pinkerton's
AT&T
Goodwill Games
Berkeley Engineering & Const.
Nelson Iron Works
ECOS Corporation
Chempro

N

X Approximate former locations of tanks

NOT TO SCALE



Earth Consultants Inc.
Geotechnical Engineering and Geology

Site Layout Sketch

Proj. No. 2453

Date 10-14-87

Plate 1

GEOTECHNICAL ENGINEERING STUDY
BAR-S PROPERTY
SEATTLE, WASHINGTON
E-2453
FOR
O.W. PROPERTIES

Earth Consultants Inc.

Geotechnical Engineering and Geology



November 12, 1984

E-2453

O.W. Properties
Post Office Box 9847
Seattle, Washington 98109

Attention: Mr. Dave Sabey

Gentlemen:

We are pleased to submit herewith our report entitled "Geotechnical Engineering Study, Bar-S Property, Airport Way South and South Stacy Street, Seattle, Washington". This report presents the results of our field exploration, laboratory tests, and engineering analysis. The purpose and scope of our study was outlined in our proposal dated September 27, 1984.

Our study indicates that the ground surface is generally underlain by three (3) to fifteen (15) feet of fill of varying density found overlying relatively soft compressible silty and clayey soils. Without deep foundations extending through these soils or preloading, substantial building settlement could result. This report describes our study and contains recommendations regarding foundation design criteria to reduce the potential for foundation settlement, earthwork considerations, and site drainage.

As detailed in the following report, two basic foundation types are generally considered applicable for the anticipated structures. To reduce potential foundation settlement, spread or continuous footings may be founded on structural fill subsequent to a preload surcharge program. For structures with heavy foundation loads or where anticipated predicted settlements cannot be tolerated, driven timber piles or augercast piers are recommended. This report has been prepared for specific application to this project in accordance with generally accepted geotechnical engineering practices for the exclusive use of O.W. Properties and their representatives. No other warranty, expressed or implied, is made. We recommend that this report, in its entirety, be included in the project contract documents for the information of the contractor.

PROJECT DESCRIPTION

At the time our study was performed, the site and existing building locations were as shown schematically on the Boring Location Plan, Plate 2.

Based on our discussions with you, we understand that it is planned to demolish all existing structures except for Building E and develop the site with four single-story office and warehouse structures. Building C may be a two-story office building.

The planned building locations are shown on the Boring Location Plan, Plate 2. It is anticipated that perimeter wall loads will be on the order of three thousand (3000) pounds per lineal foot, that column loads will be on the order of fifty (50) to seventy (70) kips and that slab loads will be up to two hundred fifty (250) pounds per square foot (psf).

The site is relatively level with the exception of the southeast corner, where the site elevation drops five to six feet below the surrounding area elevation.

If any of the above development plans change, we should be consulted to review the recommendations contained in this report. In any case, it is recommended that Earth Consultants, Inc. provide a general review of the final design.

SITE CONDITIONS

Surface

The subject site encompasses approximately 437,000 square feet bordered on the north by South Walker Street, to the east by Airport Way South, to the south by South Stacy Street and to the west by a railroad and utility easement. It should be noted that a two-story concrete building exists adjacent to the southeast quadrant of the site so the subject parcel does not extend to Airport Way South or South Stacy Streets.

The subject site has long been used for a packing plant operation with several known structural changes over time. The present existing structures are shown on the attached site plan and consist basically of a three-story brick structure with several adjacent structures ranging from tanks and single-story metal sheds to two-story concrete buildings. Several concrete slabs are found along the south side of the site, asphalt pavement in the northeast quadrant, with bare ground surface along the west property margin.

Subsurface

The site was explored by drilling six test borings at the locations shown on Plate 2. Please refer to the boring logs, Plates 4 through 9, for a detailed description of the conditions encountered at each location explored. A description of the field exploration methods and laboratory testing program is included in this report following the Discussion and Recommendations section. The following is a generalized description of the subsurface conditions encountered.

The subsurface stratigraphy can basically be described in terms of three major soil/stratigraphic units. From the surface to depths ranging from five (5) to fourteen (14) feet is found fill material in varying composition and consistency. In all borings except Boring B-1, a significant amount of rubble was encountered resulting in auger penetration refusal and relocation of borings B-3, B-4 and B-6. Underlying the fill is a soft to very soft silt and clay unit to approximately twenty-five (25) feet with a high organic content in boring B-5. Undisturbed samples were obtained in this material and laboratory consolidation test data is included in this report. The basal soil unit encountered is a gray to black fine sand with varying silt content and density as shown on the attached logs.

Groundwater

The groundwater levels observed while drilling are shown on the boring logs. Since the groundwater levels did not have time to stabilize, slotted pipe standpipes were installed in all borings. The results of readings taken two days after the completion of the borings are also shown on the boring logs. Groundwater ranges from four (4) to twelve (12) feet below existing ground surfaces. The groundwater level is not static, thus one may expect fluctuations in the level depending on the amount of rainfall, surface water runoff, and other factors. Generally the water level is higher in the wetter winter months.

DISCUSSION AND RECOMMENDATIONS

General

Most buildings in the area are supported on pile foundations. From our conversations with the Bar-S Company officials, we understand that the newest addition to the largest existing building is on twenty-five (25) foot long, driven timber piles. The building under construction on the property immediately to the west is on timber piles driven to a depth of about forty (40) feet. According to the structural engineer for that building, forty (40) feet of embedment is about average for this vicinity. The buildings are supported on piles because of the soft, compressible soils underlying the area.

Our test borings indicate somewhat variable subsurface conditions. Of the five borings drilled, Boring B-5 encountered the least favorable of conditions. In Boring B-5, an old, untreated piling or log was found at a depth of approximately seven feet. From twelve (12) to twenty (20) feet, an organic soil was found that is highly compressible and requires much time to fully consolidate. Under a load of one ton, the laboratory test indicated 22 percent compression. Under a uniform building and fill load of four hundred fifty (450) pounds predicted settlement is on the order of ten inches at this boring location. Settlement could be relatively slow, taking a number of years to fully consolidate.

Generally in areas with compressible soil, three foundation options are possible. The foundation that involves the least risk and future maintenance is a deep foundation using piers or piles to transfer the building loads to relatively incompressible soils. Another option is to preload or surcharge the site to reduce post construction settlement. This option involves more risk because variable subsurface conditions can cause different settlement rates and an exact prediction of the surcharge load and time is difficult. The third option is to place the building on conventional foundations and accept the settlement that results. The choice is usually an economic one. Life safety is seldom a problem because failure will be due to long-term settlement and not bearing capacity failure.

Due to large possible differential and total settlements, we recommend that Building A be supported on piles or piers. Depending on the usage of the building, the slab can be a floating slab or it can be a structural slab. If cracking and settlement cannot be tolerated, we recommend that the slab be structurally supported. Eventual replacement of the slab could be necessary if the slab area is not preloaded, and if the slab is not structurally supported. Settlement will take a considerable amount of time and could occur throughout the economic life of the building. Settlement will become less with time, however. To reduce settlement we suggest that the slab area be surcharged. A discussion of the surcharge program follows in another section of this report.

Building D is the largest building to be constructed on the site. Based on our laboratory test data we have computed the following settlements due to uniform areal loads using the soil profile as encountered by Boring B-3.

<u>Areal Load (pounds)</u>	<u>Settlement (inches)</u>
300	3
400	5
500	6
700	7
1200	11

Areal loads are loads over a large area such as fill or slab loads. For computational purposes, fill can be assumed to have a unit weight of one hundred twenty (120) pounds per cubic foot (pcf). Using the same profile, settlement due to column loads was computed. The results of these calculations are as follows.

<u>Load (Tons)</u>	<u>Settlement (inches)*</u>
25	4
50	5
100	6

* Bearing Pressure = 2000 psf

Where fill loads and column loading are combined, the settlements are additive although actual settlements will be somewhat less than the total due to the distribution of stresses by the fill. The amount of distribution is a function of the amount of new fill below the footing.

Based on these data, we recommend that Building D be supported on pile or pier foundations or that the building area be surcharged. If the site is surcharged, the building foundation should then be designed for post construction differential settlement on the order of two to three inches in the north-south direction and one to two inches in the east-west direction. Settlements will occur over a long period of time. The time period is both a function of loading rate and soils conditions. If the slab and building were loaded to full design load, most of the settlement would occur in about one year.

The slab for Building D can be a floating slab if settlements on the order of two inches can be tolerated. This assumes normal warehouse loading and little to no fill. If more than two feet of fill is placed, or if two inches of settlement cannot be tolerated, the slab area should be surcharged. If structural connection of the slab to the foundation is required, frequent control joints are recommended to control cracking. If the building is to be a tilt-up structure the closure strip forms a hinge at the foundation, allowing for some differential settlement without causing uncontrolled cracking of the slab.

The present location and site grades at Buildings B and C present some problems. If the site is brought to a finish grade of about Elev. 12 to 13, up to eight feet of fill will be required. There is a building adjacent to the east property line. Placement of the fill near this building could cause foundation or slab settlement to the existing building. Also, there will be differential settlement within the proposed building area due to differential fill heights. One possible solution would be to

construct a building with a basement adjacent to the property line oriented north-south. This would eliminate the weight of the fill adjacent to the existing building.

We suggest that buildings in this area be supported on augercast piers to reduce construction vibration due to driven piles. Surcharging or filling the area near the adjacent building is not recommended. The augercast piers installed adjacent to or within new fill areas should be designed for down-drag loads.

To summarize our general recommendations, we recommend that Building A be pile or pier supported due to highly compressible soils in the area and that Buildings B and C be relocated or redesigned to eliminate fill against the adjacent buildings and these buildings be pier supported due to differences in fill loads. We recommend that Building D be surcharged or pier or pile supported. The slabs on all buildings can be floating or structurally supported. Surcharging of the floor area would reduce settlement. The range of settlements without surcharging can be estimated using the settlement computation results for areal loads given previously. Fill can be assumed to weigh one hundred twenty (120) pounds per cubic foot (pcf). Fill weights plus the design slab loads is the areal load. Slab settlement in Building A could be greater due to the presence of organic soils. Further recommendations for foundation design are given in the following sections.

File or Pier Foundations

To eliminate most building settlement, driven piles or augercast concrete piers can be used to support the structure. There is a layer of sand underlying the soft, compressible soils. The density of this sand is variable. In several of the test borings the sand is relatively loose near the top, becoming more dense with depth then becoming less dense again. Tabulated below by boring is the depth of dense layers encountered by our test borings and probable pile tip depths.

<u>Boring</u>	<u>Depth of Dense Sands (ft)</u>	<u>Probable Pile Depth (ft)</u>
1	40-50 (medium dense)	45
2	28-33 (thin dense layer)	30
3	30-35	33
4	27-49+ (dense)	30
5	51 (dense)(thin med. dense layer at 33)	52
6	33-39+ (medium dense)	40

When driving piles it should be possible to break through the thinner dense layers. For instance, in Boring B-2 one SPT sample at 27.5 feet encountered 48 blow count material. The subsequent two blow counts were 24 blows and 18 blows. This points to the importance of driving test piles prior to full production driving to determine lengths of piles and driving criteria.

For design purposes, we recommend assuming a twenty (20) ton capacity for eight inch tip timber piles and twenty-five (25) tons for nine inch tip timber piles. The piles should be driven to at least twenty (20) blows per foot with a fifteen hundred (1500) foot-pound hammer such as the Vulcan No. 1 hammer. Earth Consultants, Inc. should observe the installation of all test piles and production piles. The test piles should be driven to refusal to fully evaluate driving characteristics. Refusal blow counts for test pile installation should be at least forty (40) blows per foot.

Augercast piers derive more load capacity in friction due to their larger diameter and rougher surface. For twelve (12) inch diameter piers embedded ten feet into the sands underlying the clays and silty clays, we recommend using a design capacity of thirty (30) tons. For sixteen (16) inch diameter piers, the pier capacity can be assumed to be forty (40) tons with ten feet of embedment. By varying the length and diameter, additional capacity can be developed.

We suggest that allowable timber pile loads be reduced by five tons to account for downdrag. Allowable loads for augercast piers, twelve (12) to sixteen (16) inches in diameter should be reduced by ten tons where significant fills are placed.

Several of the test borings encountered rubble or cobbles within the near surface fills. The foundation contractor should be prepared to predrill pile locations or excavate the rubble prior to deep foundation installation as needed.

Conventional Foundations

Building D can be supported on conventional foundations following the surcharge loading period. The footings should be founded on at least two feet of structural fill. Fill placed under footings should extend outwards from the edge of the footings at least two feet. Exterior footings should be bottomed at a minimum depth of twelve (12) inches below the lowest adjacent outside finish grade. Interior footings may be at a depth of twelve (12) inches below the top of the slab. Footings founded on structural fill soils may be designed for an allowable soil bearing capacity of two thousand (2000) psf. Continuous and individual spread footings should have minimum widths of twelve

(12) and eighteen (18) inches, respectively. A one-third increase in the above bearing pressures may be used when considering short term wind or seismic loads.

Lateral loads due to wind or seismic forces may be resisted by friction between the foundations and the supporting compacted fill subgrade or by passive earth pressure on the foundations. For the latter, the foundations must be poured "neat" against the existing soil or backfilled with a compact fill meeting the requirements of structural fill. A coefficient of friction of 0.35 may be used between the structural foundation concrete and the supporting subgrade. The passive resistance of undisturbed natural soils and well compacted fill may be taken as equal to the pressure of a fluid having a density of two hundred fifty (250) pcf.

We recommend that drains be placed around all perimeter footings. The drains should be constructed with a four inch diameter perforated pipe bedded and covered with free draining gravel. The drains should have a positive gradient towards suitable discharge facilities. The footing drainage system should not be tied into the roof drainage system until the drains are tightlined well away from the building. The footing excavation should be backfilled with granular soil except for the top foot which should be backfilled with a relatively impermeable soil such as silt, clay or topsoil. Alternatively, the surface can be sealed with asphalt or concrete pavements.

Surcharge Program

As indicated earlier in this report, if the anticipated slab settlements cannot be tolerated, we recommend that the slab areas be preloaded with surcharge. Also, Building D may be preloaded instead of placing the building on deep foundations provided expected settlements can be tolerated. This preload is in addition to any structural fill required to achieve design finish grades. The top of the preload fill should extend at least five feet beyond the edge of the proposed building.

For Building D, we recommend that six feet of surcharge fill be placed provided no more than three feet of permanent fill is placed in the building area. If more than three feet of fill is to be placed, the surcharge height required would be increased. This surcharge fill should remain in place at least three months. If additional permanent fill or if two to three inches of post construction settlement cannot be tolerated, then additional fill or longer surcharge time will be required.

We also suggest placing six feet of surcharge to preload the slab in the Building A area. While only slab loads would be exerted on the soil, settlement times could be slower in this area, thus more surcharge fill will be required to achieve consolidation.

Before placing the preload, structural fill should be placed, if necessary, to the design finish grade. Depending on site grades, it may be necessary to excavate soil to provide the required thickness of structural fill below footings and slabs.

The surcharge fill does not have to meet any specific requirements except that it should have a minimum in-place total density of one hundred twenty (120) pcf. However, if the preload is to be later used as fill on another part of the site, we recommend it meet the requirements for structural fill, i.e., contain no organics and be compactable. Structural fill to be placed in wet weather should contain no more than 5 percent fines passing the No. 200 sieve. The side slopes of the surcharge fill should be inclined no steeper than 1:1 (Horizontal:Vertical) and the top of the surcharge should extend at least five feet beyond the building perimeter. If future expansion is anticipated, the surcharge should extend at least twenty feet in the direction of the future addition. The extra surcharge is to reduce the possibility of future building or surcharge loads causing differential settlement.

Prior to placement of the preload fill, we recommend installation of settlement markers within the preload area. The number and location of markers should be decided after more complete development plans are available. These markers should be protected from disturbance by construction equipment. The markers should be surveyed by Earth Consultants, Inc. personnel or a licensed surveyor during fill and surcharge placement and at intervals of (2, 4, 8, 16 . . .) days after completion of the surcharge fill placement. The initial reading should show the natural ground elevation and readings taken during surcharge placement should show the surcharge fill thickness.

We will evaluate the settlement readings. Once the required settlement has been reached, the preload may be removed. The exposed subgrade should be proofrolled and any loose pockets exposed should be overexcavated and replaced by structural fill.

Slab-on-Grade Floors

Where slab-on-grade floors are constructed, the slab should be provided with a minimum of four inches of free draining coarse sand or pea gravel or sandy gravel having less than 3 percent fines. We also recommend that a vapor barrier such as a 6 mil plastic membrane should be placed beneath the slab to reduce water vapor transmission through the slab and the resultant moisture accumulation. Two inches of sand may be placed over the membrane for protection during construction and to aid in curing of the concrete.

Retaining and Foundation Walls

Retaining and foundation walls should be designed to resist lateral earth pressures imposed by the soils retained by these structures. Walls that are designed to yield an amount equal to at least 0.002 times the wall height can be designed to resist the lateral earth pressure imposed by an equivalent fluid with a unit weight of thirty-five (35) pcf. If walls are to be restrained at the top from free movement, a uniform force of one hundred (100) psf should be added to the equivalent fluid pressure force. For calculating the base resistance to sliding, we recommend using a passive pressure equivalent to that exerted by a fluid having a density of two hundred fifty (250) pcf and a coefficient of friction of 0.35.

The wall pressures apply only for a maximum wall height of twelve (12) feet. It is assumed that no hydrostatic pressures act behind the wall and that no surcharge slopes or loads will be placed above the walls. If surcharges are to be applied they should be added to the above lateral pressures.

Retaining and foundation walls should be backfilled with compacted free-draining soils. The soil should contain no more than 5 percent silt or clay and no particles greater than four inches in diameter. The percentage of particles passing the No. 4 sieve should be between 25 and 70 percent. Alternatively, a geotextile product such as Miradrain may be used. We recommend the use of footing drains at the base of all perimeter footings. The footing drains should be surrounded by at least six inches of one inch minus washed rock, and provided with a positive gradient towards suitable discharge facilities. The pipe invert should be at least as low as the bottom of the footing. For retaining walls, other than basement walls, weepholes can be used. The weepholes should be as low as possible to maintain drainage behind the walls. When weepholes are provided, all backfill within eighteen (18) inches of the weephole should consist of one inch minus washed rock.

Excavations and Slopes

In no case should excavation slopes be greater than the limits specified in local, state and national government safety regulations. Temporary cuts greater than five feet in height should have an inclination no steeper than 1:1 (Horizontal:Vertical). As an alternate to open cuts, temporary shoring can be used in conjunction with vertical cuts. Detailed criteria for shoring systems can be developed later, if needed.

All permanent cut and fill slopes should be inclined no steeper than 2:1 (H:V). These recommendations are applicable to slopes with a maximum height of twelve (12) feet. If higher slopes are anticipated, we should be contacted for the appropriate design and construction criteria. We also recommend that all excavated slopes be examined by Earth Consultants, Inc. to verify that conditions are as anticipated. Supplementary recommendations can then be developed, if needed, to improve stability, including flattening of slopes or installation of surface or subsurface drains. In any case, water should not be allowed to flow uncontrolled over the top of any slopes.

All permanently exposed slopes should be seeded with an appropriate species of vegetation to reduce erosion and improve stability of the surficial layer of soil.

Site Drainage

Groundwater was encountered in our borings at depths ranging from four (4) to twelve (12) feet. However, it has been our experience that groundwater levels change significantly due to changes in rainfall amounts, surface drainage or other factors. If seepage is encountered in the excavation, the water should be drained away from the site by use of drainage ditches, perforated pipe or French drains, or by pumping from sumps interconnected by shallow connector trenches at the bottom of the excavation.

We suggest that appropriate locations of subsurface drains, if needed, be established during grading operations by a representative of Earth Consultants, Inc., at which time the seepage areas, if present, may be more clearly defined.

The excavation and site should be graded so that surface water is directed off the site and away from the tops of slopes. Water should not be allowed to stand in any area where buildings, slabs, or pavements are to be constructed. During construction, loose surfaces should be sealed at night by compacting the surface soils to reduce the infiltration of rain into the soils. Final site grades should allow for drainage away from the building foundations. We suggest that the ground be sloped 3 percent for a distance of at least ten feet away from the buildings except in areas that are to be paved.

Pavement Areas

All parking and roadway areas may be supported on the recompact subgrade or on a minimum of twelve (12) inches of structural fill placed in accordance with the Site Preparation section of this report. A greater thickness may be needed to stabilize soft, wet or unstable areas. The upper twelve (12) inches of pavement subgrade should be compacted to at least 95 percent of

the maximum density. Below this level a compactive effort of 90 percent would be adequate. The pavement section for lightly loaded traffic and parking areas should consist of two inches of asphalt concrete over four inches of crushed rock base or three inches of asphalt treated base (ATB). Heavier loaded areas would require thicker sections. Loading or trailer storage areas where the trailer wheels can cause high, concentrated loads should be provided with a concrete apron. We will be pleased to assist you in developing appropriate pavement sections or specifications for heavy traffic zones, if needed.

Site Preparation and General Earthwork

The building areas should be stripped and cleared of all existing slabs, utilities, and any other deleterious material. In areas where the slabs are to be free floating or conventional foundations are to be used, existing piling should be cut off well below the surface. The stripped materials should not be mixed with any materials to be used as structural fill. Structural fill is defined as any fill placed under buildings, roadways, slabs, pavements, or any other load bearing areas.

Following the stripping operation, the ground surface where structural fill, foundations, or slabs are to be placed should be proofrolled. All proofrolling should be performed under the observation of a representative of Earth Consultants, Inc. Soil in any loose or soft areas should be removed and replaced with structural fill to a depth that will provide a stable base beneath the general structural fill.

Structural fill under floor slabs and footings should be placed in horizontal lifts and compacted to a minimum 95 percent of the maximum dry density in accordance with ASTM Test Designation D-1557-70 (Modified Proctor). The fill materials should be placed at or near the optimum moisture content. Fill under pavements and walks should also be placed in horizontal lifts and compacted to 90 percent of maximum density except for the top twelve (12) inches which should be compacted to 95 percent of maximum density.

Near surface on-site soils at the time of our exploration were quite variable in quality. Use of these soils as structural fill will generally not be possible because most on-site soils have a significant amount of fines and are wet. Ideally, structural fill to be placed in wet weather should consist of a granular material with a maximum size of three inches and no more than 5 percent fines passing the No. 200 sieve. During dry weather, any compactible non-organic soil can be used as structural fill.

FIELD EXPLORATION AND LABORATORY TESTING

Our field exploration was performed on October 3, 4 and 5, 1984. Subsurface conditions at the site were explored by drilling six borings to a maximum depth of fifty-nine (59) feet below the existing grade. The borings were drilled by Drilling Unlimited using a truck-mounted drill rig. Continuous flight, hollow stem augers were used to advance and support the boreholes during sampling. The locations of the borings were approximately determined by measurement from existing site structures with a 165 foot fiberglass tape. Elevations of borings were surveyed by Triad Associates. The locations and elevations of the borings should be considered accurate only to the degree implied by the method used. These locations are shown on the Boring Location Plan, Plate 2.

The field exploration was continuously monitored by an engineering geologist from our firm who classified the soils encountered and maintained a log of each boring, obtained representative samples, measured groundwater levels, and observed pertinent site features. Slotted standpipes were installed in all borings to monitor groundwater levels. All samples were visually classified in accordance with the Unified Soil Classification System which is presented on Plate 3, Legend. Logs of the borings are presented on Plates 4 through 9. The final logs represent our interpretations of the field logs and the results of the laboratory examination and tests of field samples. The stratification lines on the logs represent the approximate boundary between soil types. In actuality, the transition may be gradual.

In each boring, Standard Penetration Tests (SPT) were performed at selected intervals in accordance with ASTM Test Designation D-1586. In addition, a Shelby tube sampler was used to obtain less disturbed soil samples at selected depths. The split spoon samples were was driven with a one hundred forty (140) pound hammer falling thirty (30) inches.

Shear strengths of undisturbed soils were measured where practical in the field with a penetrometer or a torvane. These results are recorded on the boring logs at the appropriate sample depth.

Representative soil samples were placed in closed containers and returned to our laboratory for further examination and testing. Visual classifications were supplemented by index tests such as sieve and hydrometer analyses and Atterberg Limits on representative samples. Unit weight and moisture determinations were performed on all undisturbed ring samples, and moisture contents on all disturbed samples. Results of density and moisture deter-

minations, together with classifications, are shown on the boring logs included in this report. The results of two sieve analyses are illustrated on Plate 10, Grain Size Analyses.

Consolidation tests were conducted on three relatively undisturbed representative samples taken with the ring lined sampler to evaluate the consolidation characteristics of the site soils. In addition, the time readings were taken at several points of loading to evaluate the time rate of settlement. The results of these tests is are shown on Plates 11 through 13, Consolidation Test Data.

LIMITATIONS

Our recommendations and conclusions are based on the site materials observed, selective laboratory testing and engineering analyses. The conclusions and recommendations are professional opinions derived in accordance with current standards of practice. No warranty is expressed or implied.

The recommendations submitted in this report are based upon the data obtained from the borings. Soil and groundwater conditions between borings may vary from those encountered by the borings. The nature and extent of variations between borings may not become evident until construction. If variations then appear, Earth Consultants, Inc. should be allowed to reevaluate the recommendations of this report prior to proceeding with the construction.

Additional Services

It is recommended that Earth Consultants, Inc. provide a general review of the final design and specifications to verify that the earthwork and foundation recommendations have been properly interpreted and implemented in the design and in the construction specifications.

It is also recommended that Earth Consultants, Inc. be retained to provide geotechnical services during construction. Because of the nature of this project, the soil conditions, we do not accept responsibility for the performance of the foundation or earthwork unless we are retained to review the construction drawings and specifications, and to provide construction observation and testing services. This is to observe compliance with the design concepts, specifications or recommendations and to allow design changes in the event subsurface conditions differ from those anticipated prior to the start of construction.

The following plates are attached and complete this report:

Plate 1

Vicinity Map

O.W. Properties
November 12, 1984

E-2453
Page 15

Plate 2

Plate 3

Plates 4 through 9

Plate 10

Plates 11 through 13

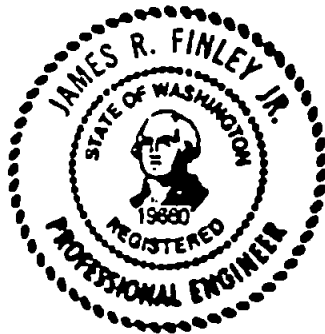
Boring Location Plan

Legend

Boring Logs

Grain Size Analyses

Consolidation Test Results



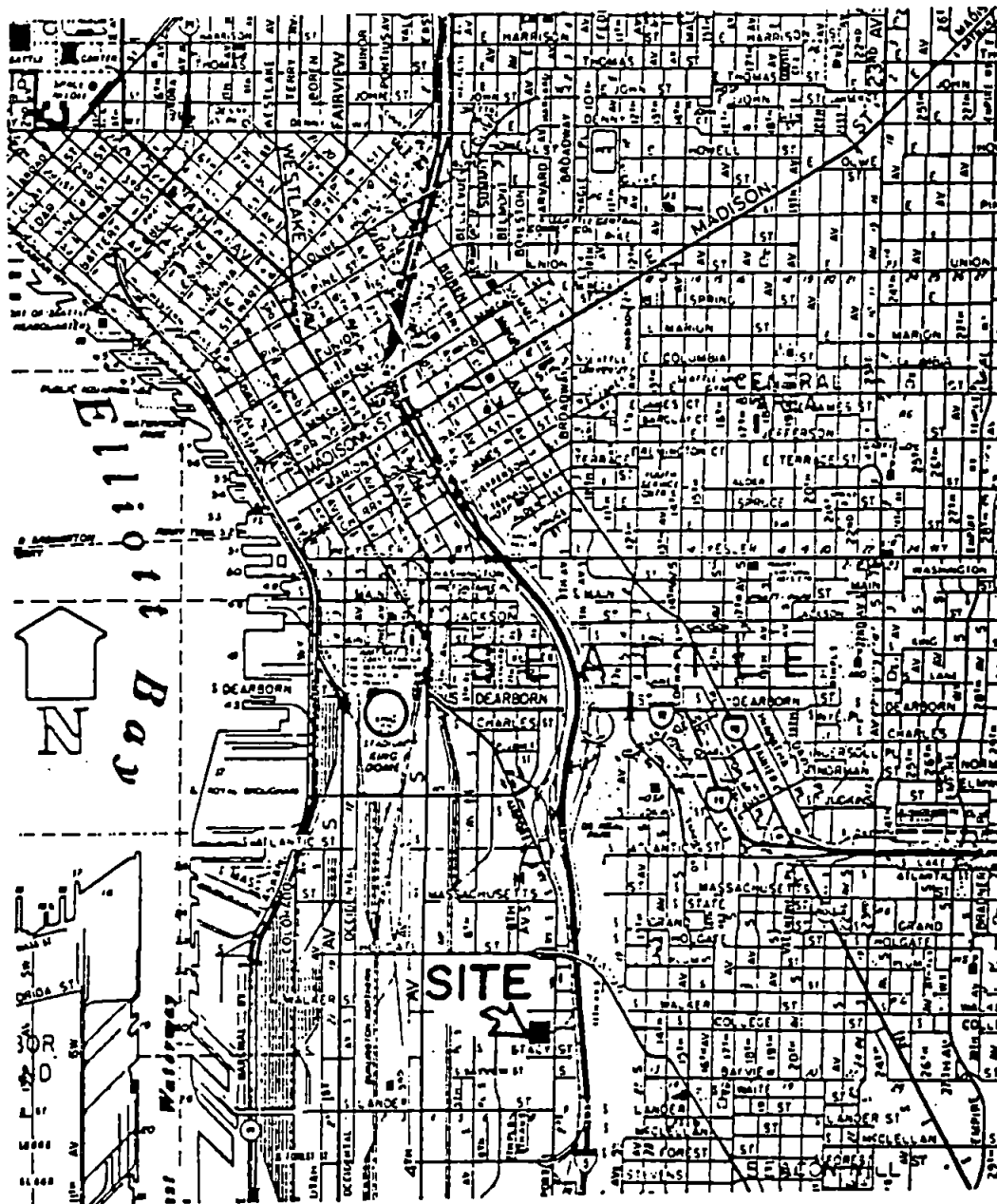
SB/JRF/tms

Respectfully submitted,

EARTH CONSULTANTS, INC.

James R. Finley, Jr.

James R. Finley, Jr., P. E.
Chief Engineer



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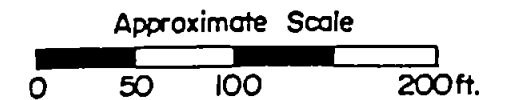
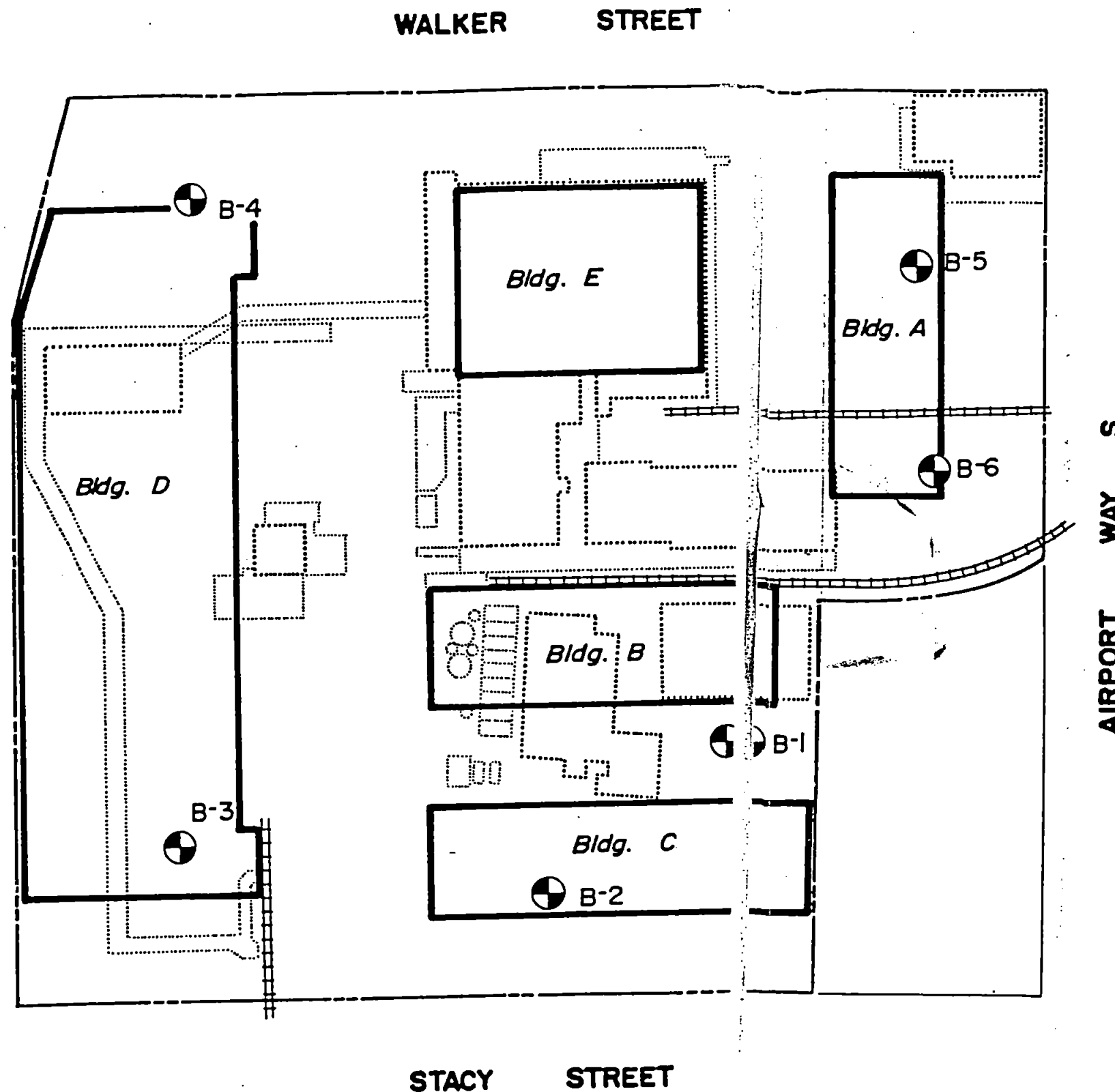


Vicinity Map
 Bar-S Property
 Seattle, Washington

Proj. No. 2453

Date Oct. '84

Plate 1



LEGEND

● B-3 Approximate Boring Location

Existing Building

Proposed Building

References :
 Sheet P-1
 Preliminary Site Plan
 By Lance Mueller & Associates Architects
 Dated 10/2/84
 Site Survey
 By Triad Associates
 Dated 6/19/81

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Boring Location Plan Bar-S Property Seattle, Washington		
Proj. No. 2453	Date Oct. '84	Plate 2

MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTION
Coarse Grained Soils	Gravel And Gravelly Soils	Clean Gravels (little or no fines)		GW / gw	Well-Graded Gravels, Gravel-Sand Mixtures, Little Or No Fines
				GP / gp	Poorly-Graded Gravels, Gravel-Sand Mixtures, Little Or No Fines
		Gravels With Fines (appreciable amount of fines)		GM / gm	Silty Gravels, Gravel-Sand-Silt Mixtures
				GC / gc	Clayey Gravels, Gravel-Sand-Clay Mixtures
	Sand And Sandy Soils	Clean Sand (little or no fines)		SW / sw	Well-Graded Sands, Gravelly Sands, Little Or No Fines
				SP / sp	Poorly-Graded Sands, Gravelly Sands Little Or No Fines
Fine Grained Soils	Silt And Clays	Liquid Limit Less Than 50		SM / sm	Silty Sands, Sand-Silt Mixtures
				SC / sc	Clayey Sands, Sand-Clay Mixtures
				ML / ml	Inorganic Silts & Very Fine Sands, Rock Flour, Silty-Clayey Fine Sands; Clayey Silts w/ Slight Plasticity
				CL / cl	Inorganic Clays Of Low To Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean
	Silt And Clays	Liquid Limit Greater Than 50		OL / ol	Organic Silts And Organic Silty Clays Of Low Plasticity
				MH / mh	Inorganic Silts, Micaceous Or Diatomaceous Fine Sand Or Silty Soils
				CH / ch	Inorganic Clays Of High Plasticity, Fat Clays
				OH / oh	Organic Clays Of Medium To High Plasticity, Organic Silts
				PT / pt	Peat, Humus, Swamp Soils With High Organic Contents
			Highly Organic Soils		

Topsoil		Humus And Duff Layer
Fill		Highly Variable Constituents

The Discussion In The Text Of This Report Is Necessary For A Proper Understanding Of The Nature Of The Material Presented In The Attached Logs

Notes:

Dual symbols are used to indicate borderline soil classification. Upper case letter symbols designate sample classifications based upon laboratory testing; lower case letter symbols designate classifications not verified by laboratory testing.

I 2" O.D. SPLIT SPOON SAMPLER
II 2.4" I.D. RING SAMPLER OR
SHELBY TUBE SAMPLER
P SAMPLER PUSHED
* SAMPLE NOT RECOVERED
∇ WATER LEVEL (DATE)
| WATER OBSERVATION WELL

C TORVANE READING, tsf
qu PENETROMETER READING, tsf
W MOISTURE, percent of dry weight
pcf DRY DENSITY, pounds per cubic ft.
LL LIQUID LIMIT, percent
PI PLASTIC INDEX

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LEGEND

Proj. No. 2453

Date Nov. '84

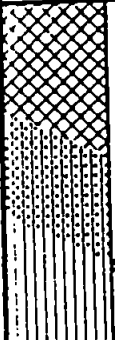
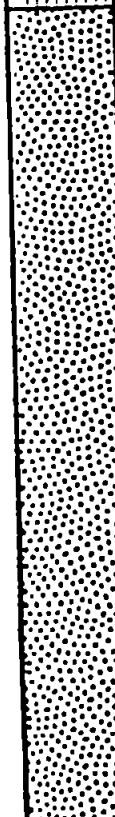
Plate 3

BORING NO. 1

Logged By SB

ELEV. 5.5⁺

Date 10-3-84

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
	sm sm/ml	brown-black silty SAND with trace gravel, medium coarse, moist, dense, (fill) becomes light brown, wet, loose to very loose becomes interbedded with gray silt with trace clay	10/5/84	I	62	27.2	
			10/31/84	I	4	46.9	
				I	1		
			10	I	2	81.2	
				I	5		
			15	I			
				I	18		
			20	I			
				I	14		
			25	I			
	SP	black SAND, fine, medium dense interbedded with silt lenses, loose becomes medium dense becomes finer with isolated wood fragments	30	I	4		
				I	23		
			35	I			
				I	13		
			40	I			
				I	30		
			45	I			
				I	30		
			50	I			
				I	13		
			55	I			
				I	10		

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BORING LOG

BAR-S PROPERTY
SEATTLE, WASHINGTON

Proj. No. 2453

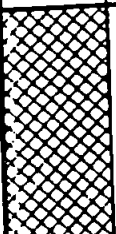
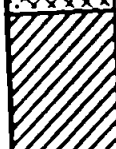
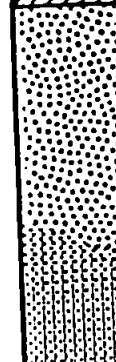
Date Nov. '84

Plate 4

BORING NO. 2

Logged By SB
Date 10-5-84

ELEV. 6.6⁺

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
	SP- SM	SAND, gravel, and wood fragments, moist, loose (fill) possible cobbles	5	I	15	39.3	$q_u < 0.25 \text{ tsf}$ LL=45 PL=24 PI=21
			10/5/84	I	13	41.6	
			10	I	18	66.7	
			10	I	100+		
	cl	silty CLAY, very soft, trace fine sand	15	I			
			20	I	2	46.6	
	sp sm	black SAND with trace silt, fine to very fine, loose becomes dense becomes medium dense with increasing silt content	25	I	8		
			30	I	48		
			35	I	24		
				I	18		
				I			

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BORING LOG
BAR-S PROPERTY
SEATTLE, WASHINGTON

Proj. No. 2453

Date Nov. '84

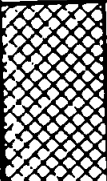
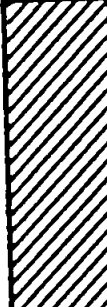
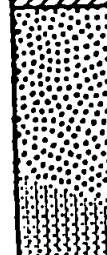
Plate 5

BORING NO. 3

Logged By SB

ELEV. 12.6⁺

Date 10-4-84

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
	ml	gray SILT with clay, above plastic limit, stiff (till) becomes gravelly encountered concrete at 7', moved twice becomes sandy and loose, wood fragments	5	I	10	25.4	LL=40
				I	8	23.7	PL=25
				I	8	45.2	PI=15
			10	I	3	68.2	Tv=.35 $q_u > 4.5 \text{ tsf}$
	CL	gray silty CLAY, wet	10/4/84				LL=45
			15	I			PL=24
				I	4		PI=21
			20	I			
	sp SP/SM	black SAND with trace silt silt content increases, becomes dense to medium dense	25	I	1	41.3	
				I	8		
			30	I	38		
			35	I	25		



BORING LOG

BAR-S PROPERTY
SEATTLE, WASHINGTON

Proj. No. 2453

Date Nov. '84

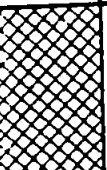
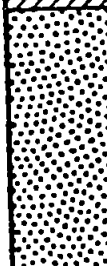
Plate 6

BORING NO. 4

Logged By SB

ELEV. 9.6⁺

Date 10-5-84

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
	ML- SM	gray gravelly sandy SILT, with scattered cobbles, moist, medium dense (fill)	5	I	16	11.5	Tv=0.125
			10/5/84	I	14	18.3	
	sm	brown silty gravelly SAND, medium dense (fill)	10	I	N/A		
				I	19	35.6	
	sm	gray SAND with silt, loose	15	I	10		
				I	3		
	ml CL	gray silty CLAY with wood fragments and organics, wet, soft SEE LAB DATA	20	I			
			25	I	10		
	SP	black SAND with trace silt, very fine to fine, dense becomes very dense	30	I	43		
			35	I	26		
				I	51		

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BORING LOG

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SEATTLE, WASHINGTON

Proj. No. 2453

Date Nov. '84

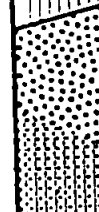
Plate 7

BORING NO. 5

Logged By SB

ELEV. 9.8⁺

Date 10-5-84

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
	ML	gray clayey SILT with trace sand, stiff to very stiff	5	I	11		Tv=0.175 q _u =0.25
			10	I	10		
		large wood fragment (log?)	10/5/84 10	I	5		
				I	1		
	ol	black organic clay to organic silt fragments	15				
		SEE LAB DATA	20	I			
	ML	gray fine sandy SILT, very loose	25	I	1		
	sp sm	black SAND with silt, fine to very fine, loose	30	I	10		
		medium dense at 33 feet	35	I	27		
		silt content increases		I	8		
	SM	black silty SAND with minor organic layer at 38 feet, very fine to fine, loose	40	I	13		
			45	I			
	ml	gray very fine sandy SILT, loose	50	I	6		
	GM	gray, silty, sandy GRAVEL with shell fragments, fine, very dense		I	53		

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BORING LOG

BAR-S PROPERTY
SEATTLE, WASHINGTON

Proj. No. 2453

Date Nov. '84

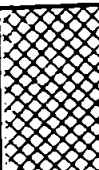
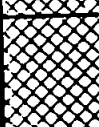
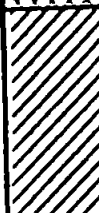
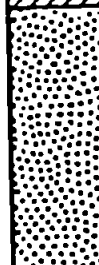
Plate 8

BORING NO. 6

Logged By SB

ELEV. 11.4⁺

Date 10-5-84

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
	SM	silty gravelly fine SAND, moist, medium dense (fill) with increased gravel (slag) brick and concrete fragments	5		22	5.4	Tv=0.05tsf
					11	3.7	
					13	9.4	
	GM	brown, silty, sandy GRAVEL, fine wet, loose, (possible fill)	10 10/5/84		4		
					5	37.6	
	cl	silty CLAY, trace fine sand, very soft, layer of wood fragments from 18.8 to 19 feet	15 20 25		0		
	SP	black SAND with trace silt, very fine to fine, loose with trace silt, dense becomes medium dense	30 35		7		
					34		
					28		

**Earth
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GEOTECHNICAL ENGINEERING & GEOLOGY



BORING LOG

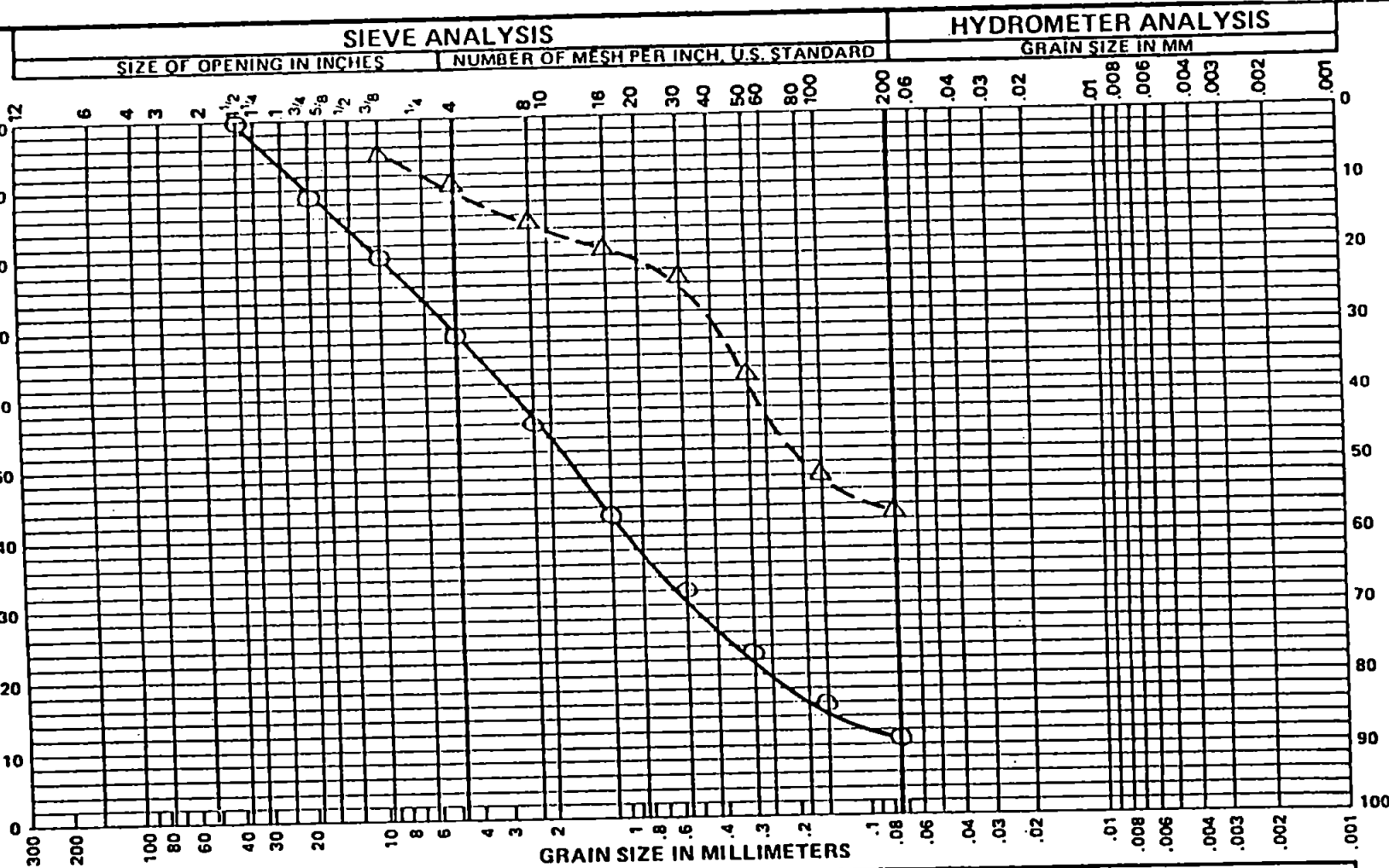
BAR-S PROPERTY
SEATTLE, WASHINGTON

Proj. No. 2453

Date Nov. '84

Plate 9

PERCENT FINER BY WEIGHT

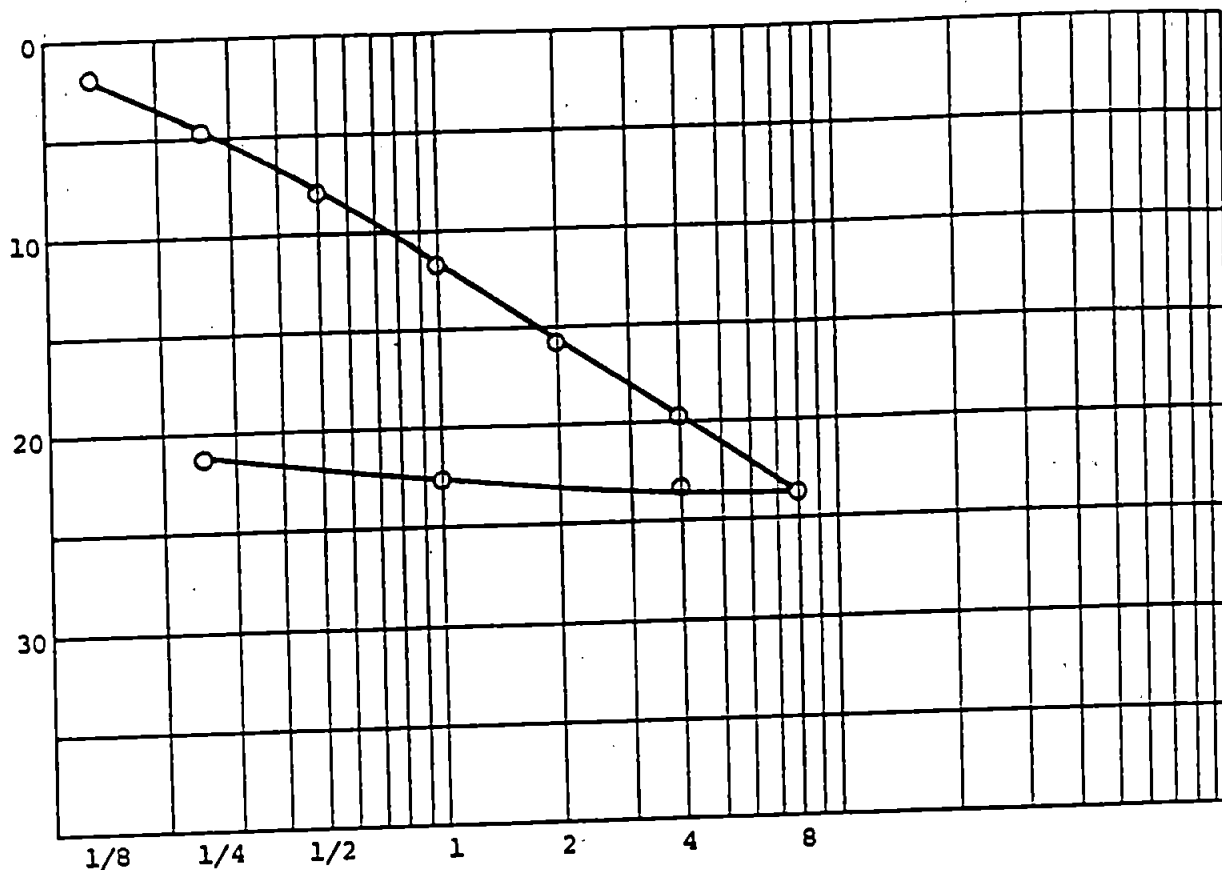


COBBLES	GRAVEL		SAND			FINES
	COARSE	FINE	COARSE	MEDIUM	FINE	

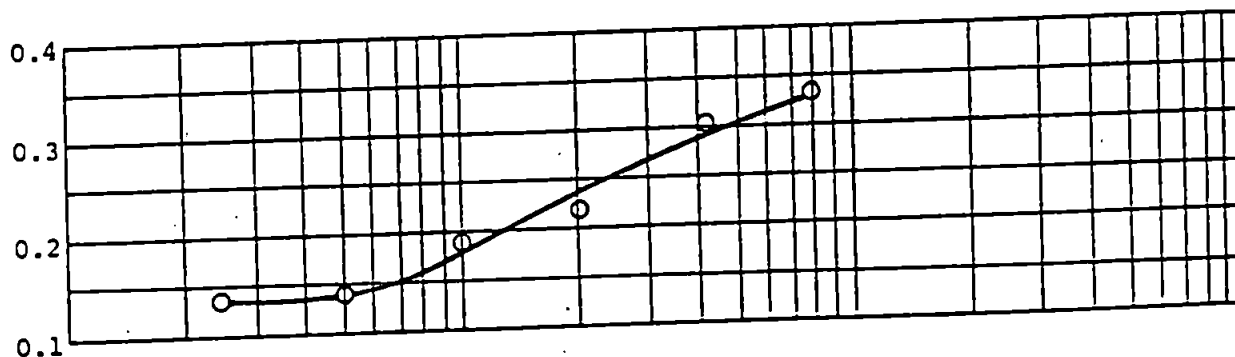
KEY	Boring or Test Pit No.	DEPTH (ft.)	USCS	DESCRIPTION	Moisture Content (%)	LL	PL
○ —	B 2	5	SW-SM	gravelly SAND with silt	42		
△ - -	B 4	2.5	SH	silty SAND	12		

PERCENT FINER BY WEIGHT

COMPRESSION, percent



C_v
in./day



PRESSURE, tsf

Key	Boring No.	Depth (ft.)	USCS	Soil Description	Liquid Limit %	Plastic Limit %	Plasticity Index %	Moisture Content, W%		Dry Density (pcf)
								Before	After	
O	B2	19	CL	lean clay	45	24	21	54.5	38.5	67.2

Earth Consultants Inc.
GEOTECHNICAL ENGINEERING & GEOLOGY



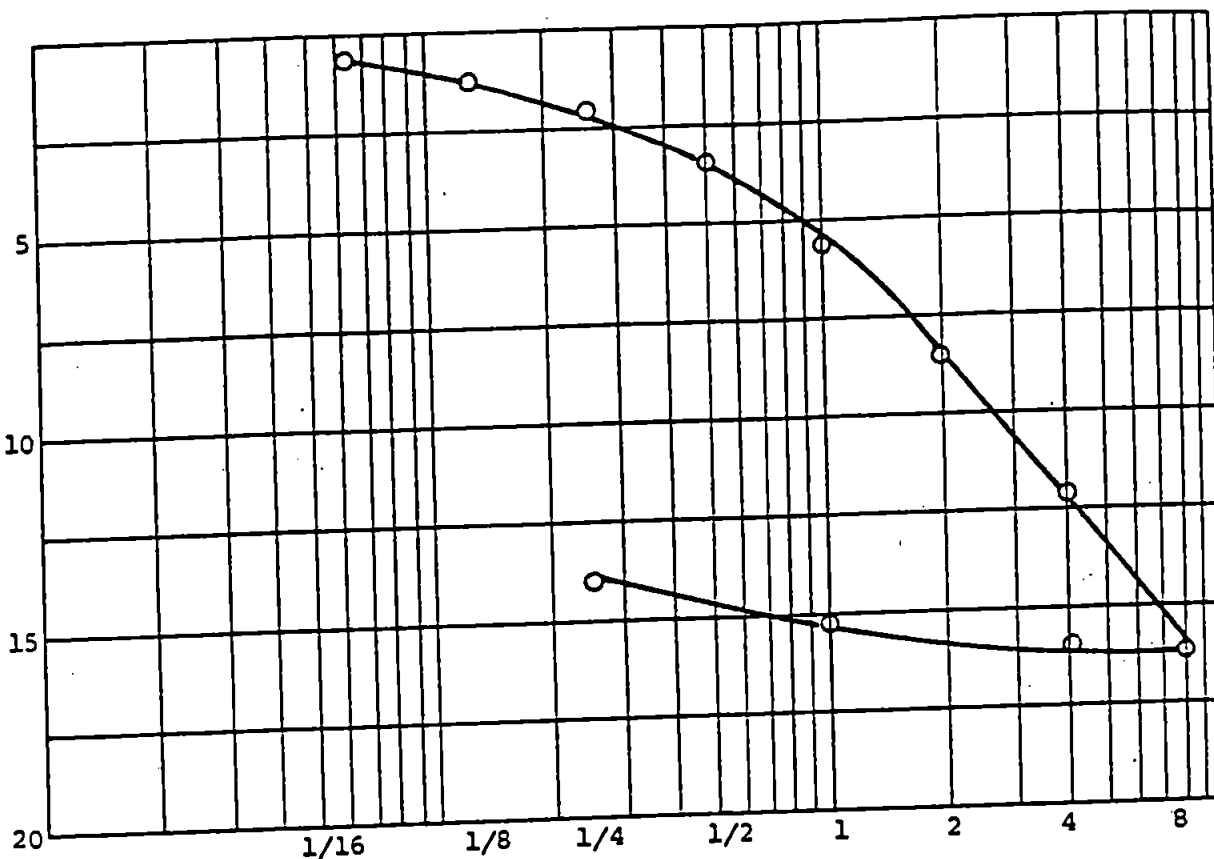
CONSOLIDATION TEST DATA
BAR-S PROPERTY
SEATTLE, WASHINGTON

Proj. No. 2453

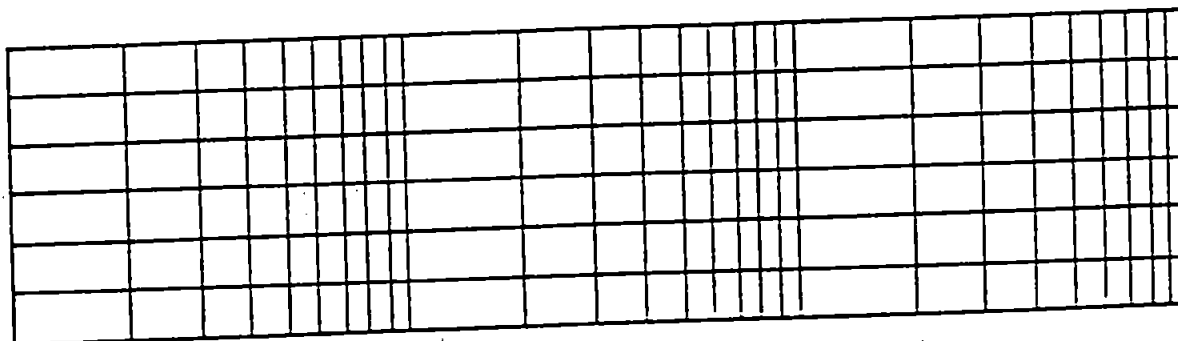
Date Nov. '84

Plate 11

COMPRESSION, percent



Cv
in²/day



PRESSURE, tsf

Key	Boring No.	Depth (ft.)	USCS	Soil Description	Liquid Limit %	Plastic Limit %	Plasticity Index %	Moisture Content, W %		Dry Density (pcf)
								Before	After	
O	B4	20	CL	lean clay	43	25	18	43.3	31.8	77.1

Earth Consultants Inc.
GEOTECHNICAL ENGINEERING & GEOLOGY

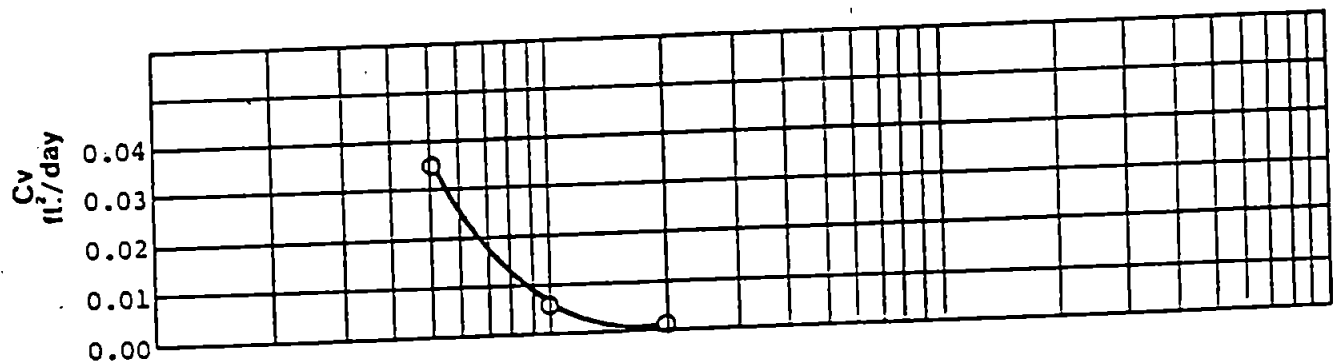
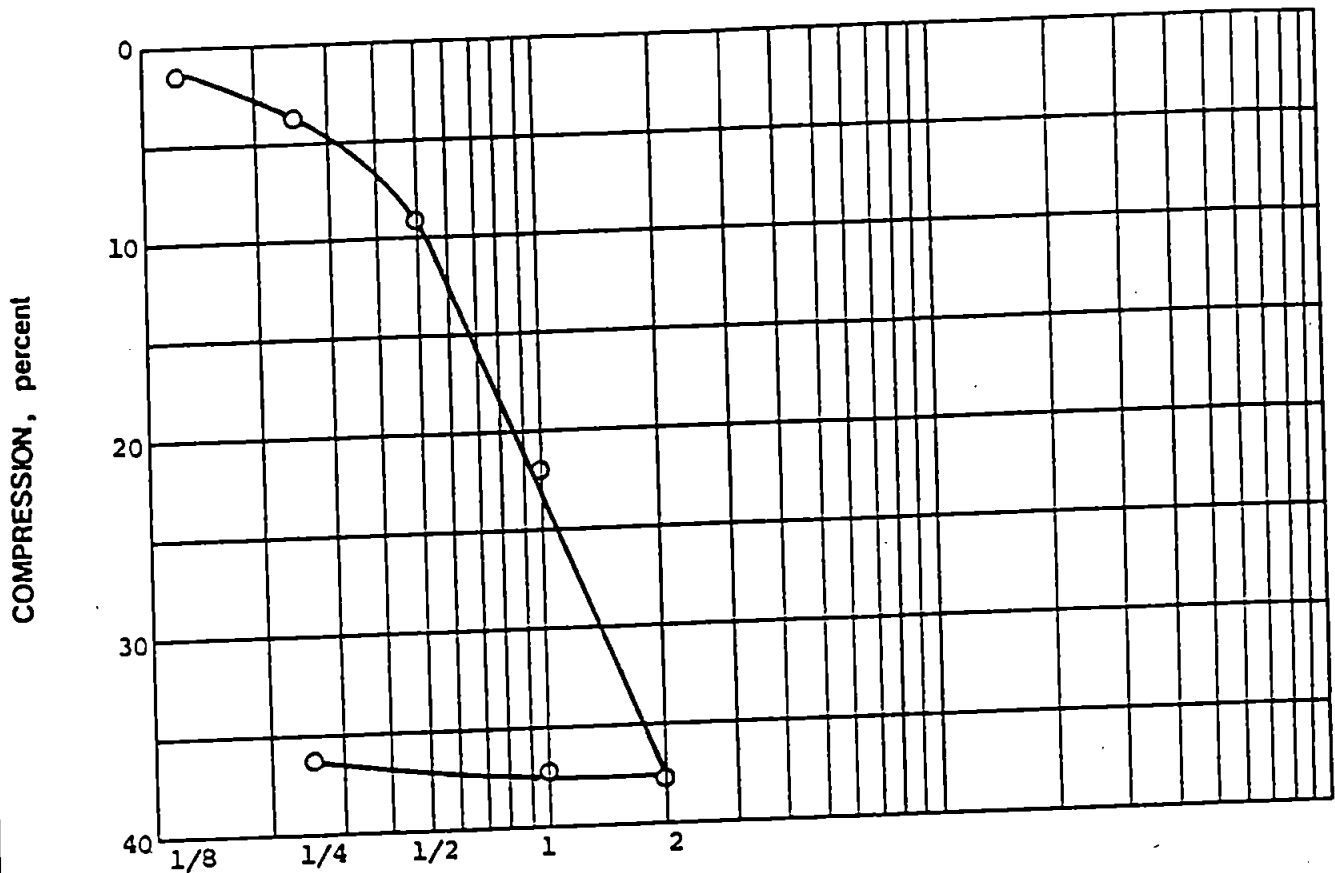


CONSOLIDATION TEST DATA
BAR-S PROPERTY
SEATTLE, WASHINGTON

Proj. No. 2453

Date Nov. '84

Plate 12



PRESSURE, tsf

Key	Boring No.	Depth (ft.)	USCS	Soil Description	Liquid Limit %	Plastic Limit %	Plasticity Index %	Moisture Content, W %		Dry Density (pcf)
								Before	After	
O	B5	18		peat-organic clay						



APPENDIX B
ENVIRONMENTAL SITE ASSESSMENT REPORT
SHANNON AND WILSON 1996a

T-1678-01

***Levels 1 and 2
Environmental Site Assessment
Park 90/5 Site
Seattle, Washington***

May 1996

***Dell Jackson & Associates, Inc.
P. O. Box 6756
Bellevue, Washington 98008-0756***



SHANNON & WILSON, INC.
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206 ■ 632 ■ 8020

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**LEVEL 1 AND 2 ENVIRONMENTAL SITE ASSESSMENT
PARK 90/5 SITE
SEATTLE, WASHINGTON**

1.0 INTRODUCTION AND SCOPE

1.1 Introduction

Shannon & Wilson has completed a Level 1 and 2 Environmental Site Assessment (ESA) for the Park 90/5 site, located at 2203 Airport Way South in Seattle, Washington. The Level 1 and 2 ESAs were authorized by Mr. J. Cordell Jackson of Dell Jackson & Associates, Inc., on April 17, 1996, by signing our proposal dated March 14, 1996. This report presents the results of the ESAs.

The purpose of the ESAs was to evaluate the potential for the presence of recognized environmental conditions. The term "recognized environmental conditions" means the presence or likely presence of hazardous or dangerous wastes and/or substances, including petroleum products, under conditions that indicate an existing release, a past release, or a material threat of a release into the structures on the property or into the ground, groundwater, or surface water of the property. Hazardous or dangerous wastes and/or substances are defined by the Washington State Model Toxics Control Act (MTCA) and the Dangerous Waste Regulations.

1.2 Scope of Services

The scope of work was in accordance with that outlined in our proposal and in accordance with the American Society for Testing and Materials (ASTM) Standard E 1527-94 for Level 1 ESAs.

The scope of work for the Level 1 portion of the ESA included the following subtasks:

- ▶ Review of readily available information from various sources with respect to current and historical uses of the property and its surroundings, including records related to building construction, maintenance, and operations. Site investigations previously performed by others were also reviewed.

- ▶ Detailed visual reconnaissance of the five buildings and property comprising the Park 90/5 office park, and cursory reconnaissance of the immediate site vicinity.
- ▶ Review of federal and state regulatory agency records.
- ▶ Interviews with present employees, the current owner/operator, and tenants.
- ▶ Review of information related to the physical setting of the site.
- ▶ Preparation of applicable portions of this report.

The scope of work for the Level 2 portion of the ESA included the following subtasks:

- ▶ Advancement of soil and groundwater probes at each of the identified former tank locations, in the fill known to contain slag, and near the boring in which Earth Consultants, Inc. (ECI) noted oil (ECI, 1987b).
- ▶ Collection of soil and groundwater samples from the probes for analysis of diesel-, oil-, and gasoline-range petroleum hydrocarbons; benzene, toluene, ethylbenzene, and toluene (BTEX), components of gasoline; and total metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver).
- ▶ Performing a geophysical survey to determine if underground storage tanks (USTs) remain on site in accessible locations.
- ▶ Preparation of applicable portions of this report.

The scope of this project did not include an audit of environmental regulatory compliance issues or permits; collection and testing of building materials for asbestos, urea formaldehyde insulation, or lead-based paint; testing of fluorescent light (PCB) ballast; testing of radon gas levels; or wetland delineation. It is our understanding that asbestos at the site has already been addressed by others.

2.0 SITE DESCRIPTION AND LAND USE HISTORY

2.1 Location and Description

The site is located in southern Seattle, Washington, in Section 8, Township 24 North, Range 4 East. The tax identification number for the property is 766620-3240, and the address is 2203 Airport Way South.

Adjacent land use is primarily commercial and industrial. The site is approximately 10 acres in size and is bounded by Airport Way South on the east, Stacy Street on the south, Great Northern Railroad tracks on the west, and Walker Street on the north. The southeast portion of the site is bordered by Pacific Food Importers (located at the corner of Airport Way South and Stacy Street). Valley Freightliner is located across Stacy Street to the south, and Mack Truck Sales and Services is located across Walker Street to the north. Site development includes five buildings currently used for office space, warehouse space, biotechnology laboratories, a coffee roasting facility, a doctor's office, and communications businesses. The areas surrounding the buildings are asphalt-paved parking lots. A vicinity map is presented in Figure 1, a historical site plan is presented in Figure 2, and a current site and exploration plan is presented in Figure 3. Appendix A contains selected site photographs from the field reconnaissance.

2.2 Site History

The history of land use of the subject property was developed to identify past uses that might have had adverse effects on the environmental conditions at the site, primarily through the use of potentially hazardous materials. The historical information was obtained through a review of readily available data at the King County Assessor's Office (Tax Assessor), Department of Construction and Land Use (DCLU), Washington State Archives, the Shannon & Wilson library, and the University of Washington library. A 50-year chain-of-title report for the site, provided by the Sabey Corporation and prepared by Transnation Title Insurance Company, also was reviewed and is provided as Appendix B. Specific sources of information used in developing the site history include:

- ▶ Sanborn Fire Insurance zonation maps (1904, 1916, and 1948)
- ▶ Kroll's Atlas of Seattle maps (1920, 1950, 1960, 1966, and 1987)

- ▶ Seattle Department of Construction and Land Use Permits
- ▶ Polk's Directory of Seattle (1938, 1940, 1943, 1948, 1955, 1960, 1969, 1977, 1980, 1985, 1990, 1993, and 1994)
- ▶ Aerial photographs (1936, 1946, 1956, 1960, 1969, 1977, 1980, 1985, 1990, 1993, and 1995)

The site was originally part of the Seattle Tide Lands at the mouth of the Duwamish River, which was platted and annexed to the City of Seattle in 1895. Between 1895 and 1902, the area was filled by dredging the Duwamish River and sluicing Beacon Hill (Phelps, 1978).

According to DCLU records, the first structures were built at 2203 Airport Way South (then 9th Avenue South) in 1899. By 1904, the site had been developed as the Frye & Company Slaughter House, shown in the 1904 Sanborn map to include stock pens, killing rooms, rendering tanks, a sausage factory, a smokehouse, and an office. Airport Way South was built on planking 15 feet high in 1904, and many of the site buildings appear to be on platforms. One set of railroad tracks was also evident in the 1904 Sanborn map.

Tax Assessor records obtained at the Washington State Archives list 1914 as the date of construction for many of the slaughterhouse buildings, including a machine shop, a lard room, a tank shed, and a saw shed. According to Tax Assessor's records, an oil house and paint shop were constructed in 1916. The 1916 Sanborn map indicates that cottonseed oil tanks were located aboveground in the tank shed. The 1916 Sanborn map also shows another set of railroad tracks coming onto the property from Airport Way South (shown on Figure 2).

A Tax Assessor card indicates that in 1927 Frye & Company added an office building to the site. This office building had a 6,000-gallon tank associated with it. This is likely the office building on the northeast corner of the property as seen in Figure 2.

The aerial photographs and the DCLU permits reviewed indicate that the site went through many structural changes between 1936 and 1980, with buildings being added and removed.

According to Polk city directories, the site was listed as Polpar Livestock Company, Frye Packing Company, Frye Investment Company, and Frye-Bruhn Company from the turn of

the century until 1950, when the site was purchased by the Seattle Packing Company. Also in 1950, Seattle DCLU records indicate that a permit was issued to Seattle Packing Company to install a 20,000-gallon underground fuel oil storage tank. The concrete building associated with the gas pumps (Figure 2) on the western portion of the property is evident in the 1956 aerial photograph. Also evident in the aerial photograph is standing water in the southwestern portion of the property.

According to the chain-of-title report, Seattle Packing Company was liquidated in 1957, and the site was purchased by the Cudahy Packing Company. In 1960, DCLU recorded the installation of a 2,200-gallon tank on the roof of the slaughterhouse. This was likely a water tank because "no heating" was stated on the Tax Assessor card.

In 1969, railroad tracks that ran north-south across the property were present on the west side of the slaughterhouse and east of the present-day Building C.

According to DCLU records, Cudahy Foods installed a 4,000-gallon UST on the northeast portion of the site in 1979. The chain-of-title indicates that Bar S Foods Company purchased the site from Cudahy Company in 1981.

In 1984, the Sabey Corporation purchased the property and demolished all buildings except the slaughterhouse (Building A), which was remodeled completely in 1985 (ECI, 1987b). Buildings B through E were constructed from 1985 to 1987. A list of tenants from 1985 to present was provided by the Sabey Corporation and is presented in Table 1.

In 1985, a permit was issued to install a waste oil storage tank at Building 5 (E). This tank was removed in 1994 (Delta, 1994). ECI stated in their Preliminary Environmental Audit that at the time of demolition in 1985, a tank was removed from the south side of the engine and boiler rooms (ECI, 1987b). Table 1 presents a summary of the USTs historically located on the site. At least five USTs have been historically located on the site as summarized in Table 2. The potential former tank locations are shown on Figures 2 and 3.

2.3 Previous Investigations

ECI conducted several geotechnical investigations as well as a preliminary environmental audit at the site (see References section). ECI noted fill containing oil and slag at two

different locations in their borings, B-1 and B-6, respectively (Figure 3). ECI noted that "all known buried tanks on the property" were removed during site construction activities; however, no closure reports or analytical testing were noted. ECI was contacted to obtain more detailed information about the tank removals, but they had none. ECI did state that there is a potential for these tanks to have leaked, and that the nature of the slag noted in earlier borings could not be determined (ECI, 1987b).

In 1985, ECI observed the installation of piles for Buildings B and E (ECI, 1985b). In 1987, ECI excavated five test pits in the area of Building D. These test pits revealed up to twelve feet of fill in this area. The fill consisted primarily of clayey silt and also contained concrete blocks, metal pipes, pieces of angle iron, wood, and reinforcing steel (ECI, 1987a).

A report prepared by Delta Environmental Consultants, Inc., provided by the Sabey Corporation, states that a 300-gallon waste oil tank was removed in March 1994 from the northeast corner of Building E, previously occupied by U S WEST for vehicle storage. The report indicates that the tank was in good condition at the time of removal and no signs of contamination were noted in the excavation. Analytical results indicated that TPH concentrations of up to 120 milligrams per kilogram (mg/kg) were in some of the soil samples; however, the concentrations were below the MTCA cleanup standards of 200 mg/kg. Further assessment was not deemed necessary (Delta, 1994).

3.0 GEOLOGIC AND HYDROLOGIC SETTING

3.1 Regional and Site Geologic Setting

An examination of a geologic map (Liesch and others, 1963) indicates that the site is in a modified area. This means that the area has undergone extensive filling that has greatly modified or obscured the original geology and topography. The site is in the area of the former tide flats of southern Seattle, which were filled between 1895 and 1902.

Geotechnical investigations were completed on the site in 1984, 1985, and 1987 by ECI (ECI, 1984, 1985a and 1987a). Based on the geotechnical borings and the soil samples taken from the probe locations by Shannon & Wilson for this study, the uppermost soils consist of sandy silt, and silty sand and gravel fill. The fill contains wood and brick

fragments, as well as concrete rubble and slag. The geotechnical borings indicate that the fill is approximately 12 to 17 feet thick and overlays soft, silty clay to approximately 25 feet. Below the clay is fine sand with silty layers to 99 feet, which is the maximum depth drilled (ECI, 1985a).

The 1984 geotechnical investigation by ECI gives the elevations for the boring locations. Based on these elevations, it is evident that the southeast portion of the site was 6 to 7 feet lower than most of the site. The fill thickness at the site varies and is likely thicker in the southeastern portion of the site, since current grade is relatively level.

3.2 Groundwater Conditions

The site is located about elevation 12 to 13 feet above mean sea level (MSL). Groundwater was encountered in the borings at depths of 6 to 10 feet below ground surface (bgs). Groundwater flow direction in the site vicinity is expected to be to the west, toward the East Duwamish Waterway.

4.0 ENVIRONMENTAL RECORDS REVIEW

A review of regulatory agency records was conducted for the site and nearby properties to identify known or potential sources of contamination that could adversely impact the subject property. Records were obtained from the U.S. Environmental Protection Agency (EPA) and Washington State Department of Ecology (Ecology). Table 3 provides a summary of the lists reviewed and Table 4 provides a summary of the findings.

4.1 Known or Suspected Contamination Sites

Based on the records review, there are numerous sites within the vicinity of the subject property with known or suspected contamination of soil and/or groundwater (Table 4 and Figure 1). Each of these sites is in various stages of investigation and/or remediation. Lee and Estes Tank Lines, located across Airport Way to the southeast, has identified soil and groundwater contamination, including floating product on the groundwater, which was noted in a UST excavation in June 1995. The file for Lee and Estes was reviewed at Ecology. The Leaking Underground Storage Tank (LUST) list states that cleanup is in progress;

however, there were no follow-up reports in the file to confirm this, and the extent of the contamination is not evident.

The LUST list indicates that only soil was affected and cleanup has been conducted at Mack Truck Sales & Service and Nordstrom Catering Corporation located at 2025 and 2415 Airport Way South, respectively.

The remaining sites with known or suspected contamination are either reported as cleaned up, are located downgradient or crossgradient (with respect to groundwater flow) from the site, or are too far from the site to present a concern. Therefore, they have a low potential for affecting the site.

4.2 Hazardous Materials Handlers

Potential sources of contamination include sites that reportedly use, generate, or store hazardous or potentially hazardous materials. Information on hazardous materials handlers was obtained from a review of the EPA Resource Conservation and Recovery Act (RCRA) Notifiers List, which includes generators, and the Ecology Registered UST List.

There is one RCRA Treatment/Storage/Disposal (TSD) facility listed within one mile of the property—Northwest EnviroService, Inc. (Table 4). In addition, there are eight listings for RCRA generators on the site and adjoining properties. Four of these listings are for former tenants of Park 90/5 and are listed as small quantity or conditionally exempt generators. Ostex and Washington Toxicology Laboratories, current tenants, are listed as conditionally exempt generators. The remaining two listings are for adjoining properties listed as non-regulated or small quantity generators.

Ecology maintains a listing of registered USTs in the state. Heating oil tanks are typically not included in this listing. Inclusion of a site on this list does not specifically imply that it is contaminated, but it is common to encounter UST-related contamination, particularly at sites that have old USTs. No registered USTs are listed for the site and adjoining properties.

The site was not listed in the Emergency Response Notification System (ERNS) database as having a reported spill during the time of recordkeeping, October 1987 to September 1995.

5.0 RESULTS OF VISUAL RECONNAISSANCE

The visual reconnaissance of the site was conducted on April 22 and 24, 1996. Mr. Ken Stickley of the Sabey Corporation accompanied the Shannon & Wilson field representative on this site reconnaissance and provided information on the operations of the tenants. Mr. Brian Straker, site maintenance/engineer for Sabey, also provided information on activities of the tenants and certain mechanical aspects of the buildings. The purpose of the site visit was to identify hazardous or potentially hazardous substances that were historically or are currently used, generated, stored, or disposed of on the subject property. A general visual reconnaissance of adjacent properties was also conducted during this site visit but was restricted to what could be observed from public areas at that time. Appendix A contains selected site photographs from the reconnaissance.

Site improvements consist of five buildings currently used for office space, as well as biotechnology laboratories, a coffee roasting facility, a doctor's office, a communications business, and distribution centers (Figure 3). Water and sewer lines to the building are provided by the City of Seattle, and the heat is natural gas. Historically, the site was steam-heated. The site is relatively flat, and surface drainage is provided by a series of storm drains across the property.

5.1 Building Interiors

The Shannon & Wilson representative was escorted through all interior portions of the buildings by Mr. Stickley and the various tenants. Building A is occupied by a doctor's office and biotechnology laboratories that store hazardous or potentially hazardous materials, and various other businesses that do not. Both Dr. O'Keefe and GeneLex have an x-ray room or developing area where film development chemicals are stored and used. Both businesses have a silver trap on the drains to prevent the metal from being washed down the drain. All of the laboratories use various amounts of laboratory chemicals, which are stored on shelves or in lockers labeled "flammable," "acid," or "corrosive." Any hazardous waste generated by the laboratories is stored until picked up by various recyclers/disposal facilities (Envirotech, UW HazWaste Pickup). All of the laboratories also generate biological hazardous waste, which is stored in properly labeled containers for pickup by BFI Medical Waste Systems or Stericycle. Ostex and GeneLex generate small amounts of radioactive material, which are also stored until picked up by a disposal company.

Each laboratory has a permit with the Municipality of Metropolitan Seattle (Metro) to wash small amounts of certain chemicals down the drain. Each laboratory stressed that the amounts are minuscule and have been approved by Metro. Floor drains were noted in the laboratories on the third floor of Building A. The floor drains are intended to provide drainage for the emergency showers, which are located in the laboratories. According to Mr. Stickley, the sink drains and floor drains on the third floor are connected to a charcoal tank on the second floor located in Dr. O'Keefe's office. All water from the third floor is filtered through the charcoal before it is released to the sewer system. This system was installed when International Clinical Laboratories was a tenant.

Building B, which houses the Committee for Children, is used as office and packaging space. With the exception of paint cans used for touching up, there were no suspect materials stored in this building. Part of the building is used for box storage by Corporate Image. This storage area also contained some 5-gallon buckets of paint and material for patching the outside of the buildings. No floor drains were noted in Building B.

The south end of Building C is occupied by two distribution facilities: Acco Chain and Lifting, which distributes various sizes of chains, and MacDonald Meat Company, which stores and distributes dry foods. The remainder of Building C is occupied by Starbucks offices, a research and development lab, an equipment development area, an equipment servicing area, and the roasting facility. The Shannon & Wilson representative was not allowed to enter the research and development lab. A Starbucks representative, Ms. Jennifer Bar, indicated that the chemicals used in the lab include solvents and coffee components. Ms. Bar stated that there are no floor drains in the lab, and the waste chemicals generated are picked up by a recycler. The only material used in the equipment development or equipment servicing areas is a phosphate soap. The roasting facility uses various oils and solvents in its equipment. A flammable locker is used for solvent storage. Spent solvents and oils are removed by Safety Kleen. Floor drains do not exist in the building and no staining was noted on the concrete floor. Mr. Juan Mojica, maintenance manager for Starbucks, stated that all equipment/machinery is checked weekly for leakage and receives routine maintenance annually. Absorbent materials are stored in the building for potential leaks or spills.

Building D is occupied by three businesses. Two of these businesses are distribution centers and do not store or use hazardous materials. The third business occupying Building D is

another division of Ostex. The same storage and disposal practices that are observed in the laboratory in Building A are practiced in Building D as well. The only area that has a floor drain is the glass washing area, and any chemicals that are washed down the drain are neutralized first. The only area with a potential for a spill is the scale room where bulk amounts of sulfuric acid are handled. In the event of a spill, a "tub" is located beneath the scale. The tub would contain any material until it was pumped to an external, aboveground storage tank (AST) with a 400-gallon capacity. The acid would then be neutralized before being picked up by a recycler. Ostex has never experienced a spill and has filled the tank with only water during testing of the system.

Building E is occupied by Kaman Industrial Technologies on the eastern quarter of the building. Kaman distributes bearings, drives, and belts. Adhesives, sealants, lubricants, and epoxies are stored on a sales rack but are not opened or used in the building. The remaining portion of the building has no leased tenant but is often rented to film companies who use the space to film movies or television shows. Floor drains extending across the width of the building were noted in this area, which was previously occupied by US WEST as a truck parking facility. Also seen inside this portion of the building was the former fill port for the UST discussed in Section 2.3. The fill port has been filled with concrete, and no staining was noted on the concrete floor in this area.

5.2 Building Exteriors

The areas surrounding the buildings are asphalt-paved parking lots. During the site reconnaissance, it was noted that some patching had occurred in the asphalt. According to Mr. Stickley and Mr. Straker, these patches are locations where repairs have occurred because of settling or water main breaks. An asphalt patch outside of the northeastern portion of Building E, marked the UST excavation discussed in Section 2.3. The vent line and an outside fill port for the former UST are still in place. They were not removed to preserve a surface concrete pad.

Along the west side of Building C are stacks, which are associated with the roasters at Starbucks. The purpose of the stacks is to release the heat generated in the roasters. Also on the west side of the building is a concrete equipment pad, where minor surface staining was noted at the time of the assessment. The Great Northern Railroad tracks border the

property on the west. Some of the railroad ties appeared to be treated with creosote, and some staining was noted on the ballast.

The first floor of Building A is located below grade. Because the groundwater table is shallow (6 to 8 feet below ground surface [bgs]), a drain system is in place around the building to prevent flooding. Mr. Straker stated that the water drains to a sump located on the east side of Building A. The water is pumped intermittently to the storm sewer. During the site visit the sump was viewed by the Shannon & Wilson representative. A sample of the water was taken strictly for observation purposes; no laboratory analyses were performed. No sheen or obvious hydrocarbon odor were observed on the water. A photoionization detector (PID) was used to measure volatile organic compounds (VOCs) in the headspace and none were detected.

6.0 SAMPLING LOCATIONS AND METHODOLOGY

A subsurface exploration for the Level 2 ESA was conducted on April 23, 1996. Shannon & Wilson subcontracted Transglobal Environmental Geosciences Northwest, Inc. (TEG), to drive five soil probes at the site with a truck-mounted hydraulic Strataprobe. The probes were labeled P-1 through P-5, as shown on Figure 3. The probes were installed to investigate the potential for contamination associated with USTs historically located on the site, as well as the oil and slag noted in borings previously advanced by ECI (ECI, 1987b). Soil and groundwater samples were collected at each location.

Soil samples were collected continuously using either a 3- or 2-foot-long, split-spoon sampler. Soils encountered were generally silty sand and gravel fill containing various amounts of wood and brick fragments, concrete rubble, wood pieces, and slag. The probes were driven to depths of 12 to 15 feet. Probe logs showing soil stratigraphy are presented in Appendix C. Groundwater was encountered in most of the probes at 6 to 8 feet bgs. Sample collection depths are summarized in Tables 5 and 6.

The split-spoon samplers were decontaminated after each sample to prevent cross-contamination of the samples. Upon completion of soil and groundwater sampling at each probe location, the holes were backfilled with bentonite chips and patched with asphalt.

7.0 ANALYTICAL RESULTS

Soil samples were selected for chemical laboratory analysis based on visual observations and/or sample depth relative to the water table. One soil and one groundwater sample from each probe (two soil at P-2 and P-3) were analyzed by TEG's mobile laboratory for diesel- and oil-range petroleum hydrocarbons by method WTPH-D/D Extended; gasoline-range petroleum hydrocarbons by method WTPH-G; and benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8020. Three soil and three groundwater samples were submitted to Sound Analytical for total metals analysis of the eight RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). The results of the analyses are summarized in Tables 5 and 6, and the full laboratory report is presented in Appendix D.

Soil samples from P-2, P-4, and P-5 contained total petroleum hydrocarbon (TPH) levels above the potential state cleanup criteria. The soil at P-2 contained 20,900 mg/kg of diesel, which is above the 200 mg/kg cleanup criteria. The soil samples from P-4 and P-5 contained 12,774 and 21,700 mg/kg of oil-range hydrocarbons, respectively, also above the 200 mg/kg cleanup criteria. The samples from P-4 and P-5 were analyzed following a modified procedure (silica gel cleanup) in order to confirm that the oil was of petroleum hydrocarbon origin and not biogenic (related to animal fat). The soil sample from P-3 contained 990 mg/kg of chromium, which is above the 500 mg/kg cleanup criteria. All other analytes were either not detected or were detected below regulatory criteria.

TPH and arsenic were detected in the groundwater above potential cleanup criteria. The groundwater sample from P-2 contained 219,000 micrograms per liter ($\mu\text{g/L}$) of diesel, which is above the 1,000 $\mu\text{g/L}$ cleanup criteria. Diesel was also detected in the groundwater from P-5 at 233 $\mu\text{g/L}$; however, this is below the cleanup criteria. Arsenic was detected in the groundwater samples from P-3 and P-4 at concentrations of 0.017 $\mu\text{g/L}$ and 0.011 $\mu\text{g/L}$, respectively, which are slightly above the cleanup criteria of 0.005 $\mu\text{g/L}$.

8.0 GEOPHYSICAL SURVEY

On April 24 and 25, 1996, GeoRecon International of Seattle, Washington, conducted a geophysical survey of portions of the site to determine if USTs remain on the site. No

evidence of USTs was found on the eastern half of the site, or on the east side of Building C at the location of the former gas pumps for the rendering plant. It is possible that a tank is still present beneath Building C and/or beneath Building B. However, ECI indicated that tanks were removed during site preparations for Buildings A, B, C, and D (ECI, 1987b). Apparently, ECI was referring to the three tank locations identified on the site plan in their report which are the gas pump areas, the ASTs of animal fat, and a tank near the engine/boiler room. The geophysical survey may have located a buried foundation wall associated with the rendering plant office building, which was formerly located in the northeast corner of the property; however, no evidence of a buried UST was noted. The letter report and map showing the areas surveyed are located in Appendix E of this report.

9.0 FINDINGS AND CONCLUSIONS

Based on our studies and observations, Shannon & Wilson offers the following findings and conclusions.

Historical

The site was originally part of the Seattle Tide Lands, which was annexed to the City of Seattle in 1895 and filled for development. Between 1899 and 1904, the site was developed as a meat rendering/packing plant, which was operated under various ownerships until 1984 when the property was purchased by the Sabey Corporation.

Approximately 12 to 17 feet of fill was placed on the site at various times. Based on our investigation and investigations by ECI, the fill consists of silty sand and gravel with wood and brick fragments, concrete rubble, glass, and slag. The fill beneath the buildings also contains reinforcement steel, metal pipes, and pieces of angle iron.

Historical records indicate that at least four USTs were present on the site during the operation of the rendering plant.

1. One 6,000-gallon tank, installed in 1927, was associated with the office building on the northeast corner of the property.

2. One 20,000-gallon UST was installed in 1950 and was likely associated with the gas pumps on the western portion of the property.
3. One 4,000-gallon UST was installed in 1979 on the northeastern portion of the property.
4. One tank of unknown size was removed from south of the engine and boiler rooms when the buildings were demolished (ECI, 1987b).

There are no records with Ecology or DCLU to indicate that these tanks have been removed. ECI (1987b) indicates that tanks were removed during the 1985 demolition of the buildings. No specific information about tank removal was available from ECI.

A geophysical survey was performed on April 24, and 25, 1996, at the site to look for signs of the above four USTs. The survey, which was performed in the parking lots on the eastern half of the property and on the east side of Building C in the vicinity of the former gas pumps, found no indications of buried USTs. There is a slight possibility that a tank could be located beneath Building C and that a tank could be located under Building B.

In addition to USTs associated with the former rendering plant, ASTs were also located east of the steam plant, in the area currently between Buildings D and E. Sanborn maps indicate that these tanks contained cottonseed oil. An ECI report indicated that these tanks may have contained rendering products such as animal fats (ECI, 1987b).

A waste oil UST was installed next to Building E in 1985. The tank was used by US WEST for maintenance of their vehicles, which were stored in Building E. A report prepared by Delta Environmental Consultants indicated that this tank was removed in 1994, that two of the samples contained petroleum hydrocarbons below the cleanup criteria, and that no further action was necessary.

Subsurface Investigation

Our subsurface investigation identified five areas of concern:

1. Diesel contamination was found in the soil and groundwater at Building C (P-2 area).
2. Oil contamination was found in the soil between Buildings D and E (P-5 area).
3. Oil contamination was also found northeast of Building E (P-4 area).
4. Chromium contamination exists in the soil east of Building B (P-3 area).

5. Sporadic contamination in the fill.

The concentration of diesel in the groundwater (219,000 $\mu\text{g/L}$) near Building C (P-2) in the area of the former gas pumps significantly exceeded the potential cleanup criteria of 1,000 $\mu\text{g/L}$. Concentrations this high are usually associated with either a free-product layer or solvents in the water causing more diesel to be dissolved in the water. A sheen was noted in the sample. Soil and groundwater contamination likely extend west beneath Building C and may extend off site to the west. The nature and extent of the contamination are unknown, i.e., other contaminants may be present.

The area between Buildings D and E (P-5) previously contained large ASTs of animal fats and other natural oils. The chemist confirmed that the oil detected in the soil was of petroleum hydrocarbon origin and not biogenic. Analytical tests were conducted following a modified procedure (silica gel cleanup) in order to confirm the origin of the oil. The source of the oil is unknown. It is possible that types of oil other than those identified in the historical records were stored in the tanks, or that a fuel UST was formerly located nearby.

A UST was formerly located in the vicinity of the boiler room northeast of the current Building E (ECI, 1987b) in the area of P-4. Historical records indicate that the UST was used for heating. Oil-contaminated soil may extend off site to the east. The nature and extent of the contamination are unknown. Minor amounts of gasoline and some gasoline constituents were also detected at P-4.

Metals analyses were performed on soil and groundwater samples from three probe locations across the site. Only chromium at P-3, near the southeast corner of Building B, was detected slightly above the potential soil cleanup criteria. However, chromium was not detected in the groundwater at the locations sampled. This area was noted by ECI (1987b) to contain slag in the fill during its geotechnical investigations.

Fill was placed on the site in several different episodes. Locally the fill contains debris such as glass, bricks, wood, concrete rubble, slag and metallic objects, and organic matter. Sporadic contamination of metals and petroleum is likely in the fill. Arsenic was detected in the groundwater in two of the three locations at concentrations exceeding potential state regulatory criteria. This may reflect arsenic in the fill or an area-wide groundwater problem.

Other Findings

The site is located in an area with known groundwater quality problems and potentially contaminated fill. The agency list search indicated that two of the current tenants of Park 90/5, Ostex and Washington State Toxicology Laboratories, are listed as conditionally exempt generators, meaning they generate less than 100 kg of hazardous waste per month. The search also revealed that numerous sites in the vicinity of the subject property are confirmed or suspected of having soil and/or groundwater contamination. The file for one site, Lee and Estes Tank Lines, was reviewed at Ecology. The file confirmed the information found in the LUST list: soil and groundwater contamination, including floating product on the groundwater was discovered during a tank excavation in June 1995.

There were no further reports in the file to indicate that cleanup had been initiated, although it was reported on the LUST list as "cleanup started". The other confirmed or suspected contaminated sites in the vicinity have a low potential to affect the Park 90/5 site.

If groundwater flow is to the west, groundwater TPH contamination could migrate onto the Park 90/5 site from the Lee and Estes site. However, this seems unlikely since no significant concentrations of TPH in groundwater were detected in the probes on the east side of the Park 90/5 site.

The current tenants that store, use, and/or generate hazardous or potentially hazardous materials are Starbucks and the following laboratories: Ostex, Washington State Toxicology Laboratory, Tacora, and GeneLex. All of these businesses appear to follow good housekeeping procedures, and all hazardous and biological hazardous materials are picked up by recyclers/treatment facilities.

10.0 RECOMMENDATIONS

Based on the above findings, Shannon & Wilson concludes that negative impacts to the site soil and groundwater have occurred from historical site practices. The vertical and lateral extent of contamination is unknown. TPH contamination has likely resulted from former leaking USTs. Metal contamination may have been a result of slag or other metal debris in the fill. Metals contamination may be sporadic across the site. Soil and groundwater TPH

contamination likely extends beneath Buildings C, D, and E. The following recommendations are offered to address soil and groundwater contamination.

Owners are required by law to report any release of any hazardous substance, including petroleum products, to Ecology within 90 days of discovery. This includes any discovery during excavation, or geotechnical or environmental investigations. In our opinion, the analytical results from the Level 2 ESA qualify as reportable concentrations. We understand that Sabey Corporation is reporting the discovery to Ecology.

There are two basic approaches to site remediation: (1) perform additional soil and groundwater sampling to evaluate the nature and extent of contamination in order to plan the appropriate remediation, or (2) begin remediation by first excavating accessible contaminated soil and then perform soil and groundwater sampling to determine what remains.

Even with remediation, the site soil and/or groundwater may never be "clean" because of the potential for contamination in inaccessible areas, such as under buildings, and because of the extent of fill underlying the site. It is reasonable to assume that a level of cleanup acceptable to Ecology can be attained at some time in the future. However, long-term groundwater monitoring may be a requirement from Ecology and deed restrictions may be placed on the property due to the likelihood that contamination will remain beneath the buildings.

Approach 1

Four to five groundwater monitoring wells should be installed, and sampling and analyses should be conducted to address the groundwater contamination discovered near Building C. Two to three of the monitoring wells should be placed on the west side of the property to check for potential off-site migration. At least one well should be placed in an upgradient, background location. The monitoring wells should be screened across the groundwater table to check for free product. The elevations and horizontal locations of the wells should be surveyed so that the groundwater flow direction and gradient can be accurately determined.

Further soil sampling should be performed in the vicinity of P-2, P-4, and P-5 to determine the extent of the oil and diesel contamination observed. Some of these soil samples should be analyzed for chromium to determine if there is a sitewide chromium contamination

problem. To evaluate the extent of soil and groundwater contamination beneath Building C, samples could be collected through the floor slab.

Soil and groundwater sampling should be conducted in the northeast corner of the property to address the potential for contamination related to former USTs that were located in this area. Although the geophysical survey indicates that the tanks have likely been removed, soil and/or groundwater could have been negatively impacted in this area if the tanks leaked.

Approach 2

Excavation could be conducted at the locations of concern to remove accessible contaminated soil. After excavation, the bottoms and sidewalls of the excavations should be sampled to determine whether contamination remains. Then, monitoring wells should be installed to determine the extent of groundwater contamination that remains and to address the potential for off-site migration. Dewatering may be required since the water table is shallow and contaminated soil is present below the water table.

After either approach, the results of analytical testing should be evaluated to determine what further action is needed, if any, to meet the requirements for an acceptable level of cleanup under current state regulations.

11.0 LIMITATIONS

Shannon & Wilson has reviewed historical records, conducted interviews with past and present employees, and conducted an on-site visual inspection of the subject property, and collected and analyzed a limited number of soil and groundwater samples. We have examined and relied on documents referenced in the report and on oral statements made by certain individuals. Shannon & Wilson has not conducted an independent examination of the facts contained in referenced materials and statements. We have assumed that these documents are genuine, and that the information provided in these documents and statements is true and accurate. Data generated from the site reconnaissance and sampling reflect that which can be reasonably inferred or is obvious by direct visual observation. Shannon & Wilson assumes no responsibility for identification of characteristics of the subject property

that were not readily identifiable by visual reconnaissance or sampling at the time of our site visit.

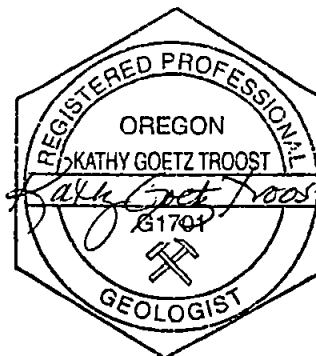
Shannon & Wilson has prepared this report in a professional manner, using that level of skill and care normally exercised for similar projects under similar conditions by reputable and competent environmental consultants currently practicing in the area, and in accordance with the terms and conditions set forth in our proposal dated March 14, 1996. Shannon & Wilson shall not be responsible for conditions or consequences arising from relevant facts that were concealed, withheld, or not fully disclosed at the time the report was prepared. We also note that the facts and conditions referenced in this report may change over time, and that the conclusions and recommendations set forth here are applicable to only the facts and conditions as described at the time of this report. Conclusions and recommendations were made within the operative constraints of the scope, budget, and schedule for this project. We believe that the conclusions stated here are factual, but no guarantee is made or implied.

Appendix F contains information about the qualifications of the personnel who conducted this ESA.

This report is for the exclusive use of Dell Jackson & Associates, Inc., and its representatives. Shannon & Wilson has prepared Appendix G, "Important Information About Your Environmental Site Assessment/Evaluation Report" and "Important Information About Your Environmental Report," to help you and others understand the use and limitations of our reports.

SHANNON & WILSON, INC.

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5-22-96/T1678-01.RPT/T1678-lkd/dgw

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TABLE 1
TENANT HISTORY

Building	Business Name	Use of Space	Tenant Status
Building A	—	Occupational therapy rehabilitation center	Former
	Pinkerton Security	Offices only	Former
	Starbucks Training Center	Offices only	Former
	Chempro	Offices and small laboratory	Former
	Burlington Environmental	Offices and laboratory	Former
	International Clinical Laboratories	Offices and laboratory	Former
	SeaAir Express	Offices only	Former
	AT&T	Offices only	Former
	Goodwill Games	Offices only	Former
	Berkeley Engineering & Construction	Offices only	Former
	Nelson Iron Works	Offices only	Former
	ECOS Corporation	Offices only	Former
	MicroVision	Electro optics research and development, offices only	Current
	AAT Television	Offices only	Current
	Perfect Systems	Offices only	Current
	Zephyr Communications	Offices only	Current
	Alaska Railroad	Offices only	Current
	Dr. O'Keefe - Occupational Health Resources	Doctor's office	Current
	Starbucks	Offices only	Current
	US West	Offices only	Current
	Ostex	Biotechnology laboratory	Current
	Washington State Toxicology Laboratory	Forensics testing laboratory	Current
	GeneLex	Biotechnology laboratory	Current
	Tacora	Laboratory	Current
	The Purdy Company	Offices only	Current
Building B	Unitech	Small distribution facility	Former
	AT&T Network Systems	Warehouse and office space	Former
	Committee for Children	Offices and packaging	Current
	Corporate Image	Warehouse	Current

TABLE 1 (cont.)

TENANT HISTORY

Building	Business Name	Use of Space	Tenant Status
Building C	Abodio	Furniture outlet	Former
	Port of Seattle	Dry storage	Former
	Starbucks Roasting Plant	Offices, laboratory, roasting facility, warehousing	Current
	Acco Chain and Lifting	Distribution center	Current
	MacDonald Meat Company	Distribution center	Current
Building D	Ostex	Laboratory	Current
	West 175	Distribution and sales office	Current
	Corporate Image	Distribution and sales office	Current
Building E	Pacific NW Bell (US WEST)	Truck storage facility	Former
	Kaman Industrial Technologies	Office and distribution center	Current

Tenant information provided by the Sabey Corporation.

TABLE 2

HISTORICAL EVIDENCE OF UNDERGROUND STORAGE TANKS (USTs)

Support Evidence	Size	Probable Location
1927 Tax Assessor Card	6,000 gallons	Office building on northeast corner
1950 Permit (DCLU)	20,000 gallons	Gas pumps
1979 Permit (DCLU)	4,000 gallons	Northeast portion
1987 Earth Consultants, Inc., Report	Unknown	Engine room and boiler room
1985 DCLU Permit and 1994 Delta Environmental Consultants Report	300 gallons	Building E

DCLU = Department of Construction and Land Use (City of Seattle)

Refer to Figures 2 and 3 for potential locations of USTs.

TABLE 3
LIST OF AGENCY RECORDS REVIEWED

Agency	List	Date of List	Search Distance (miles)
EPA	National Priority List (NPL), which lists Superfund sites.	3-19-96	1.0
EPA	Comprehensive Environmental Response, Compensation, and Liability Act Information System (CERCLIS)	3-25-96	0.5
EPA	Resource Conservation and Recovery Act (RCRA) Notifiers List. Lists businesses that generate, transport, handle, treat, store, or dispose of hazardous wastes as part of their normal operation.	3-21-96	1.0
EPA	RCRA Generators List, which lists businesses that generate hazardous wastes.	3-21-96	Site and adjoining
EPA	Emergency Response Notification System (ERNS) Spill Reports, which lists spills about which EPA has been notified.	9-30-95	Site
Ecology	Confirmed and Suspected Contaminated Sites (C&SCS) and Hazardous Sites List, which list sites in Washington that are currently considered or suspected of being contaminated at levels exceeding state agency criteria.	11-13-95	1.0
Ecology	Leaking Underground Storage Tank (LUST) List.	3-22-96	0.5
Ecology	Registered Underground Storage Tank (UST) List.	3-14-96	Site and adjoining
Ecology	Landfills in Washington	9-13-93	0.5

Notes: Ecology = Washington State Department of Ecology
EPA = U.S. Environmental Protection Agency

TABLE 4

SUMMARY OF FINDINGS OF AGENCY RECORDS REVIEW

List	EPA/Ecology ID Number	Site Name	Address	Status	Approximate Distance from Park 90/5
NPL	—	None within 1-mile radius of site.		—	
CERCLIS	—	None within ½-mile radius of site.		—	
RCRA TSDs and C&SCS	WAD058367152	Northwest Enviroservice Inc.	1500 Airport Way S. Seattle, WA 98134	Treatment, Storage and Disposal (TSD) facility. Transporter, burner and/or blender, large-quantity generator (> 1,000 kg/month). Suspected soil and groundwater contamination. No specific contaminants listed. Awaiting site hazard assessment.	2,500 feet north
RCRA Notifiers/ Generators	WAD009257106	Motor Parts Machine Co., Inc.	2100 Airport Way S. Seattle, WA 98134	Non-regulated generator.	100 feet north-northeast
	WAD988475471	Dames & Moore S Lab	2203 Airport Way S., Building 100400 Seattle, WA 98134	Non-regulated generator.	Formerly located in Building A
	WAR000001487	Katy Films, Inc.	2203 Airport Way S., Suite 100 Seattle, WA 98134	Small-quantity generator (100 to 1,000 kg/month).	Formerly located in Building A
	WAD981773120	Burlington Environmental, Inc. Lab	2203 Airport Way S. Suite 400 Seattle, WA 98134	Non-regulated generator.	Formerly located in Building A
	WAD981771843	International Clinical Laboratories	2203 Airport Way S. Suite 200 Seattle, WA 98134	Non-regulated generator.	Formerly located in Building A
	WAD988495164	Ostex International, Inc.	2203 Airport Way S. Suite 301 Seattle, WA 98134	Conditionally exempt generator (< 100 kg/month).	Currently located in Building A
	WA0000026849	University of Washington, State Toxicology Lab	2203 Airport Way S. Suite 360 Seattle, WA 98134	Conditionally exempt generator (< 100 kg/month).	Currently located in Building A
	WAD027466413	Valley Freightliner, Inc.	2401 Airport Way S. Seattle, WA 98134	Small-quantity generator (100 to 1,000 kg/month).	Adjacent south

TABLE 4 (continued)

SUMMARY OF FINDINGS OF AGENCY RECORDS REVIEW

List	EPA/Ecology ID Number	Site Name	Address	Status	Approximate Distance from Park 90/5
ERNS	—	No spills have been reported for the site for the period of October 1987 through September 1995.		—	—
C&SCS and Abandoned Landfills		6th Ave. S. Landfill (Current site of Langendorf Bread on LUST list)	2901 6th Ave. S. Seattle, WA 98134	Confirmed soil contamination (metals and petroleum products), suspected soil contamination (PCBs, pesticides, inorganic and organic conventional contaminants), suspected groundwater (GW) contamination (metals, petroleum products, PCBs, pesticides, inorganic and organic conventional contaminants). Awaiting site hazard assessment. There are no clear records of the location; the landfill likely stretched from Lander to Spokane along 6th Avenue, and operated from the early 1900s until approximately 1931.	1,500 feet south-southwest
C&SCS and LUST		Port of Seattle Terminal 30	2715 E. Marginal Way S. Seattle, WA 98134	Confirmed GW, sediment and soil contamination (petroleum products, PAHs). Suspected surface water contamination (petroleum products, PAHs). Remedial action in progress.	3,960 feet west
		Seattle Water Department Garage	2700 Airport Way S. Seattle, WA 98134	Confirmed soil and contamination (petroleum products). Awaiting site hazard assessment. Cleanup started. Tanks are in place, 8 monitoring wells were sampled in March 1995.	1,000 feet south-southeast
C&SCS		Alaska Copper & Brass	3200 6th Ave. S. Seattle, WA 98134	Suspected GW contamination (metals, reactive wastes, corrosive wastes, inorganic conventional wastes). Undergoing independent remedial action, independent site assessment received.	2,640 feet south-southwest
		City of Seattle Fire Garage	815 S. Dearborn St. Seattle, WA 98134	Suspected soil contamination. Suspected halogenated organics, metals, petroleum products, non-halogenated solvents. Awaiting site hazard assessment.	4,100 feet north

TABLE 4 (continued)

SUMMARY OF FINDINGS OF AGENCY RECORDS REVIEW

List	EPA/Ecology ID Number	Site Name	Address	Status	Approximate Distance from Park 90/5
C&SCS (continued)		MC Terminals	40 S. Spokane St. Seattle, WA 98134	Confirmed GW contamination (halogenated organic compounds), suspected GW contamination (organics, PAHs), suspected soil contamination (halogenated organic compounds, organics, PAHs). Undergoing independent remedial action, independent site assessment received.	1 mile southwest
		Metro Dearborn Site	802 S. Dearborn St. Seattle, WA 98134	Confirmed soil and groundwater contamination. Confirmed and/or suspected halogenated organics, petroleum, priority pollutant metals and cyanide, and non-halogenated organic contamination. Remedial action in progress. Site was added to ranked list, 2/96. WARM BIN Ranking #3, middle priority.	4,100 feet north
		Metro - Central Operating Base	1333 Airport Way S. Seattle, WA 98134	Confirmed soil contamination (petroleum products), suspected soil contamination (EPA priority metals and cyanide, inorganic conventional organics). Suspected GW, sediment and surface water contamination (petroleum products, EPA priority metals and cyanide, inorganic conventional organics). Awaiting site hazard assessment.	2,700 feet north
		Mobile Truck Service	2214 4th Ave. S. Seattle, WA 98134	Confirmed soil contamination (organics, EPA priority metals and cyanide, petroleum products, phenolic compounds, PAHs), suspected soil contamination (halogenated organics, non-halogenated solvents). Suspected surface water and GW contamination (EPA priority metals and cyanide, petroleum products). Confirmed metals and petroleum products. Awaiting site hazard assessment.	800 feet west

TABLE 4 (continued)

SUMMARY OF FINDINGS OF AGENCY RECORDS REVIEW

List	EPA/Ecology ID Number	Site Name	Address	Status	Approximate Distance from Park 90/5
C&SCS (continued)		Nelson Iron Works	45 S. Spokane St. Seattle, WA 98134	Confirmed soil contamination (petroleum products), suspected soil contamination (EPA priority metals and cyanide). Suspected GW and sediment contamination (petroleum products, EPA priority metals and cyanide). Undergoing independent remedial action, independent site assessment received.	1 mile southwest
		Pacific Chem & Cleaning Co.	2200 4th Ave. S. Seattle, WA 98134	Suspected soil contamination (petroleum products). Awaiting site hazard assessment.	900 feet west
		Pacific Iron & Metals	2230 4th Ave. S. Seattle, WA 98134	Site has been remediated; contaminants (EPA priority metals and cyanide, other metals, PCBs) have been treated or removed. Construction completed, operation and maintenance underway.	1,200 feet west
		Ralph's Concrete Pumping	1511 Rainier Ave. S. Seattle, WA 98144	Confirmed soil contamination (petroleum products), suspected surface water contamination (petroleum products). Awaiting site hazard assessment.	3,960 feet northeast
		VanWaters & Rogers 1st Ave. S.	4000 1st Ave. S. Seattle, WA 98134	Confirmed soil contamination (halogenated organic compounds, petroleum products), suspected soil contamination (EPA priority metals and cyanide, phenolic compounds, non-halogenated solvents), confirmed GW contamination (halogenated organic compounds, non-halogenated solvents), suspected GW contamination (EPA priority pollutants, petroleum products, phenolic compounds). Undergoing independent remedial action, independent site assessment received.	1 mile southwest
LUST	102330	Romaine Electric	1101 Airport Way S. Seattle, WA 98134	Cleanup started, soil and GW affected. One leaded gas and one heating oil tank removed, TPH-G present in GW, TPH-G and TPH-O present in soil.	2,800 feet north-northwest
	200574	WSDOT 1205-6th Ave S.	1205 6th Ave. S. Seattle, WA 98134	Cleanup started, soil affected. Two oil tanks removed.	2,640 feet north-northwest

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TABLE 4 (continued)

SUMMARY OF FINDINGS OF AGENCY RECORDS REVIEW

List	EPA/Ecology ID Number	Site Name	Address	Status	Approximate Distance from Park 90/5
LUST (cont.)	200850	Leavitt Shay Industrial Building	1217 6th Ave. S. Seattle, WA 98134	Cleanup conducted. One #2 fuel oil tank removed 11/94.	2,300 feet north-northwest
	100900	Music-Vend Distributing	1550 4th Ave. S. Seattle, WA 98134	Cleanup in progress. One unleaded gas, one hydraulic fluid/water tank removed 12/93.	2,000 feet northwest
	10096	Metro Central Base and Metro Atlantic Base	1555 Airport Way S. Seattle, WA 98134	Cleanup in progress, soil affected, numerous tanks removed/replaced/closed-in-place.	2,200 feet north
	3028	VECA Electric	1762 Airport Way S. Seattle, WA 98134	Soil affected, cleanup status unknown. One gasoline and one heating oil tank removed.	800 feet north
	200767	Jack in the Box, 4th & Holgate	1907 4th Ave. S. Seattle, WA 98134	One tank, tank status unknown, soil and GW affected, cleanup started.	1,320 feet northwest
	200321	Taylor Edwards Seattle	1930 6th Avenue South Seattle, WA 98134	Soil affected, awaiting cleanup. One oil tank removed 1990.	660 feet northwest
	9895	Budget Rent-A-Car 4th Ave. S.	1961 4th Ave. S. Seattle, WA 98134	Soil affected, cleanup in progress. One gasoline, one diesel, one waste tank removed 4/91.	1,100 feet west-northwest
	200089	Mack Truck Sales & Service	2025 Airport Way S. Seattle, WA 98134	Cleanup conducted. One heating oil tank removed 7/94.	Adjacent north
	8746	Arco Station #4090	2200 4th Ave. S. Seattle, WA 98134	Soil and GW affected, awaiting cleanup. Three gasoline tanks in place, high levels of lead found in MW-2, groundwater is at 6' below ground surface.	900 feet west
	2508	Flajole Bros., Inc.	2201 4th Ave. S. Seattle, WA 98134	Soil affected, cleanup started. Two unleaded and two leaded gasoline tanks, one diesel and one waste tank removed 5/93.	1,000 feet west
	101675	Stanley Terminals	2214 4th Ave. S. Seattle, WA 98134	Cleanup started. Two gasoline or diesel (one with water), two heating oil tanks removed.	800 feet west
	10101	Metro Power Distribution HQ	2255 4th Ave. S. Seattle, WA 98134	Soil affected, cleanup started. Abandoned diesel TPH to 38,000 ppm.	1,100 feet west
	9523	Exxon Station #7-9532	2401 4th Ave. S. Seattle, WA 98134	Cleanup conducted. All structures have been demolished, five tanks were removed.	1,200 feet southwest

TABLE 4 (continued)

SUMMARY OF FINDINGS OF AGENCY RECORDS REVIEW

List	EPA/Ecology ID Number	Site Name	Address	Status	Approximate Distance from Park 90/5
LUST (cont.)	4559	US Postal Service Terminal South	2401-2445 3rd Ave. S. Seattle, WA 98134	Soil and GW affected, cleanup started. One diesel and one waste tank were removed.	1,320 feet southwest
	1053	Nordstrom Catering Corp.	2415 Airport Way S. Seattle, WA 98134	Cleanup conducted. Site is also listed as a registered/state-owned UST.	400 feet south
	8352	Lee & Eastes Tank Lines	2418 Airport Way S. Seattle, WA 98134	Soil and GW affected, cleanup started. One diesel tank was removed, free product was found above the groundwater at 8'. Site is also listed as a registered/state-owned UST.	100 feet south-southeast
	4462	Texaco Station #0043	2461 4th Ave. S. Seattle, WA 98134	Soil and GW affected, cleanup started. Tanks are in place, 8 MW's were sampled 3/95.	1,320 feet southwest
	4167	Axthelm and Sweat	2701 4th Ave. S. Seattle, WA 98134	Soil cleanup in progress.	1,400 feet southwest
	102335	Newell Properties	2730 4th Ave. S. Seattle, WA 98134	Soil affected, monitoring site. Four gas/diesel tanks removed 5-6/94.	1,500 feet southwest
	200142	Chevron Station #9-9168	2740 1st Ave. S. Seattle, WA 98134	Soil and GW affected, monitoring. Tanks were removed in 1985, MW-8 TPH levels were greater than MTCA Level A.	1 mile southwest
	4916	Elephant Car Wash	2763 4th Ave. S. Seattle, WA 98134	Soil cleanup in progress. Two gasoline tanks were removed 8/93.	1,800 feet southwest
	7997	Langendorf Bread	2901 6th Ave. S. Seattle, WA 98134	Soil cleanup in progress. One waste tank removed.	1,500 feet south-southwest
	200725	Northwest Motor Parts	2930 6th Ave. S. Seattle, WA 98134	Limited soil cleanup conducted. Tanks removed, petroleum-contaminated soils remain.	2,000 feet south-southwest
	2618	Unocal Station #5477	2415 Beacon Ave. S. Seattle, WA 98144	Soil and groundwater affected; cleanup started.	1,500 feet east-southeast
	601	Rainier Brewing Company	3100 Airport Way S. Seattle, WA 98134	Soil cleanup in progress. Three MWs on site, free product present on clay layer.	2,000 feet south-southeast

TABLE 4 (continued)

SUMMARY OF FINDINGS OF AGENCY RECORDS REVIEW

List	EPA/Ecology ID Number	Site Name	Address	Status	Approximate Distance from Park 90/5
LUST (cont.)	200723	Scalzo Co.	3211 Airport Way S. Seattle, WA 98134	Soil cleanup in progress. One heating oil tank removed 12/93. Groundwater on site is approximately 12.5' below ground surface.	2,200 feet south-southeast
	10940	HOVDE Electric	555 S. Lander St. Seattle, WA 98134	Soil cleanup in progress. One heating oil tank removed 12/93.	1,100 feet southwest
	1395	Gray Line of Seattle	720 S. Forest St. Seattle, WA 98134	Soil and GW cleanup in progress. One diesel, one waste, and one lubricant tank removed.	1,320 feet south
UST		No registered USTs for the site or adjoining properties are on file with Ecology.			
Landfills		No operating landfills or solid waste disposal sites within 1/2-mile radius of site.			

NOTES:

CERCLIS Comprehensive Environmental Response, Compensation, and Liability Information System
 C&SCS Washington Department of Ecology Confirmed and Suspected Contaminated Sites
 ERNS Emergency Response Notification System
 GW groundwater
 LUST Washington Department of Ecology Leaking Underground Storage Tank
 MTCA Model Toxics Control Act
 MW monitoring well
 NPL EPA National Priority List
 PAH polyaromatic hydrocarbons
 PCB polychlorinated biphenyls
 RCRA Resource Conservation Reauthorization Act
 TSD Treatment, Storage and Disposal
 UST Underground Storage Tank

TABLE 5
SOIL AND GROUNDWATER TPH AND BTEX ANALYTICAL RESULTS

Sample Data				Soil Sample Results						
Sample Location	Sample Number	Date Sampled	Sample Interval ^a	Oil (mg/kg)	Diesel (mg/kg)	Gas (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
P-1	167804	4/23/96	9-11	< 40	< 20	< 10	< 0.05	< 0.05	< 0.05	< 0.05
P-2	167809	4/23/96	6-9	< 40	20,900	NA	NA	NA	NA	NA
P-2	167810	4/23/96	9-11	52	118	< 10	< 0.05	< 0.05	< 0.05	< 0.05
P-3	167814	4/23/96	1-4	< 40	< 20	< 10	< 0.05	< 0.05	< 0.05	< 0.05
P-3	167815	4/23/96	3-6	83	< 20	< 10	< 0.05	< 0.05	< 0.05	< 0.05
P-4	167819	4/23/96	8-10	12,774	< 20	25	< 0.05	< 0.05	0.13	1.10
P-5	167824	4/23/96	8-10	21,700	< 20	< 10	< 0.05	0.84	< 0.05	< 0.05
MTCA Cleanup Levels ^b				200	200	100	0.5	40.0	20.0	20.0
Sample Data				Groundwater Sample Results						
Sample Location	Sample Number	Date Sampled	Screened Interval ^a	Oil (µg/L)	Diesel (µg/L)	Gas (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)
P-1	167806	4/23/96	6-8.5	< 400	< 200	< 100	< 1	< 1	< 1	< 1
P-2	167813	4/23/96	6.5-9	538	219,000	< 100	< 1	< 1	< 1	< 1
P-3	167816	4/23/96	7-9.5	< 400	< 200	< 100	< 1	< 1	< 1	< 1
P-4	167821	4/23/96	9-10.5	< 400	< 200	< 100	< 1	< 1	< 1	< 1
P-5	167825	4/23/96	9-11.5	< 400	233	< 100	< 1	1.75	< 1	9.40
MTCA Cleanup Levels ^b				1000 ^c	1000 ^c	1000 ^c	5.0	40.0	30.0	20.0

NOTES:

^a Measured in feet from existing ground surface.

^b Model Toxics Control Act Method A Industrial Standards, December 1993. Values presented for comparison purposes only.

^c Cleanup level is reported for the sum of hydrocarbons.

Soil and groundwater results analyzed by methods Washington Total Petroleum Hydrocarbons as Diesel and Oil (WTPH-D/Extended), and Washington Total Petroleum Hydrocarbons as Gasoline with benzene, toluene, ethylbenzene, and xylenes distinction (WTPH-G/BTEX).

TPH = Total petroleum hydrocarbons

BTEX = benzene, toluene, ethylbenzene, and xylenes

mg/kg = milligrams per kilogram

µg/L = micrograms per liter

NA = Not analyzed

< = Less than the method detection limit (MDL), limit reported.

Boldface concentrations exceed cleanup level.

Laboratory results reported by Transglobal Environmental Geosciences Northwest, Inc., Lacey, Washington.

TABLE 6
SOIL AND GROUNDWATER METALS ANALYTICAL RESULTS

Soil Sample Results											
Sample Location	Sample Number	Date Sampled	Sample Interval ^a	Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)
P-2	167810	4/23/96	9-11	4.0	290	< 0.34	7.4	41	< 0.13	< 27	< 1.3
P-3	167815	4/23/96	3-6	2.7	260	< 0.26	990	8.5	< 0.09	< 21	< 1.0
P-4	167817	4/23/96	1-4	4.8	200	0.36	23	47	0.1	< 21	< 1.1
MTCA Cleanup Levels ^b				200.0	5600 ^c	10.0	500.0	1000.0	1.0	400 ^c	400 ^c
Groundwater Sample Results											
Sample Location	Sample Number	Date Sampled	Screened Interval ^a	Arsenic (µg/L)	Barium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Lead (µg/L)	Mercury (µg/L)	Selenium (µg/L)	Silver (µg/L)
P-2	167813	4/23/96	6.5-9	0.003	0.19	< 0.0005	< 0.010	0.002	< 0.0002	< 0.20	< 0.010
P-3	167816	4/23/96	7-9.5	0.017	0.025	< 0.0005	< 0.010	< 0.0005	< 0.0002	< 0.20	< 0.010
P-4	167821	4/23/96	9-10.5	0.011	0.14	< 0.0005	< 0.010	0.004	< 0.0002	< 0.20	< 0.010
MTCA Cleanup Levels ^b				0.005	1.12 ^c	0.005	0.050	0.005	0.002	0.08 ^c	0.08 ^c

NOTES:

^a Measured in feet from existing ground surface.

^b Model Toxics Control Act (MTCA) Method A Industrial Standards, December 1993, unless otherwise noted. Values presented for comparison purposes only.

^c MTCA Method B Cleanup level for direct soil contact.

Soil samples were analyzed for total metals by EPA Methods 6010 (barium, chromium, selenium, and silver); 6020 (arsenic, cadmium, and lead); and 7471 (mercury).

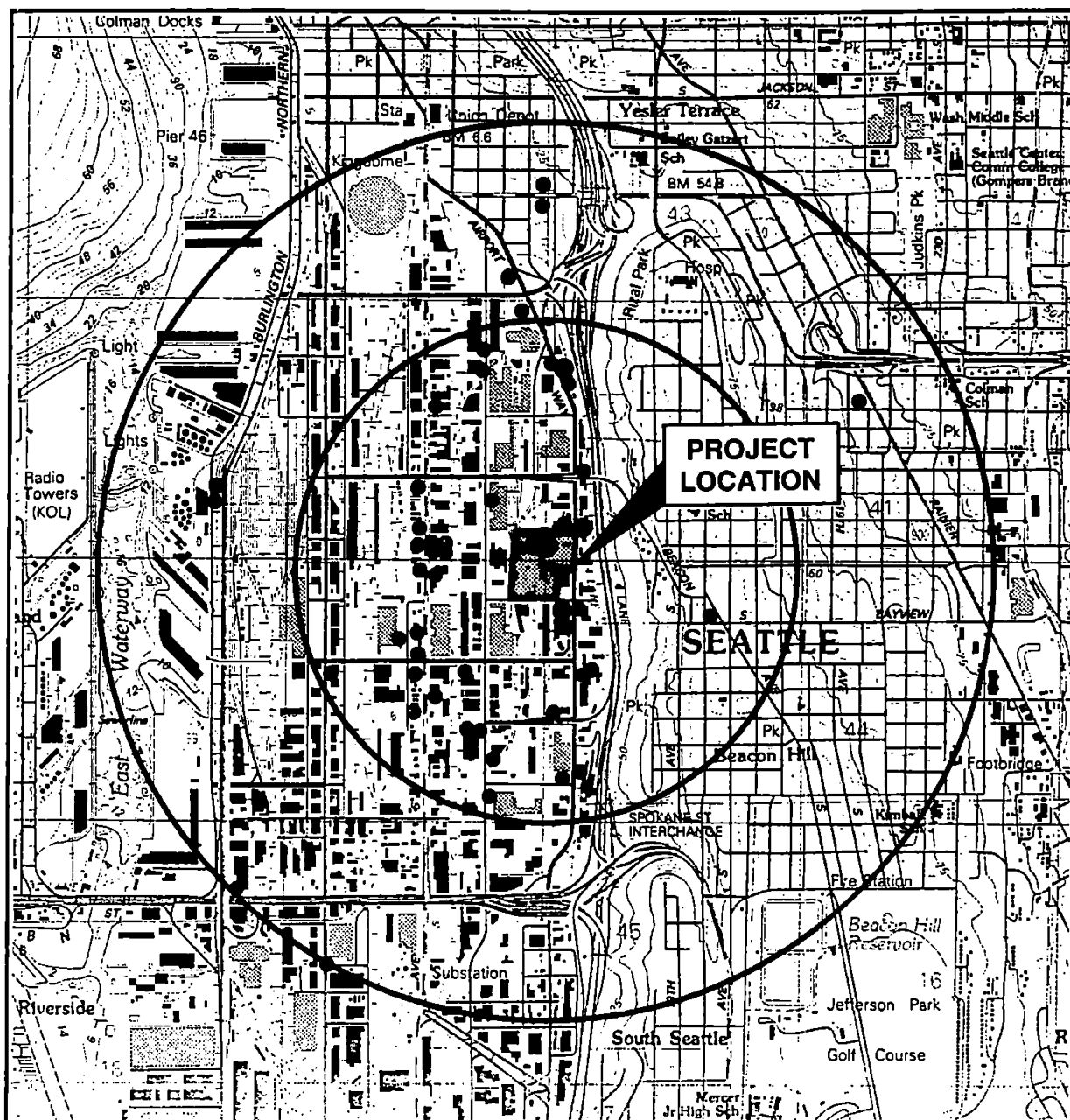
Groundwater samples were analyzed for dissolved metals by EPA Methods 200.7 (barium, chromium, selenium, and silver); 200.8 (arsenic, cadmium, and lead); and 245.2 (mercury).

mg/kg = milligrams per kilogram

µg/L = micrograms per liter

Boldface concentrations exceed cleanup level.

Laboratory results reported by Transglobal Environmental Geosciences Northwest, Inc., Lacey, Washington.



LEGEND

- C&SCS Sites
- RCRA TSD or Generator
- LUST Sites

NOTE

Map adapted from USGS metric topographic map of Seattle South, Washington quadrangle, dated 1983.

Park 90/5
Level 1 and 2 Environmental Site Assessment
Seattle, Washington

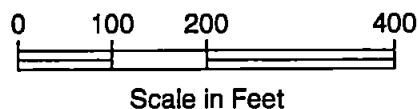
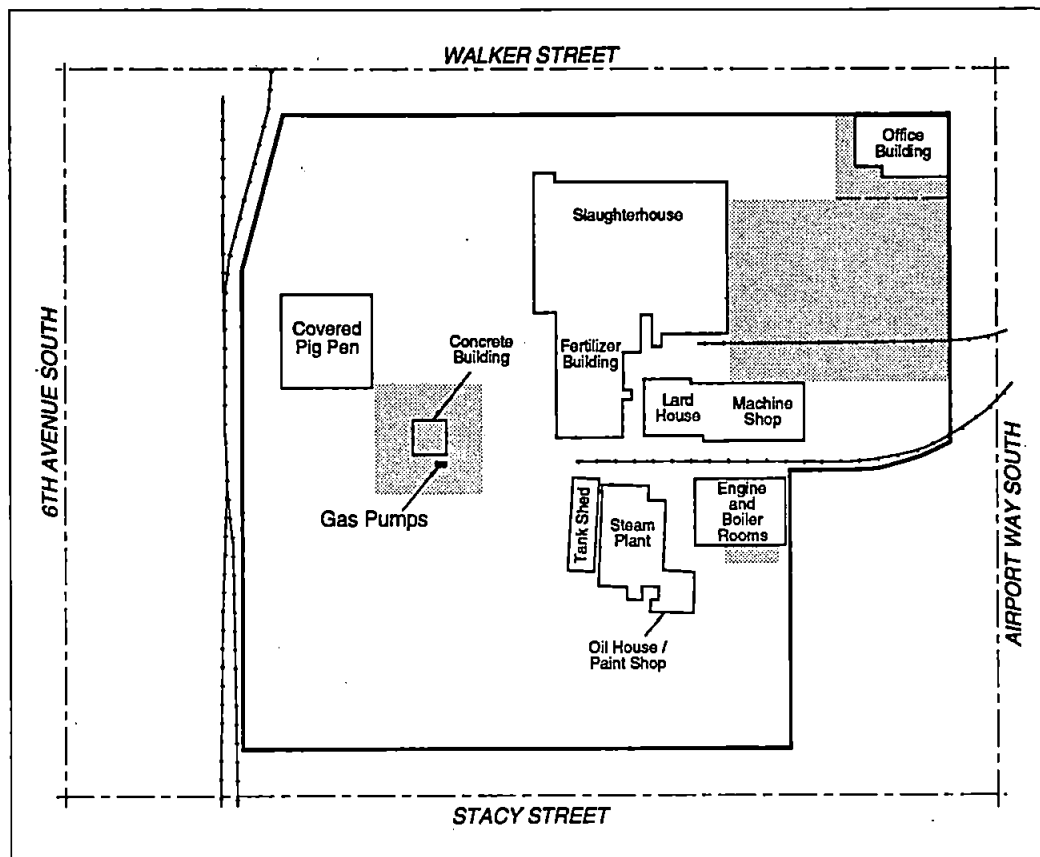
VICINITY MAP

May 1996

T-1678-01

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 1



LEGEND

 Potential Location of Former USTs

NOTE

Historical site features and structures are taken from drawing prepared by Triad Associates, dated 10-22-84.

Park 90/5
Level 1 and 2 Environmental Site Assessment
Seattle, Washington

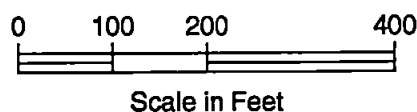
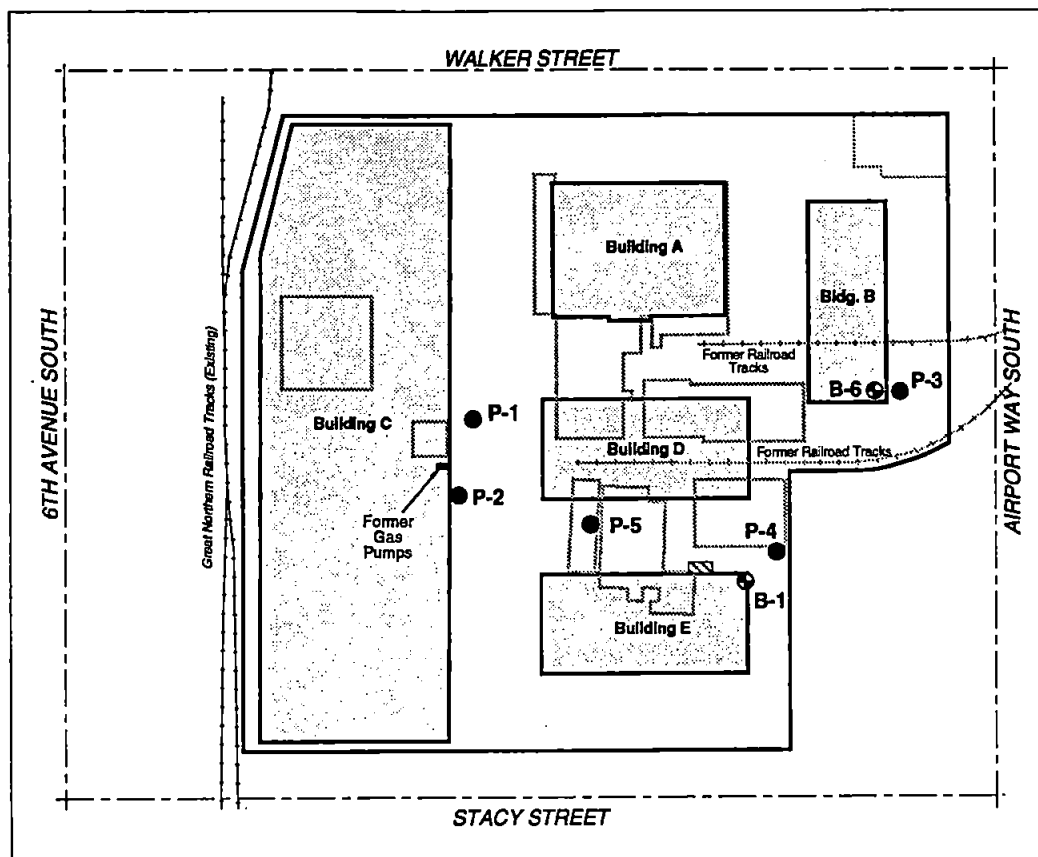
HISTORICAL SITE PLAN

May 1996

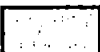
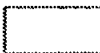
T-1678-01

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Geotechnical and Environmental Consultants

FIG. 2



LEGEND

- B-1 ● Boring Designation and Approximate Location of ECI Borings of Concern
- P-1 ● Probe Designation and Approximate Location
-  Existing Building
-  Former Building / Structure
-  Former Location of 300-gallon Waste Oil Tank

NOTE

Current and historical site features and structures are taken from drawings prepared by Triad Associates, dated 7-15-86 and 10-22-84.

Park 90/5
Level 1 and 2 Environmental Site Assessment
Seattle, Washington

SITE AND EXPLORATION PLAN

May 1996

T-1678-01

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 3

APPENDIX A
SITE PHOTOGRAPHS



Photo A. West side of Building C looking north.



Photo B. East side of Building C looking north.



South side of Building D looking northeast. Probe P-5 is located near the white car.



Photo D. South side of Building A looking northeast.

FIG.

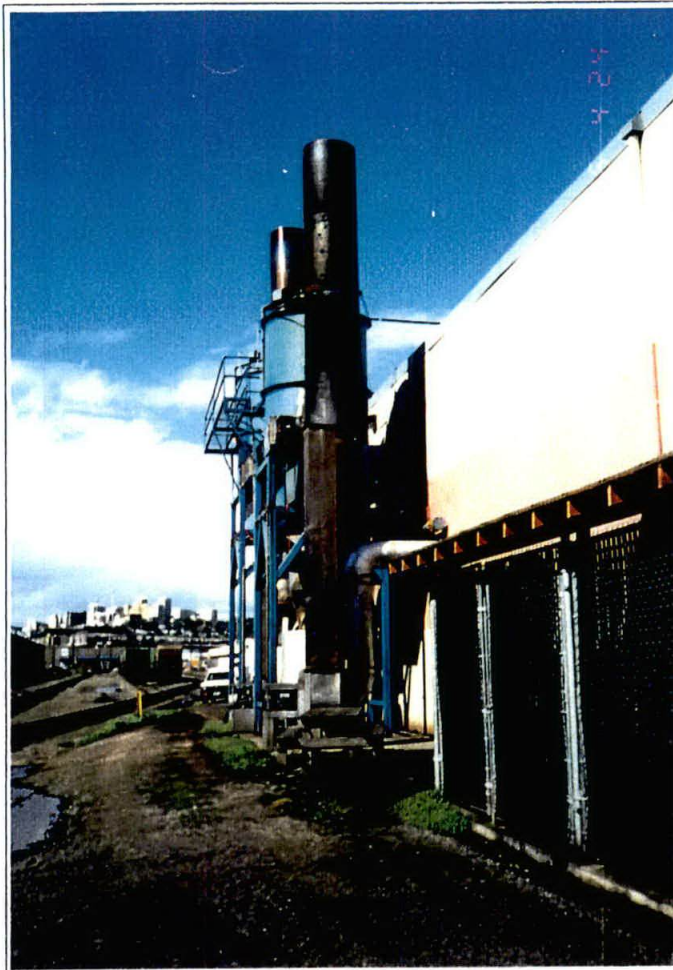


Photo E. Starbucks roasting stacks on west side of Building C. Note surface staining near concrete pad in foreground.

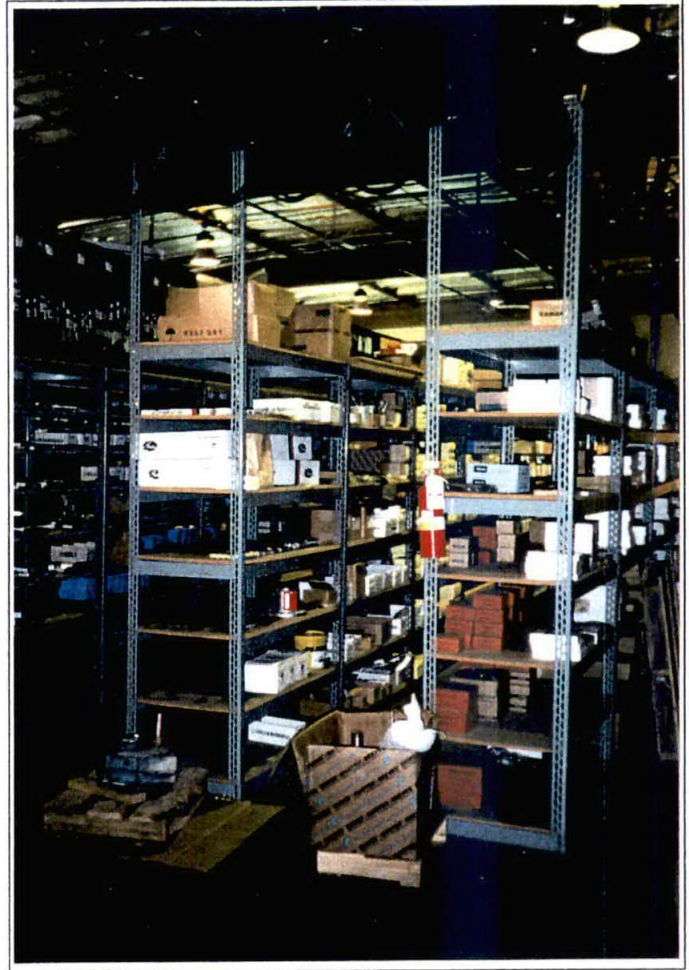


Photo F. Typical warehouse storage, Building E, Kaman Industrial Technologies.



Photo G. Floor drains in vacant half of Building E, formerly occupied by U.S. West.

May 1996
T-1678-01
**Photographs
of Park 90/5**

SHANNON & WILSON, INC.

APPENDIX B
CHAIN OF TITLE REPORT

T-1678-01

TRANSNATION TITLE INSURANCE COMPANY
320 108TH AVENUE N.E.
P.O. BOX 1493
BELLEVUE, WA 98009

Prepared for:

TRANSNATION NAT'L SERVICES

1200 6TH AVE., STE. 1910
SEATTLE, WA 98101
Attn: KATE MCCUSKER

Order No.: 865361
Charge : \$200.00
Sales Tax: \$ 16.40
Total : \$216.40

C H A I N O F T I T L E C E R T I F I C A T E

Subject to the terms and conditions set forth in the attached Application, executed by the Applicant on the May 3, 1996, which Application is attached hereto and made a part hereof, including, without limitation, the definitions of terms used in this Certificate, the Company hereby certifies to the Applicant that the following identified and attached documents constitute all of the Designated Documents requested in the Application.

DESIGNATED DOCUMENTS

1. RECORDING NO.: 4001505
RECORDING DATE: April 5, 1950
DOCUMENT: Deed
GRANTOR: Frye and Company
GRANTEE: Seattle Packing Company
2. RECORDING NO.: 4001506
RECORDING DATE: April 5, 1950
DOCUMENT: Deed
GRANTOR: Union Stockyards Company
GRANTEE: Seattle Packing Company
3. RECORDING NO.: 4772697
RECORDING DATE: February 18, 1957
DOCUMENT: Deed
GRANTOR: Liquidating Trustee of Seattle Packing Company, et al
GRANTEE: The Cudahy Packing Company
4. RECORDING NO.: 8108280791
RECORDING DATE: August 28, 1981
DOCUMENT: Deed
GRANTOR: Cudahy Company
GRANTEE: Bar-S Foods Co.
5. RECORDING NO.: 8412130621
RECORDING DATE: December 13, 1984
DOCUMENT: Deed
GRANTOR: Bar-S Foods Co.
GRANTEE: Sabey, David A. & Sandra L.

The certification provided by this Certificate is not valid, and the Company shall have no liability hereunder unless:

- a) The Application referred to above is attached hereto; and
- b) this Certificate is executed by an officer or other designated employee of the Company. AGENTS OR OTHER PERSONS NOT DIRECTLY EMPLOYED BY THE COMPANY HAVE NO AUTHORITY TO BIND THE COMPANY

Order No. 865361

- UNDER THIS CERTIFICATE.

Effective Date: April 28, 1996 at 8:00 A.M.

TRANSNATION TITLE INSURANCE COMPANY

By 
For service on this order call:
(206) 646-8589/1-800-441-7701
JOHN W. JONES, DAVID P. CAMPBELL
or MARK S. NIKLASON
(FAX # (206) 646-8593)

BW:amh

4001505

V. 2023 4197

D E E D

THE GRANTOR, FRYE and COMPANY, a Nevada corporation, for and in consideration of TEN AND NO/100 DOLLARS (\$10.00) in hand paid, conveys and warrants to SEATTLE FACTORY COMPANY, a Washington corporation, the following described real estate, situated in the County of King, State of Washington:

All of Block 242, including all of the vacated alley in said Block, EXCEPT that portion of the east 170 feet thereof lying southerly of the southerly line of the spur track right of way granted to Northern Pacific Railway Company by instrument recorded March 26, 1950, under Auditor's File No. 3998467, as a limiting boundary line; Lots 12 to 22 inclusive, Block 251, EXCEPT the west 22.5 feet thereof and EXCEPT the west 100 feet of the east 150 feet thereof conveyed to the City of Seattle for 8th Avenue South by deed recorded under Auditor's File No. 660933; All of vacated 8th Avenue South lying between said Blocks 242 and 251, ALL in Seattle Tide Land.

subject to the following:

1. Easement for spur track 17 feet in width over and across Lots 5, 18 and 19, said Block 242 and the vacated alley between said lots.

2. The east half of vacated 8th Avenue South adjoining, granted by Frye and Company, a Nevada corporation, to Northern Pacific Railway Company, a Wisconsin corporation, by instrument dated June 2, 1947, recorded in Volume 2751 of Deeds, Page 75, under Auditor's File No. 3506770, records of said County.

3. Easement for spur track granted to Northern Pacific Railway Company by instrument recorded March 27, 1940 under King County, Washington Auditor's File No. 3996477, and the rights of said Railway Company thereunder to enter upon adjoining lands for the purpose of maintaining said spur track and the waiver of damages resulting from such operation.

4. Any lien or liens affecting said portions of Blocks 242 and 251 that may arise or be created in consequence of or pursuant to an Act of the Legislature of the State of Washington entitled "An Act prescribing the ways in which waterways for the uses of navigation may be excavated by private contract, providing for liens upon lands belonging to the state, granting rights of way across lands belonging to the state," approved March 2, 1933.

2923-188



Exceptions and reservations contained in deed from the State of Washington under which title to the south 30 feet of the east 33 feet of lot 6 and the south 30 feet of lot 17, Block 242, is claimed, recorded under Auditor's File No. 1839702, records of said County, whereby the grantor saves, excepts and reserves all oils, gases, coal, ores, minerals, fossils, etc., together with the right to enter upon said lands for the purpose of opening, developing and working mines, etc., provided that no rights shall be exercised under this reservation until provision has been made by the state, its successors or assigns, for full payment of all damages sustained by owner by reason of such entering.

5. Right of the City of Seattle under judgment on verdicts entered in King County Superior Court Cause No. 172818, to damage portions of said premises by changing and establishing street grades, grading and regrading, as provided by Ordinance No. 45323.

6. Real estate taxes payable in 1950.

7. Restrictions, building and zoning regulations and rights reserved in federal patents or state deeds.

IN WITNESS WHEREOF, said FRYE and COMPANY has caused this instrument to be executed by its President and Secretary and its corporate seal to be hereunto affixed this 4th day of April, 1950.



FRYE and COMPANY
By W. S. Greathouse
W. S. Greathouse, President
By L. D. Hastings
L. D. Hastings, Secretary



STATE OF WASHINGTON }
COUNTY OF KING }

ON THIS 4th day of April, 1950, before me personally appeared W. S. GREATHOUSE and L. D. HASTINGS, to me known to be the President and Secretary, respectively, of the corporation that executed the within and foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that they were authorized to execute said instrument and that the seal affixed is the corporate seal of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year first above written.



W. S. Greathouse
Notary Public in and for the State of Washington, residing at Seattle.

April 4, 1950
Robert A. McGowan, County Auditor

THE
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4001506

V. 2923 PAGE 189

DEED

THE GRANTOR, UNION STOCKYARDS COMPANY, a Washington corporation, for and in consideration of TEN AND NO/100 DOLLARS (\$10.00) in hand paid, conveys and warrants to SEATTLE PACKING COMPANY, a Washington corporation, the following described real estate, situated in the County of King, State of Washington:

Lots 1 to 11 inclusive, EXCEPT the east 45 feet of the west 285 feet thereof conveyed to Great Northern Railway Company by deed recorded under Auditor's File No. 2316539; and West 22.5 feet of Lots 12 to 22 inclusive, ALL in Block 251; ALSO East 270 feet of north 10 feet of Lot 19; and East 270 feet of Lots 20, 21 and 22, Block 277; ALL in Seat . . . Tide Lands,

subject to the following:

1. Assessment for 6th Avenue South, paving, under ordinances 76631 and 76847, District 5013, payable in 10 annual installments with interest at 4% per annum from November 1, 1940. Original amounts \$770.11 each on west 240 feet of Lots 1 to 11 inclusive, Block 251, \$936.25 on north 10 feet of east 270 feet of Lot 19 and east 270 feet of Lot 20, Block 277, and \$502.75 each on east 270 feet of Lots 21 and 22; and the first installment of which has been paid; the second installment will become delinquent November 8, 1950, if then unpaid.

2. Right of the City of Seattle under judgment on verdicts entered in King County Superior Court Cause No. 172818, to damage portions of said premises by changing and establishing street grades, grading and regrading, as provided by Ordinance No. 45323.

3. Waiver of any and all damages to said portion of Block 277, by reason of the proper construction, maintenance and operation of railway tracks upon property lying westerly of said portion of Block 277, and by reason of the proper use of the same for railway purposes, contained in deeds conveying said portion of said Block 277.

4. Any lien or liens affecting said portions of Block 251 that may arise or be created in consequence of or pursuant to an Act of the Legislature of the State of Washington entitled "An Act prescribing the ways



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D Feb 18-57 (tx pd 250049) 4772697
Feb 16-57 \$10. and ovc \$1980. lrtx \$1800. stx

Henry J Kruse and Harry J Thompson Jr., and Wilfred W Rystogi, as liquidating trustees of Seattle Packing Company Wash corp
to The Cudahy Packing Company, a Maine corporation

cy & wrnt

(a) All of blk 242 incl all of vac alley in sd blk
exc that ptn of E 170 ft thof lying Sly of Sly in of
spur tract R/W gtd to Northern Pacific Railway Company
by inst rec Map 28-50 under file #3998467 as a limiting
bdry in

(b) Its 12 to 22 incl blk 251 Exc W 100 ft of E 150 ft
thof cvyd to Cors for 8th Ave S, by deed rec #660933

(c) All of vacated 8th ave S lying bet sd blks 242 and
251

(d) Its 1 to 11 incl blk 251, Exc W 285 ft thof

All in Seattle Tide Lands

TGW all imprvts and bldgs loc then

TGW capital imprvts in form of mchy, equipment and addns
loc then.

Sub to:

cont--2

4772697--2

1. Assessment in original amt of \$8477.81 on W 240 ft of its 1 to 11 incl, sd blk 251, for 6th Ave Street paving, under Ord #76631 and 76847, Dist #5831, pybl in 10 annual pyts plus int at 4% pa from Nov 8-48, unpaid bal of which is \$ 1695.54

2. Eamt for spur tract 17 ft in width over and across its 4, 5, 18 and 19 sd blk 242 and vac alley bet sd its, and E $\frac{1}{2}$ of vac 8th Ave S, adj, gtd by Frye & Company, a Nevada corp, to Northern Pacific Railway Company, Wisconsin corp by inst dtd Jun 2-48 rec under file #3808770

3. Eamt for spur tract 30 ft in width over its 16 and 17, and E 95 ft of its 6 and 7, blk 242 gtd by Frye & Bruhn, Inc. Wash corp by inst dtd Apr 14 1909, rec Mar 28-50 by inst #3998467 which grants also right to enter upon adj lands for prps of constructing, maintaining and operating sd spur tract. By sd inst, grantor, for itself and its successors and assigns, ~~franchise~~ released and discharged the grantee, its successors and assigns from any and all damages, liability for damages and injuries of every kind and descn caused by escape of fire or burning any ptoperty by reason of operation of sd spur track

4. Right of CofS under jdgt on verdicts entd Feb 19-26 in KCSOC #172818 to damage portions of premises by changing and estab street grades, grading and regarding as prvd by Ord #45323

5. Cvnt to pay cost of relaying a 16 inch cash iron (cont-30)

water main and a 16 inch swr siphon loc on premises, a cvnt to pay cost of breaking thru an underpass loc on premises and supporting thin any public or private trans in or facility, and to cvnt to seal off the entrance to sd underpass to prevent access thereto and to install a manhole in street to provide access to the tunnel, all work to conform to Corps Standard Plans and specifications contained in amt dtd Jun 27-45 exec by fp, rec Oct 16-56 under file #4739848,

6. Any lien or liens affecting sd ptns of blks 242, and 251 that may arise or be created, in consequence of or pursuant to an Act of legislature of St of Wash entitled "An Act prescribing the ways in which waterways for uses of navigation may be excavated by private contract, providing for liens upon lands belonging to the State, grantedg rights of way across lands belonging to State, approved Mar 9-93

7. Exceptions and rsvns contained in deed from State of Wash under which title to S 30 ft of E 82 ft of it 6, and S 30 ft of it 17, blk 242 is claimed; rec under #1839702 whereby grantor saves, excepts, and reserves all oils, gases coal, ores minerals, fossils, etc, TOW right to enter upon sd lands for purpose of opening, developing and working mine ext provided that no rights shall be exercised under rsvn until provision has been made by State, its successors or assigns for full payment of damages sustained by owner by reason of such entering

cont--4

DOCUMENT

4772697--4

xon ek sm dt
ml to Mr Allen STIC
fld---
h

Washington
DEPT. OF AUSTRIAN
REVENUE
950.00
F.B. 10999

WASHINGTON
DEPT. OF AUSTRIAN
REVENUE
950.00
F.B. 10999

WASHINGTON
DEPT. OF AUSTRIAN
REVENUE
950.00
F.B. 10999

TO CUDAHY COMPANY
c/o General Host Corporation
22 Care House Road
Stamford, Connecticut 06902

81-08-28
REC'D F
CASHSL
4.00
#0791 E
****4.00
22

Special Warranty Deed
(CORPORATE FORM)

Form L 6

THE GRANTOR, CUDAHY COMPANY, a Delaware Corporation
for and in consideration of Four Million Two Hundred Sixty Thousand Dollars
(\$ 4,260,000.00), in hand paid grant, bargain, sell, convey, and confirm to
BAR-S FOODS CO., a Delaware Corporation
the following described real estate, situated in the County of King State of
Washington:

See Exhibit A attached hereto and made a part hereof.

WASHINGTON COUNTY
EXCISE TAX PAID
AUG 28 1981
E0651089

The Grantor for itself and for its successors and assigns does by these presents expressly limit the covenants of this deed to those herein expressed, and excludes all covenants arising or to arise by statutory or other implication, and does hereby covenant that against all persons whomsoever lawfully claiming or to claim by, through or under said Grantor and not otherwise, it will forever warrant and defend the said described real estate.

IN WITNESS WHEREOF, said corporation has caused this instrument to be executed by its proper officers and its corporate seal to be hereunto affixed ~~the~~ ^{as of} the 28 day of August, A. D., 1981.

WASHINGTON
DEPT. OF AUSTRIAN
REVENUE
950.00
F.B. 10999

CUDAHY COMPANY
By *[Signature]*
Vice President
Attest: *[Signature]*
Assistant Secretary

CONNECTICUT
STATE OF ~~WASHINGTON~~
County of Fairfield

On this 24 day of August, 1981, before me, the undersigned, a Notary Public in and for the State of ~~Washington~~ ^{Connecticut}, duly commissioned and sworn, personally appeared Louis A. Guzzetti and William H. Bertin to me known to be the Vice President and Assistant Secretary, respectively, of

the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that Louis A. Guzzetti is authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

Witness my hand and official seal hereto affixed the day and year in this certificate above written

Notary Public in and for the State of ~~Washington~~ ^{Connecticut}

A27555-UP
610828079

4260

EXHIBIT A

ALL OF BLOCK 242, INCLUDING ALL OF VACATED ALLEY IN SAID BLOCK, EXCEPT THAT PORTION OF THE EAST 170 FEET THEREOF LYING SOUTHERLY OF THE SOUTHERLY LINE OF THE SPURTRACK RIGHT OF WAY GRANTED TO NORTHERN PACIFIC RAILWAY COMPANY BY INSTRUMENT RECORDED MARCH 28, 1950, UNDER AUDITOR'S FILE NO. 3998467, AS A LIMITED BOUNDARY LINE;

LOTS 12 TO 22 INCLUSIVE, BLOCK 251.

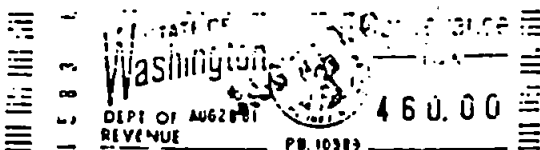
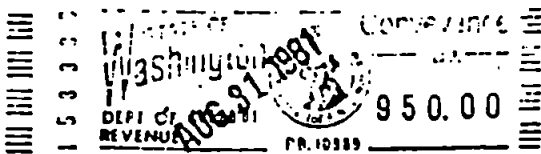
ALL OF VACATED 8TH AVENUE SOUTH LYING BETWEEN SAID BLOCK 242 AND 251;

LOTS 1 TO 11 INCLUSIVE, BLOCK 251, EXCEPT THE WEST 285 FEET THEREOF;

ALL IN SEATTLE TIDE LANDS, IN KING COUNTY, WASHINGTON.

AND EXCEPT ALL THOSE PARTS OF LOTS 1, 2, AND 3, BLOCK 251, SEATTLE TIDE LANDS, IN KING COUNTY, WASHINGTON. DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE NORTH LINE OF SAID BLOCK 251, 285 FEET EAST AS MEASURED ALONG SAID NORTH LINE FROM THE NORTHWEST CORNER OF SAID BLOCK, SAID POINT BEING IN THE EAST LINE OF THE PROPERTY CONVEYED TO THE GREAT NORTHERN RAILWAY COMPANY BY SEATTLE UNION STOCKYARDS BY WARRANTY DEED DATED JUNE 30, 1926, AND RECORDED MARCH 7, 1927, IN VOLUME 1346 OF DEEDS, PAGE 192; THENCE SOUTH ALONG SAID EAST PROPERTY LINE, BEING PARALLEL WITH AND DISTANT 285 FEET EAST FROM THE WEST LINE OF SAID BLOCK 251, A DISTANCE OF 160 FEET; THENCE NORTHEASTERLY IN A STRAIGHT LINE 164.92 FEET, MORE OR LESS, TO A POINT IN SAID NORTH LINE OF BLOCK 251, DISTANT 40 FEET EAST AS MEASURED ALONG SAID NORTH LINE, FROM THE POINT OF BEGINNING; THENCE WEST ALONG SAID NORTH LINE 40 FEET TO THE POINT OF BEGINNING.



SPECIAL WARRANTY DEED

TICOR TITLE INSURANCE
1008 WESTERN AVE., SUITE 200
SEATTLE, WA 98104

ESCROW NO 318850-0

THE GRANTOR, BAR-S FOODS CO., a Delaware Corporation, for and in consideration of Three Million One Hundred Twenty Thousand Three Hundred Forty Dollars (\$3,120,340.00) in hand paid, grant, bargain, sell, convey, and confirm to David A. Sabey and Sandra L. Sabey, Husband and Wife, the following described real estate, situated in the County of King, State of Washington:

ALL OF BLOCK 242, INCLUDING ALL OF VACATED ALLEY IN SAID BLOCK, EXCEPT THAT PORTION OF THE EAST 170 FEET THEREOF LYING SOUTHERLY OF THE SOUTHERLY LINE OF THE SPURTRACK RIGHT-OF-WAY GRANTED TO NORTHERN PACIFIC RAILWAY COMPANY BY INSTRUMENT RECORDED MARCH 28, 1950, UNDER AUDITOR'S FILE NO. 3998467, AS A LIMITED BOUNDARY LINE:

LOTS 12 TO 22 INCLUSIVE, BLOCK 251.

ALL OF VACATED 8TH AVENUE SOUTH LYING BETWEEN SAID BLOCK 242 AND 251;

LOTS 1 TO 11 INCLUSIVE, BLOCK 251, EXCEPT THE WEST 285 FEET THEREOF;

ALL IN SEATTLE TIDE LANDS, IN KING COUNTY, WASHINGTON.

AND EXCEPT ALL THOSE PARTS OF LOTS 1, 2, and 3, BLOCK 251, SEATTLE TIDE LANDS, IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE NORTH LINE OF SAID BLOCK 251, 285 FEET EAST AS MEASURED ALONG SAID NORTH LINE FROM THE NORTHWEST CORNER OF SAID BLOCK, SAID POINT BEING IN THE EAST LINE OF THE PROPERTY CONVEYED TO THE GREAT NORTHERN RAILWAY COMPANY BY SEATTLE UNION STOCKYARDS BY WARRANTY DEED DATED JUNE 30, 1926, AND RECORDED MARCH 7, 1927, IN VOLUME 1346 OF DEEDS, PAGE 192; THENCE SOUTH ALONG SAID EAST PROPERTY LINE, BEING PARALLEL WITH AND DISTANT 285 FEET EAST FROM THE WEST LINE OF SAID BLOCK 251, A DISTANCE OF 160 FEET; THENCE NORTHEASTERLY IN A STRAIGHT LINE 164.92 FEET, MORE OR LESS, TO A POINT IN SAID NORTH LINE OF BLOCK 251, DISTANCE 40 FEET EAST AS MEASURED ALONG SAID NORTH LINE, FROM THE POINT OF BEGINNING; THENCE WEST ALONG SAID NORTH LINE 40 FEET TO THE POINT OF BEGINNING.

The Grantor for itself and for its successors and assigns does by these presents expressly limit the covenants of this deed to those herein expressed, and excludes all covenants arising or to arise by statutory or other implication, and does hereby covenant that against all persons whomsoever lawfully claiming or to claim by, through or under said Grantor and not otherwise, it will forever warrant and defend the said described real estate.

IN WITNESS WHEREOF, said corporation has caused this instrument to be executed by its proper officers and its corporate seal to be hereunto affixed this 10th day of December, A.D., 1984.

BAR-S FOODS CO.

By Timothy T. Day
President

Attest: Morris Y. Kinne
Secretary

STATE OF ARIZONA

COUNTY OF MARICOPA

10th day of December, 1984, before me, the undersigned, a Notary Public in and for the State of Arizona duly commissioned and sworn, personally appeared Timothy T. Day and Morris Y. Kinne to me known to be the President and Secretary, respectively, of the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that Timothy T. Day is authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

Witness my hand and official seal hereto affixed the day and year in this certificate above written.

My Commission Expires Aug. 4, 1985

KING COUNTY
EXCISE TAX PAID
DEC 13 1984

EX1012897

Betty J. Cottrell

8412130621

RECEIVED THIS DAY

DEC 13 2 00 PM '84

DIVISION OF
RECORDS & ELECTIONS
KING COUNTY

84/12/13
RECD F
CASHSL

4.00

#0621

****4.00
55

15006-11-1300001

STATE OF Washington
DEPT. OF REVENUE
P.B. 10389

Conveyance Tax
900.00

DEC 13 1984

STATE OF Washington
DEPT. OF REVENUE
P.B. 10389

Conveyance Tax
900.00

DEC 13 1984

EXCISE TAX PAID
DEC 13 1984
889181030

62600

APPENDIX C
PROBE LOGS

APPENDIX C

PROBE LOGS

Figure C-1 Soil Classification and Log Key

Figure C-2 Log of Probe P-1

Figure C-3 Log of Probe P-2

Figure C-4 Log of Probe P-3

Figure C-5 Log of Probe P-4

Figure C-6 Log of Probe P-5

Shannon & Wilson, Inc. uses a soil classification system modified from the Unified Soil Classification (USC) System. Elements of the USC and other definitions are provided on this and the following page. Soil descriptions are based on visual-manual procedures (ASTM D 2488-93) unless otherwise noted.

S&W CLASSIFICATION OF SOIL CONSTITUENTS

- MAJOR constituents compose more than 50 percent, by weight, of the soil. Major constituents are capitalized (SAND).
- Minor constituents compose 12 to 50 percent of the soil and precede the major constituents (silty SAND). Minor constituents preceded by "slightly" compose 5 to 12 percent of the soil (slightly silty SAND).
- Trace constituents compose 0 to 5 percent of the soil (slightly silty SAND, trace of gravel).

MOISTURE CONTENT DEFINITIONS

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, from below water table

ABBREVIATIONS

ATD	At Time of Drilling
Elev.	Elevation
ft	feet
HSA	Hollow Stem Auger
ID	Inside Diameter
in	inches
lbs	pounds
Mon.	Monument cover
N	Blows for last 2 six-inch increments
NA	Not Applicable or Not Available
OD	Outside Diameter
OVA	Organic Vapor Analyzer
PID	Photoionization Detector
ppm	parts per million
PVC	Polyvinyl Chloride
SS	Split Spoon sampler
SPT	Standard Penetration Test
USC	Unified Soil Classification
WLI	Water Level Indicator

GRAIN SIZE DEFINITIONS

DESCRIPTION	SIEVE SIZE
FINES	< #200 (0.08 mm)
SAND*	• #200 - #40 (0.4 mm) • #40 - #10 (2 mm) • #10 - #4 (5 mm)
GRAVEL*	• #4 - 3/4 inch • 3/4 - 3 inches
COBBLES	3 - 12 inches
BOULDERS	> 12 inches

* Unless otherwise noted, sand and gravel, when present, range from fine to coarse in grain size.

RELATIVE DENSITY / CONSISTENCY

COARSE-GRAINED SOILS		FINE-GRAINED/COHESIVE SOILS	
N, SPT, BLOWS/FT.	RELATIVE DENSITY	N, SPT, BLOWS/FT.	RELATIVE CONSISTENCY
0 - 4	Very loose	<2	Very soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium dense	4 - 8	Medium stiff
30 - 50	Dense	8 - 15	Stiff
Over 50	Very dense	15 - 30	Very stiff
		Over 30	Hard

WELL AND OTHER SYMBOLS

	Cement		Asphalt or PVC Cap
	Bentonite Grout		Cobbles
	Bentonite Seal		Fill
	Slough		Ash
	Silica Sand		Bedrock
	2" I.D. PVC Screen (0.010-inch Slot)		

Park 90/5
Level 1 and 2 Environmental Site Assessment
Seattle, Washington

SOIL CLASSIFICATION AND LOG KEY

May 1996

T-1678-01

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. C-1
Sheet 1 of 2

UNIFIED SOIL CLASSIFICATION SYSTEM (From ASTM D-2488-93 & 2487-93)					
MAJOR DIVISIONS			GROUP/GRAPHIC SYMBOL ^②		TYPICAL DESCRIPTION
Coarse-Grained Soils (more than 50% retained on No. 200 sieve) [Use Dual Symbols for 5 - 12% Fines (i.e. GP-GM)] ^①	Gravels (more than 50% of coarse fraction retained on No. 4 sieve)	Clean Gravels ^① (less than 5% fines)	GW		Well-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
			GP		Poorly-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
		Gravels with ^① Fines (more than 12% fines)	GM		Silty Gravels, Gravel-Sand-Silt Mixtures
			GC		Clayey Gravels, Gravel-Sand-Clay Mixtures
	Sands (50% or more of coarse fraction passes the No. 4 sieve)	Clean Sands ^① (less than 5% fines)	SW		Well-Graded Sands, Gravelly Sands, Little or No Fines
			SP		Poorly-Graded Sand, Gravelly Sands, Little or No Fines
		Sands with ^① Fines (more than 12% fines)	SM		Silty Sands, Sand-Silt Mixtures
			SC		Clayey Sands, Sand-Clay Mixtures
Fine-Grained Soils (50% or more passes the No. 200 sieve)	Sils and Clays (liquid limit less than 50)	Inorganic	ML		Inorganic Silts of Low to Medium Plasticity, Rock Flour, or Clayey Silts with Slight Plasticity
			CL		Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
		Organic	OL		Organic Silts and Organic Silty Clays of Low Plasticity
	Sils and Clays (liquid limit 50 or more)	Inorganic	CH		Inorganic Clays of Medium to High Plasticity, Sandy Fat Clay, Gravelly Fat Clay
			MH		Inorganic Silts, Micaceous or Diatomaceous Fine Sands or Silty Soils, Elastic Silt
		Organic	OH		Organic Clays of Medium to High Plasticity, Organic Silts
Highly Organic Soils	Primarily organic matter, dark in color, and organic odor		PT		Peat, Humus, Swamp Soils with High Organic Content (See D 4427-92)

NOTES

- Dual symbols (symbols separated by a hyphen, i.e. SP-SM, slightly silty fine SAND) are used for soils with between 5% and 12% fines or when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart.
- Borderline symbols (symbols separated by a slash, i.e. CL/ML, silty CLAY/clayey SILT; GW/SW, sandy GRAVEL/gravelly SAND) indicated that the soil may fall into one of two possible basic groups.

Park 90/5
Level 1 and 2 Environmental Site Assessment
Seattle, Washington

**SOIL CLASSIFICATION
AND LOG KEY**

May 1996

T-1678-01

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. C-1
Sheet 2 of 2

ENVIRONMENTAL BOREHOLE LOG

Date Started 4/23/96	Location Building C	Depth Water First Encountered (Ft) 6.0
Date Completed 4/23/96	Drilling Company TEG	Drilling Method Strata-Probe
Total Depth (Ft) 12.0	Sampling Method Split-spoon	Hammer: Weight (lbs) Drop (In)
Borehole Diam. (In) 2	Ground Elev. (ft) NA	Monument Elev. (ft) NA
		PVC Elev. (ft)

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
							0.5	Ground Surface Asphalt Surface.	ASPHAL			
	167801			75	1.3	0905		Gray to black, silty SAND; asphalt rubble and brick fragments; moist; (Fill).	SM			
5	167802			28	1.9	0914	4.0	Black, silty, sandy GRAVEL; rock and brick fragments; wet at 6 feet; (Fill).	GM			
	167803			50	2.5	0923		Sample 167806 of groundwater, screen at 6 to 8.5 feet.				
10	167804			50		0934		Wood fragments; slight oil/organic odor at 9 feet.				
	167805			50	2.6	0941						
							12.0	BOTTOM OF PROBE 12 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

- USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

 2" O.D. Split-Spoon Sample	 Water Level and Date Measured
 3" O.D. Split-Spoon Sample	 Water Level at Time of Drilling

Park 90/5
Level 1 and 2 Environmental Site Assessment
Seattle, Washington

LOG OF PROBE P-1

May 1996

T-1678-01

Logged By

GMM

Reviewed By

KAT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. C-2

ENVIRONMENTAL BOREHOLE LOG

Date Started 4/23/96		Location Building C		Depth Water First Encountered (Ft) 6.5	
Date Completed 4/23/96		Drilling Company TEG		Drilling Method Strata-Probe	
Total Depth (Ft) 15.0		Sampling Method Split-spoon		Hammer: Weight (lbs) Drop (In)	
Borehole Diam. (In) 2		Ground Elev. (ft) NA		Monument Elev. (ft) 	
PVC Elev. (ft) 					

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
							0.5	Ground Surface Asphalt surface.	ASPHAL			
	167807			100	2.4	1038	2.0	Gray, slightly sandy, gravelly SILT; brick and rock fragments; moist; (Fill).	ML			
							3.5	Black, silty sand and GRAVEL; asphalt rubble, slag; moist; (Fill).	GM			
	167808			33	1.7	1050	4.0	Gray, silty sand and GRAVEL; rock fragments; moist; (Fill).	GM SM			
							6.0	Black, silty SAND; rock fragments; moist; slight oil/petroleum odor; (Fill).				
	167809			50	26.4	1101		Black, silty, sandy GRAVEL; slag; strong diesel odor; hydrocarbon sheen; wet; (Fill). Sample 167813 of groundwater, screen at 6.5 to 9 feet.	GM			
	167810			40	3.0	1116						
	167811			33	3.6	1125						
	167812			75	2.9	1139	13.5	Gray, sandy SILT; slight diesel odor; wet; (Fill).	ML			
							15.0	BOTTOM OF PROBE 15 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

- USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

I 2" O.D. Split-Spoon Sample W Water Level and Date Measured

II 3" O.D. Split-Spoon Sample W Water Level at Time of Drilling

Park 90/5

Level 1 and 2 Environmental Site Assessment

Seattle, Washington

LOG OF PROBE P-2

May 1996 T-1678-01

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Geotechnical and Environmental Consultants

FIG. C-3

ENVIRONMENTAL BOREHOLE LOG

Date Started 4/23/96		Location Building B		Depth Water First Encountered (Ft) 7.0	
Date Completed 4/23/96		Drilling Company TEG		Drilling Method Strata-Probe	
Total Depth (Ft) 11.0		Sampling Method Split-spoon		Hammer: Weight (lbs) Drop (In)	
Borehole Diam. (In) 2		Ground Elev. (ft) NA		Monument Elev. (ft) 	
PVC Elev. (ft) 					

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery(%)	P/D (ppm)	Time	Depth (Ft)	Lithologic Description	USCS Symbol	Soil Log	Well Log	Depth (Ft)
							0.5	Ground Surface Asphalt surface.	ASPHAL			
	167814			100	2.0	1229	1.5	Gray to black, silty, sandy GRAVEL; rock fragments; moist; (Fill).	GM			
								Brownish-gray, sandy SILT; iron-oxide staining at 3 feet; rock fragments; moist; (Fill).	ML			
	167815			50	1.3	1337	3.5	Gray, silty SAND and GRAVEL; moist; (Fill).	GM			
				15		1352		Concrete rubble; rock fragments; wet at 7 feet. Sample 167816 of groundwater, screen at 7 to 9.5 feet.				
				10		1402						
							11.0	BOTTOM OF PROBE 11 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

- USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | | | |
|--|----------------------------|--|---------------------------------|
| | 2" O.D. Split-Spoon Sample | | Water Level and Date Measured |
| | 3" O.D. Split-Spoon Sample | | Water Level at Time of Drilling |

Park 90/5
Level 1 and 2 Environmental Site Assessment
Seattle, Washington

LOG OF PROBE P-3

May 1996

T-1678-01

Logged By

GMM

Reviewed By

KAT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. C-4

ENVIRONMENTAL BOREHOLE LOG

Date Started 4/23/96		Location Building E		Depth Water First Encountered (Ft) 9.0	
Date Completed 4/23/96		Drilling Company TEG		Drilling Method Strata-Probe	
Total Depth (Ft) 12.0		Sampling Method Split-spoon		Hammer: Weight (lbs) Drop (In)	
Borehole Diam. (In) 2		Ground Elev. (ft) NA		Monument Elev. (ft) NA	
PVC Elev. (ft)					

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery(%)	P/D (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
								Ground Surface				
							0.5	Asphalt surface.	ASPHAL			
							1.5	Brown, silty SAND; metal and brick fragments; wood pieces; moist; (Fill).	SM			
							2.3	Brownish-gray, sandy SILT; moist; (Fill).	ML			
	167817			75	2.4	1446	2.3	Wood chunk; moist; (Fill).	PT			
							4.5					
							5.0	Brown, slightly sandy SILT; rock and brick fragments; moist; (Fill).	ML			
	167818			50	2.4	1455	5.0	Gray, silty, sandy GRAVEL; rock fragments; moist; (Fill).	GM			
							8.0					
							8.3	Brownish-gray SILT; wood and brick fragments; moist; (Fill).	ML			
	167819			50	4.0	1501	8.3	Gray to black, silty SAND and GRAVEL; wet at 9 feet; slight solvent odor; (Fill).	GM			
								Sample 167821 of groundwater, screen at 9 to 10.5 feet.				
	167820			50	2.4	1511		Pieces of slag at 11 feet.				
							12.0	BOTTOM OF PROBE 12 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

- * USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | | | |
|----|----------------------------|---|---------------------------------|
| I | 2" O.D. Split-Spoon Sample | W | Water Level and Date Measured |
| II | 3" O.D. Split-Spoon Sample | W | Water Level at Time of Drilling |

Park 90/5
Level 1 and 2 Environmental Site Assessment
Seattle, Washington

LOG OF PROBE P-4

May 1996

T-1678-01

Logged By

GMM

Reviewed By

KAT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. C-5

Date Started 4/23/96		Location Building D		Depth Water First Encountered (Ft)	
Date Completed 4/23/96		Drilling Company TEG		Drilling Method Strata-Probe	
Total Depth (Ft) 12.0		Sampling Method Split-spoon		Hammer: Weight (lbs) Drop (In)	
Borehole Diam. (In) 2		Ground Elev. (ft) NA		Monument Elev. (ft) PVC Elev. (ft)	

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS Symbol	Soil Log	Well Log	Depth (Ft)
							0.5	Ground Surface Asphalt surface.	ASPHAL			
	167822			100	3.0	1600		Gray, silty SAND and GRAVEL; scattered wood and brick fragments; slight animal/organic odor; moist; (Fill).	SM/GM			
5	167823			100	2.4	1608	4.0	Dark gray SILT; occasional sand and gravel; rock and brick fragments; occasional layers of light gray sand; slight manure/animal odor; moist; (Fill).	ML			
	167824			80		1619	8.0	Black, silty SAND and GRAVEL; brick fragments, metal pieces; moist; animal odor; (Fill).	GM			
10				15		1631	11.0	Black, silty SAND; slight organic/animal odor; moist; (Fill).	SM			
							12.0	BOTTOM OF PROBE 12 FEET				
15												

Remarks: Refer to key for explanation of terminology and symbols.

- USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

I 2" O.D. Split-Spoon Sample
II 3" O.D. Split-Spoon Sample

III Water Level and Date Measured
IV Water Level at Time of Drilling

Park 90/5
Level 1 and 2 Environmental Site Assessment
Seattle, Washington

LOG OF PROBE P-5

May 1996
T-1678-01

Logged By
GMM

Reviewed By
KAT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. C-6

APPENDIX D
ANALYTICAL LABORATORY REPORTS

TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES NORTHWEST, INC.

**7110 38th Drive SE
Lacey, Washington 98503**

**Mobile Environmental Laboratories
Environmental Sampling Services**

**Telephone: 360-459-4670
Fax: 360-459-3432**

April 29, 1996

Kathy Troost
Shannon & Wilson
300 North 34th Street
P.O. Box 300303
Seattle, WA 98103

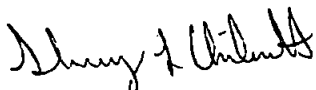
Dear Ms. Troost:

Please find enclosed the data reports from on-site collection and analyses of soil and water samples at the Park 90/5 Site, Project No. T-1678-01, in Seattle, Washington. Soil and water samples were collected and analyzed on-site April 23, 1996, for Diesel and Oil by WTPH-D/D Extended, Gasoline by WTPH-G and BTEX by EPA Method 8020. Soil samples were analyzed off-site on April 24 and 25, 1996, for Diesel and Oil by WTPH-D/D Extended and RCRA 8 Metals on April 25, 1996.

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

TEG Northwest appreciates the opportunity to have provided these services to Shannon and Wilson for this project. It was a pleasure working with you, and we are looking forward to the next opportunity to work together.

Sincerely,



Sherry L. Chilcutt
Senior Chemist

QA/QC FOR ANALYTICAL METHODS

GENERAL

The TEG Northwest Laboratory quality assurance and quality control (QA/QC) procedures are conducted following the guidelines and objectives which meet or exceed certification/-accreditation requirements of California DOHS, Washington DOE, and Oregon DEQ. The Quality Control Program is a consistent set of procedures which assures data quality through the use of appropriate blanks, replicate analyses, surrogate spikes, and matrix spikes, and with the use of reference standards that meet or exceed EPA standards.

When analyses are taking place on-site with the mobile lab, the need for Field Blanks or Travel/Trip Blanks is eliminated. If there is going to be a delay before sample preparation for analysis, the sample is stored at 4° C.

ANALYTICAL METHODS

TEG Northwest Labs use analytical methodologies which are in conformity with U. S. Environmental Protection Agency (EPA), Washington DOE, and Oregon DEQ methodologies. When necessary and appropriate due to the nature or composition of the sample, TEG may use variations of the methods which are consistent with recognized standards or variations used by the industry and government laboratories.

TPH-Gasoline, TPH-Diesel

(Gasoline and/or Diesel, Modified EPA 8015, WTPH-G and WTPH-D)

A blank and a calibration standard are run at the beginning of the day. The standard must be within 15% of the continuing calibration curve value. The standard is rerun at the end of the day. All samples are prepared with a surrogate spike, and the recovery must be between 65% and 135%. A duplicate sample is run at a rate of 1 per 10 samples (or a matrix spike sample is prepared and analyzed). At least 1 method blank is run per 10 samples analyzed.

Purgeable Volatile Aromatics
(BTEX, EPA 602/8020)

A blank and a calibration standard are run at the beginning of the day. The standard must be within 15% of the continuing calibration curve value. The standard is rerun at the end of the day if more than 10 samples have been run. All samples are prepared with a surrogate spike, and the recovery must be between 65% and 135%. At least 1 method blank is run per day.

TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES NORTHWEST INC.

Page 1

PARK 90/5 PROJECT
Seattle, Washington
Shannon & Wilson, Inc.
Project No. T-1678-01

Diesel and Oil in Water by WTPH-D/D-Extended

Sample Number	Date	Recovery %	Diesel ug/l	Heavy Oil ug/l
Meth. Blank	04/23/96	95	nd	nd
167806	04/23/96	89	nd	nd
167813	04/23/96	99	219000	538
167816	04/23/96	91	nd	nd
167816 Dup	04/23/96	106	nd	nd
167821	04/23/96	103	nd	nd
167825	04/23/96	108	233	nd
MDL			200	400

"nd" Indicates not detected at the listed detection Limit.

"int" Indicates that interference peaks prevent determination.

* Samples 167813, 167821, and 167825 were centrifuged for
five minutes prior to analysis.

TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES NORTHWEST INC.

Page 2

PARK 90/5 PROJECT
Seattle, Washington
Shannon & Wilson, Inc.
Project No. T-1678-01

Diesel and Oil in Soil by WTPH-D/D-Extended

Sample , Number	Date	Recovery %	Diesel mg/kg	Heavy Oil mg/kg
Meth. Blank	04/23/96	96	nd	nd
167804	04/23/96	93	nd	nd
167810 SiGel	04/23/96	95	118	52
167814	04/23/96	101	nd	nd
167814 Dup	04/23/96	101	nd	nd
167815	04/23/96	104	nd	83
167819	04/23/96	99	nd	12600
167824	04/23/96	95	nd	21700

MDL 20 40

"nd" Indicates not detected at the listed detection limit.

"int" Indicates that interference peaks prevent determination.

PARK 90/5 PROJECT
 Seattle, Washington
 Shannon & Wilson, Inc.
 Project No. T-1678-01

Gasoline (WTPH-G), & BTEX (EPA 8020) Analyses for Water

Sample Number	Date Analyzed	Benzene ug/l	Toluene ug/l	Eth Benz ug/l	Xylene ug/l	Gasoline ug/l	Recovery (%)
Meth. Blank	04/23/96	nd	nd	nd	nd	nd	106
167806	04/23/96	nd	nd	nd	nd	nd	86
167813	04/23/96	nd	nd	nd	nd	nd	102
167816	04/23/96	nd	nd	nd	nd	nd	87
167816 Dup	04/23/96	nd	nd	nd	nd	nd	95
167821	04/23/96	nd	nd	nd	nd	nd	96
167825	04/23/96	nd	1.75	nd	9.40	nd	94
Detection Limits		1	1	1	1	100	

"nd" Indicates not detected at the listed detection limits.

"int" Indicates that interferences prevent determination.

Page 4

PARK 90/5 PROJECT
Seattle, Washington
Shannon & Wilson, Inc.
Project No. T-1678-01

Gasoline (WTPH-G) & BTEX (EPA 8020) Analyses for Soils

Sample Number	Date Analyzed	Benzene mg/kg	Toluene mg/kg	Eth Benz mg/kg	Xylene mg/kg	Gasoline mg/kg	Recovery (%)
Meth. Blank	04/23/96	nd	nd	nd	nd	nd	91
167804	04/23/96	nd	nd	nd	nd	nd	101
167810	04/23/96	nd	nd	nd	nd	nd	91
167814	04/23/96	nd	nd	nd	nd	nd	101
167814 Dup	04/23/96	nd	nd	nd	nd	nd	99
167815	04/23/96	nd	nd	nd	nd	nd	100
167819	04/23/96	nd	nd	0.13	1.10	25	96
167824	04/23/96	nd	0.84	nd	nd	nd	75
Detection Limits		0.05	0.05	0.05	0.05	10	
"nd" Indicates not detected at the listed detection limits.							
"int" Indicates that interferences prevent determination.							

PARK 90/5 PROJECT
 Seattle, Washington
 Shannon & Wilson, Inc.
 Project No. T-1678-01

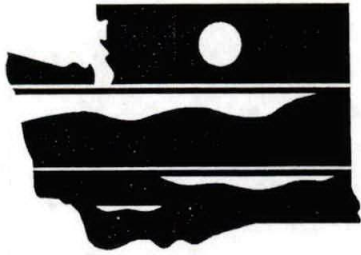
Diesel and Oil in Soil by WTPH-D/D-Extended

Sample Number	Date	Recovery %	Diesel mg/kg	Heavy Oil mg/kg
Meth. Blank	04/24/96	97	nd	nd
167809	04/24/96	85	20900	nd
167819 SiGel	04/24/96	85	nd	12774
167824	04/24/96	102	nd	17600
167824 SiGel	04/24/96	113	nd	17400
MDL			20	40

"nd" Indicates not detected at the listed detection limit.

"int" Indicates that interference peaks prevent determination.

"SiGel" indicates samples recieved Silica Gel cleanup.



WASHINGTON STATE
DEPARTMENT OF
ECOLOGY

TOXICS CLEANUP PROGRAM

FACSIMILE TRANSMITTAL

TO:

JOE HICKEY

FAX #:

() NWRO

PAGES:

9

(INCLUDING THIS
PAGE)

FROM:

Mike Kuntz

SENDER'S PHONE #:

(360) 407- 7239

DATE:

10-6-00

REMARKS:

Please notify Joe Hickey

re: VCP Park 90/5 OFFICE PARK

Sent Fri
Resnee



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

P.O. Box 47600 • Olympia, Washington 98504-7600
(360) 407-6000 • TDD Only (Hearing Impaired) (360) 407-6006

September 8, 1999

Mr. Joe Garcia
City of Seattle/Facility Services Division
Alaska Building, 14th Floor
618 Second Avenue
Seattle, WA 98104

Dear Mr. Garcia:

RE: Park 90/5 Office Park, 2203 Airport Way South, Seattle, WA
Voluntary Cleanup Program

Thank you for the technical report of July 17, 1999, describing additional information to support a request under the Voluntary Cleanup Program for a No Further Action letter for the property at 2203 Airport Way South. The Toxics Cleanup Program has received and reviewed the consultant's submittal. Specific findings follow:

The TPH issue described in my letter of March 8 is resolved for areas P-4 and P-5. Use of the interim policy regarding TPH, assuming all TPH is pyrene, and using the reported levels of TPH at 813 and 929 mg/kg, has demonstrated these levels are below the Method B level of 2,400 mg/kg and Method C level of 9,600 mg/kg. A status of No further Action can be conferred on areas P-4 and P-5.

Area P-2 is still subject to a Restrictive Covenant. The boundary of this area should be agreed to by Ecology prior to the City of Seattle incorporating it into the covenant. Please see the March 9, 1998 letter for Restrictive Covenant.

The concentration of hexavalent chromium at area P-3 is not resolved because soil extraction at the laboratory used Method 3050A. This method, which is acidic, would reduce all of the hexavalent chromium to trivalent chromium, so there is no way to tell what is really in the original sample. There are two courses of action regarding the concentration of hexavalent chromium at area P-3. The first course is for the City of Seattle to secure Ecology's agreement of the boundary to area P-3 prior to its incorporation into a Restrictive Covenant. The second course is to retest similar soil at

Joe Garcia
September 8, 1999
Page 2 of 2

P-3 for the concentration of hexavalent chromium and forward the results to Ecology. Ecology would review the results in regard to the Voluntary Cleanup Program. We suggest using Method 3060A, which is alkaline.

Thank you for the submittal. If you have any questions please contact me at (360) 407-7239.

Sincerely,

A handwritten signature in cursive script, appearing to read "Michael Kuntz".

Michael Kuntz
Toxics Cleanup Program

MK:gj

cc: Joe Hickey, Ecology
Matthew Dalton, Dalton, Olmstead & Fuglevand, Inc.

CHAIN-OF-CUSTODY RECORD

[illegible]

SOUND ANALYTICAL SERVICES, INC.

ANALYTICAL & ENVIRONMENTAL CHEMISTS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: TEG Northwest, Inc.

Date: April 26, 1996

Report On: Analysis of Soil & Water

Report No.: 56153

IDENTIFICATION:

Samples received on 04-24-96

Project: Park 90/5

ANALYSIS:

Lab Sample No. 56153-1
Matrix: Soil

Client ID: 167810

Total ICP Metals Per EPA Method 6010

Date Analyzed: 4-24-96

Units: mg/kg

<u>Parameter</u>	<u>Result</u>	<u>PQL</u>
Barium	290	0.67
Chromium	7.4	1.3
Selenium	ND	27
Silver	ND	1.3

Total ICP-MS Metals Per EPA Method 6020

Date Analyzed: 4-25-96

Units: mg/kg

<u>Parameter</u>	<u>Result</u>	<u>PQL</u>
Arsenic	4.0	0.67
Cadmium	ND	0.34
Lead	41	0.34

Total Mercury By Cold Vapor AA Per EPA Method 7471

Date Analyzed: 4-25-96

Units: mg/kg

<u>Parameter</u>	<u>Result</u>	<u>PQL</u>
Mercury	ND	0.13

ND - Not Detected

PQL - Practical Quantitation Limit

SOUND ANALYTICAL SERVICES, INC.

TEG Northwest, Inc.
Project: Park 90/5
Report No. 56153
April 26, 1996

Lab Sample No. 56153-2
Matrix: Water

Client ID: 167813

Dissolved ICP Metals Per EPA Method 200.7
Date Analyzed: 4-24-96
Units: mg/L

<u>Parameter</u>	<u>Result</u>	<u>PQL</u>
Barium	0.19	0.005
Chromium	ND	0.010
Selenium	ND	0.20
Silver	ND	0.010

Dissolved ICP-MS Metals Per EPA Method 200.8
Date Analyzed: 4-25-96
Units: mg/L

<u>Parameter</u>	<u>Result</u>	<u>PQL</u>
Arsenic	0.003	0.001
Cadmium	ND	0.0005
Lead	0.002	0.0005

Dissolved Mercury By Cold Vapor AA Per EPA Method 245.2
Date Analyzed: 4-25-96
Units: mg/L

<u>Parameter</u>	<u>Result</u>	<u>PQL</u>
Mercury	ND	0.0002

ND - Not Detected
PQL - Practical Quantitation Limit

SOUND ANALYTICAL SERVICES, INC.

TEG Northwest, Inc.
Project: Park 90/5
Report No. 56153
April 26, 1996

Lab Sample No. 56153-3
Matrix: Soil

Client ID: 167815

Total ICP Metals Per EPA Method 6010
Date Analyzed: 4-24-96
Units: mg/kg

<u>Parameter</u>	<u>Result</u>	<u>PQL</u>
Barium	260	0.52
Chromium	990	1.0
Selenium	ND	21
Silver	ND	1.0

Total ICP-MS Metals Per EPA Method 6020
Date Analyzed: 4-25-96
Units: mg/kg

<u>Parameter</u>	<u>Result</u>	<u>PQL</u>
Arsenic	2.7	0.52
Cadmium	ND	0.26
Lead	8.5	0.26

Total Mercury By Cold Vapor AA Per EPA Method 7471
Date Analyzed: 4-25-96
Units: mg/kg

<u>Parameter</u>	<u>Result</u>	<u>PQL</u>
Mercury	ND	0.09

ND - Not Detected
PQL - Practical Quantitation Limit

SOUND ANALYTICAL SERVICES, INC.

TEG Northwest, Inc.
Project: Park 90/5
Report No. 56153
April 26, 1996

Lab Sample No. 56153-4
Matrix: Water

Client ID: 167816

Dissolved ICP Metals Per EPA Method 200.7
Date Analyzed: 4-24-96
Units: mg/L

<u>Parameter</u>	<u>Result</u>	<u>PQL</u>
Barium	0.025	0.005
Chromium	ND	0.010
Selenium	ND	0.20
Silver	ND	0.010

Dissolved ICP-MS Metals Per EPA Method 200.8
Date Analyzed: 4-25-96
Units: mg/L

<u>Parameter</u>	<u>Result</u>	<u>PQL</u>
Arsenic	0.017	0.001
Cadmium	ND	0.0005
Lead	ND	0.0005

Dissolved Mercury By Cold Vapor AA Per EPA Method 245.2
Date Analyzed: 4-25-96
Units: mg/L

<u>Parameter</u>	<u>Result</u>	<u>PQL</u>
Mercury	ND	0.0002

ND - Not Detected
PQL - Practical Quantitation Limit

SOUND ANALYTICAL SERVICES, INC.

TEG Northwest, Inc.
Project: Park 90/5
Report No. 56153
April 26, 1996

Lab Sample No. 56153-5
Matrix: Soil

Client ID: 167817

Total ICP Metals Per EPA Method 6010
Date Analyzed: 4-24-96
Units: mg/kg

<u>Parameter</u>	<u>Result</u>	<u>PQL</u>
Barium	200	0.53
Chromium	23	1.1
Selenium	ND	21
Silver	ND	1.1

Total ICP-MS Metals Per EPA Method 6020
Date Analyzed: 4-25-96
Units: mg/kg

<u>Parameter</u>	<u>Result</u>	<u>PQL</u>
Arsenic	4.8	0.53
Cadmium	0.36	0.27
Lead	47	0.27

Total Mercury By Cold Vapor AA Per EPA Method 7471
Date Analyzed: 4-25-96
Units: mg/kg

<u>Parameter</u>	<u>Result</u>	<u>PQL</u>
Mercury	0.10	0.09

ND - Not Detected
PQL - Practical Quantitation Limit

SOUND ANALYTICAL SERVICES, INC.

TEG Northwest, Inc.
Project: Park 90/5
Report No. 56153
April 26, 1996

Lab Sample No. 56153-6
Matrix: Water

Client ID: 167821

Dissolved ICP Metals Per EPA Method 200.7
Date Analyzed: 4-24-96
Units: mg/L

<u>Parameter</u>	<u>Result</u>	<u>PQL</u>
Barium	0.14	0.005
Chromium	ND	0.010
Selenium	ND	0.20
Silver	ND	0.010

Dissolved ICP-MS Metals Per EPA Method 200.8
Date Analyzed: 4-25-96
Units: mg/L

<u>Parameter</u>	<u>Result</u>	<u>PQL</u>
Arsenic	0.011	0.001
Cadmium	ND	0.0005
Lead	0.004	0.0005

Dissolved Mercury By Cold Vapor AA Per EPA Method 245.2
Date Analyzed: 4-25-96
Units: mg/L

<u>Parameter</u>	<u>Result</u>	<u>PQL</u>
Mercury	ND	0.0002

ND - Not Detected
PQL - Practical Quantitation Limit

SOUND ANALYTICAL SERVICES, INC.

ANALYTICAL & ENVIRONMENTAL CHEMISTS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

QUALITY CONTROL REPORT

Total Metals

Client: TEG Northwest, Inc.
Lab No: 56153ql
Units: mg/kg

METHOD BLANK

QC Batch No. S148
Date Analyzed: 4-24-96

Parameter	Result	PQL
Barium	ND	0.50
Chromium	ND	1.0
Selenium	ND	20
Silver	ND	1.0

QC Batch No. S148
Date Analyzed: 4-25-96

Parameter	Result	PQL
Arsenic	ND	0.50
Cadmium	ND	0.25
Lead	ND	0.25

ND - Not Detected

PQL - Practical Quantitation Limit

SOUND ANALYTICAL SERVICES, INC.

QUALITY CONTROL REPORT

Total Metals

Client: TEG Northwest, Inc.
Lab No: 56153q1
Units: mg/kg

DUPLICATES

QC Batch No. S148
Date Analyzed: 4-24-96

Parameter	Sample Result	Duplicate Result	RPD	Flag
Barium	240	290	19	
Chromium	26	34	27	
Selenium	ND	ND	NC	
Silver	ND	ND	NC	

QC Batch No. S148
Date Analyzed: 4-25-96

Parameter	Sample Result	Duplicate Result	RPD	Flag
Arsenic	4.8	4.7	2.1	
Cadmium	0.36	0.38	5.4	
Lead	47	47	0.0	

NC = Not Calculated

RPD = Relative Percent Difference

SOUND ANALYTICAL SERVICES, INC.

QUALITY CONTROL REPORT

Total Metals

Client: TEG Northwest, Inc.
Lab No: 56153q1
Units: mg/kg

QC Batch No. S148
Date Analyzed: 4-24-96

MATRIX SPIKE

QC Batch No. S148
Date Analyzed: 4-24-96

Parameter	Sample Result	MS Result	MS Amount	%R	Flag
Barium	240	870	830	76	
Chromium	26	98	83	87	
Selenium	ND	720	830	87	
Silver	ND	16	21	76	

QC Batch No. S148
Date Analyzed: 4-24-96

Parameter	Sample Result	MS Result	MS Amount	%R	Flag
Arsenic	4.8	14.0	10.6	90	
Cadmium	0.36	11.0	10.6	100	
Lead	47	55	10.6	75	

MS = Matrix Spike

%R = Percent Recovery

SOUND ANALYTICAL SERVICES, INC.

QUALITY CONTROL REPORT

Dissolved Metals

Client: TEG Northwest, Inc.
Lab No: 56153q1
Units: mg/L

METHOD BLANK

QC Batch No. D152
Date Analyzed: 4-24-96

Parameter	Result	PQL
Barium	ND	0.005
Chromium	ND	0.01
Selenium	ND	0.20
Silver	ND	0.01

QC Batch No. D152
Date Analyzed: 4-25-96

Parameter	Result	PQL
Arsenic	ND	0.001
Cadmium	ND	0.0005
Lead	ND	0.0005

ND - Not Detected
PQL - Practical Quantitation Limit

SOUND ANALYTICAL SERVICES, INC.

QUALITY CONTROL REPORT

Dissolved Metals

Client: TEG Northwest, Inc.
Lab No: 56153q1
Units: mg/L

DUPLICATES

QC Batch No. D152
Date Analyzed: 4-24-96

Parameter	Sample Result	Duplicate Result	RPD	Flag
Barium	0.025	0.025	0.0	
Chromium	ND	ND	NC	
Selenium	ND	ND	NC	
Silver	ND	ND	NC	

QC Batch No. D152
Date Analyzed: 4-25-96

Parameter	Sample Result	Duplicate Result	RPD	Flag
Arsenic	0.017	0.017	0.0	
Cadmium	ND	ND	NC	
Lead	ND	ND	NC	

NC = Not Calculated
RPD = Relative Percent Difference

SOUND ANALYTICAL SERVICES, INC.

QUALITY CONTROL REPORT

Dissolved Metals

Client: TEG Northwest, Inc.
Lab No: 56153q1
Units: mg/L

QC Batch No. D152
Date Analyzed: 4-24-96

MATRIX SPIKE

QC Batch No. D152
Date Analyzed: 4-24-96

Parameter	Sample Result	MS Result	MS Amount	%R	Flag
Barium	0.025	3.8	4.0	94	
Chromium	ND	0.38	0.40	95	
Selenium	ND	3.7	4.0	93	
Silver	ND	0.075	1.0	75	

QC Batch No. D152
Date Analyzed: 4-24-96

Parameter	Sample Result	MS Result	MS Amount	%R	Flag
Arsenic	0.017	3.9	4.0	97	
Cadmium	ND	0.101	0.100	101	
Lead	ND	0.92	1.0	92	

MS = Matrix Spike

%R = Percent Recovery

SOUND ANALYTICAL SERVICES, INC.

ANALYTICAL & ENVIRONMENTAL CHEMISTS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

QUALITY CONTROL REPORT

Total Mercury

Client: TEG Northwest, Inc.
Lab No: 56153q2
Units: mg/kg

QC Batch No. S009
Date Analyzed: 4-25-96

METHOD BLANK

Parameter	Result	PQL
Mercury	ND	0.10

ND - Not Detected

PQL - Practical Quantitation Limit

DUPLICATE

Parameter	Sample Result	Duplicate Result	RPD
Mercury	ND	ND	NC

NC = Not Calculated

RPD = Relative Percent Difference

MATRIX SPIKE

Parameter	Sample Result	MS Result	MS Amount	%R	Flag
Mercury	ND	0.78	0.77	101	

MS = Matrix Spike

%R = Percent Recovery

SOUND ANALYTICAL SERVICES, INC.

QUALITY CONTROL REPORT

Dissolved Mercury

Client: TEG Northwest, Inc.
Lab No: 56153q2
Units: mg/L

QC Batch No. D011
Date Analyzed: 4-25-96

METHOD BLANK

Parameter	Result	PQL
Mercury	ND	0.0002

ND - Not Detected

PQL - Practical Quantitation Limit

DUPLICATE

Parameter	Sample Result	Duplicate Result	RPD
Mercury	ND	ND	NC

NC = Not Calculated

RPD = Relative Percent Difference

MATRIX SPIKE

Parameter	Sample Result	MS Result	MS Amount	%R	Flag
Mercury	ND	0.0018	0.0020	90	

MS = Matrix Spike

%R = Percent Recovery



56153

181 Pacific Hwy. E.
Tacoma, Washington 98424
(206) 922-2310 • FAX (206) 922-5047

[illegible]

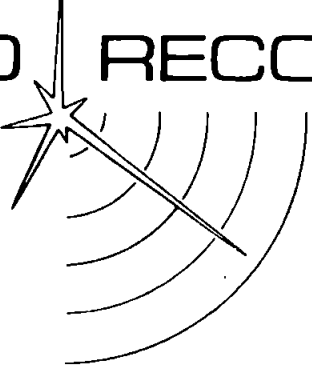
CLIENT: <u>Shannon & Wilson</u>	DATE: <u>4-23-96</u> PAGE <u>2</u> OF <u> </u>
ADDRESS: _____	PROJECT NAME: <u>Park 90/S /</u>
PHONE: _____ FAX: _____	LOCATION: _____
CLIENT PROJECT #: <u>T-1678-01</u> PROJECT MANAGER: <u>KAT</u>	COLLECTOR: <u>GMM</u> DATE OF COLLECTION: _____

[illegible]

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME	SAMPLE RECEIPT		LABORATORY NOTES:
<i>[Signature]</i>	4/23 800	<i>[Signature]</i>	4/23 1800	TOTAL NUMBER OF CONTAINERS		
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME	CHAIN OF CUSTODY SEALS Y/N/NA		
				SEALS INTACT? Y/N/NA		
				RECEIVED GOOD COND./COLD		
SAMPLE DISPOSAL INSTRUCTIONS				NOTES:		
☒ WTEG DISPOSAL @ \$2.00 each ☐ Return ☐ Pickup						

APPENDIX E
GEORECON REPORT

GEO RECON INTERNATIONAL



applied geophysics

April 26, 1996
J96-648/H

Shannon & Wilson Inc
400 N. 34th St., Suite 100
Seattle, WA 98103

RE: UST Search at the Sabey Corporation Property
Park 90/5 Office Park, Walker Street & Airport Way South
Seattle, Washington

This letter reports the results of a Electro-magnetic (EM) and Ground Penetrating Radar (GPR) exploration for underground storage tanks (UST) at the Sabey Corporation Park 90/5 Office Park Site at the above location (see Methods). The site covers approximately 10 acres, of which approximately 2.9 acres were surveyed for USTs. The work was completed between April 24 and 25, 1996.

Results of the Survey

Figure 1 shows the locations of the areas covered by the survey. The search area was divided into to 9 portions, labeled Area 1 through Area 9. These locations were determined from your historical research as the most likely locations for USTs. The reported USTs that were once on the site were in the order of 10,000 to 20,000 gallons in size except for a possible smaller UST that may have been associated with the structure that once was located in Area 3.

No evidence of a UST was found in the 9 areas.

The search area covered the parking and driveway areas of the office park. The work was accomplished during the early morning/late evening hours to minimize the number of parked cars on the site.

Area 9, the area in front of Building C, had truck trailers at some of the loading docks. Though the area underneath the trailers could not be scanned directly, the edge effects created by a UST should have registered on the EM and GPR equipment, particularly given the size of the suspected USTs (10,000 to 20,000 gallons); a UST of these sizes would have approximated the size of or have been greater than the size the truck trailers.

A UST vent line is located in Area 7, tied to the North side of Building E at the trash enclosure West of the loading dock. The UST is reported to have been removed. No evidence of a UST around the UST vent could be found. There is buried rubble in front (North of) the vent line location that may represent the UST excavation area.

The EM and GPR data indicates that at least two separate fills may have been placed on the site; the first fill probably originated from initial development for the land use, and the final during construction of the existing buildings. The EM and GPR data shows that the soil varies between being coarse to fine grained materials, and contains a varying amount of apparent building debris depending on location.

The EM and GPR data may have located a buried foundation wall of the structure that once occupied the Northeast portion (Area 3) of the site. In Areas 1 and 2, a buried, reinforced concrete surface or pavement was found near the Southeast corner of Building B.

Storm drainage piping in the park appears to be connected to dry wells at some of the catch basin locations. The depth to the ground water apparent on the GPR records appears to be approximately 40 nano-seconds in depth, or at a depth of from 6 to 8 feet dependent on the vertical electro-magnetic velocity and elevation of the GPR location. The EM wave velocity appears to be dependent on depth, probably as a result of an increase in moisture content of the soils with depth (i.e. the greater the moisture, the slower the EM wave velocity).

Methods

An Electro-magnetic (EM) device was used to look for buried metal targets. Small metal objects in the near surface (1 to 2 feet) will have an EM response equivalent to a larger object (UST) at depth. The EM targets were then investigated with Ground Penetrating Radar (GPR) to determine the relative depth, size and ground projection of the object; i.e. to determine if the object is or is not a UST.

The electro-magnetic or EM device transmits and receives an electro-magnetic signal at a frequency of 6 KHz. The EM signal is transmitted through the ground, which in turn radiates a signal that is dependent on the ground conductivity and which is also received at the receiver. The two signals, the transmitted and ground response EM waves, are balanced (nulled) for a zero response in the instrument electronics. When the ground conditions change, for example, when the transmitted signal encounters buried metal, the ground conductivity changes and the balance or null point is changed, and the instrument responds with an audible signal. Depending on the size of the metal object, the penetration is up to 15 feet in depth.

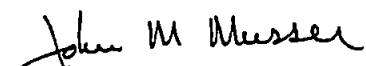
The Ground Penetrating Radar (a GSSI, SIR System 3) utilized a 500 Mega-Hertz antenna. The GPR antenna used for this investigation transmits a 2 nano-second (ns) pulse at a frequency of 500 Mega-Hertz for the selected scan rate of 8 times per second. When the signal encounters a change in electrical properties (a change in electrical permittivity), a portion of the signal energy is reflected back to the surface. The reflected signal is received by the antenna, processed and recorded on an analog recorder. The character of the reflection is used to define the source of the reflection.

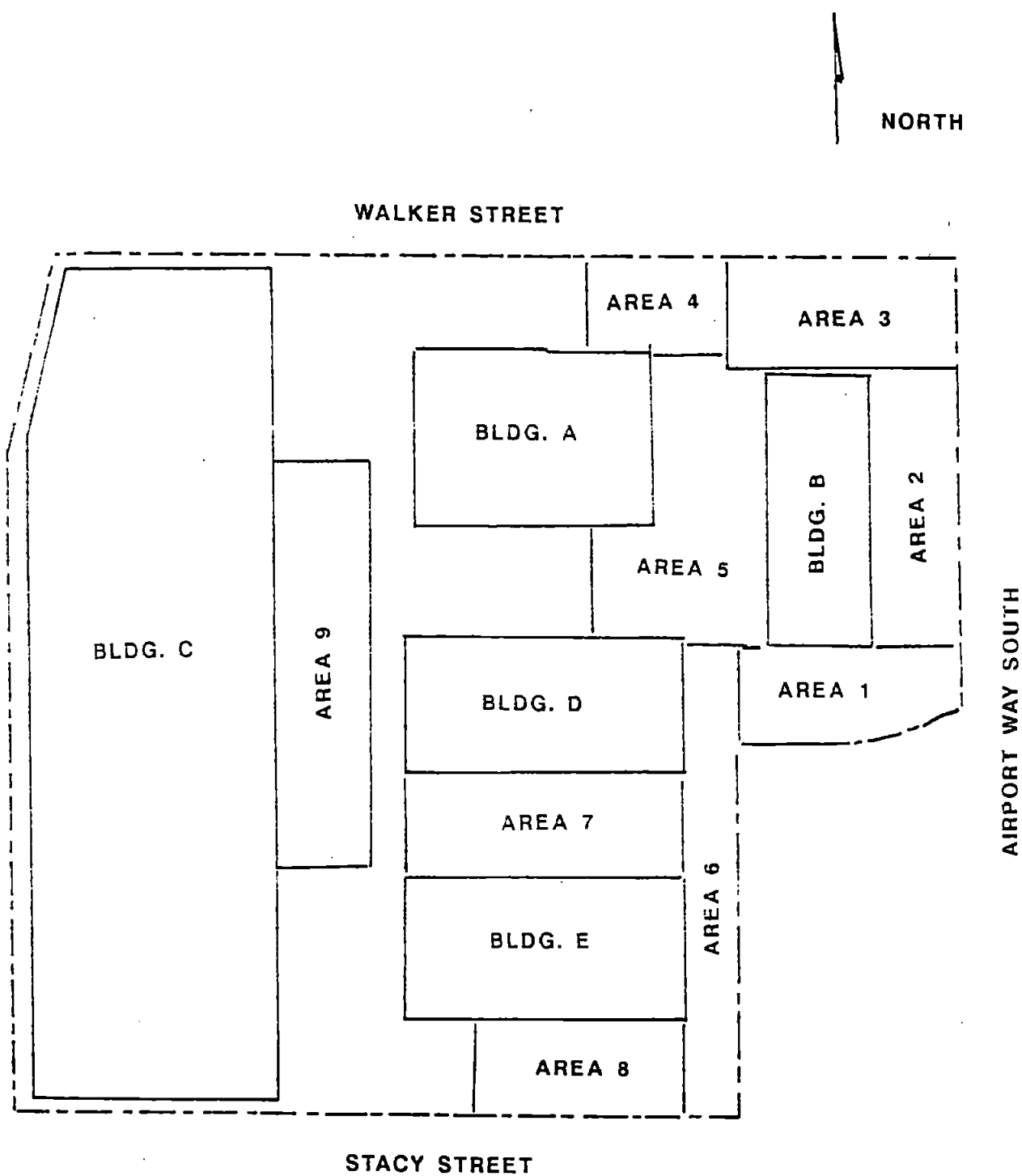
A UST will produce, in cross-section, a hyperbolic reflection. A traverse parallel to the centerline of the UST will show a horizontal (if there is no velocity or elevation change along the traverse) reflection, with hyperbolic signatures at both ends of the UST. The hyperbolic signature is the result of "seeing" the tank before the center of the antenna is over the tank.

The GPR records were recorded at an 80 nano-seconds full scale sweep, with 8 nano-seconds between horizontal time marks. The top of the recordings are marked at one metre (3.28 ft) intervals. The depth of an object is determined by the electro-magnetic wave propagation rate (inverse of wave velocity) of the site materials. The recorded time is two-way time, that is the time down to the surface and then back to the antenna. The two-way time is estimated to vary between 5 to 7 nano-seconds per foot dependent on depth, or an estimated 1.1 to 1.6 feet between the horizontal time lines. The electro-magnetic velocity may vary across the site, both horizontally and vertically.

We trust that the above is sufficient for your requirements. Please let us know if you have any questions or if we may be of further assistance.

For Geo-Recon International


John M Musser
Principal Geophysicist



PARK 90/5 OFFICE PARK SITE

GPR IMAGERY

LOCATION PLAN

J98-648/H

GEO-RECON INTERNATIONAL

FIG 1

APPENDIX F
QUALIFICATIONS

The following Shannon & Wilson, Inc., employees completed this Level 1 and 2 ESA:

- ▶ Ms. Kathy Troost, who directed the effort, is a Registered Environmental Property Assessor and Registered Professional Geologist with over 16 years of experience.
- ▶ Ms. Gretchen Miller is an experienced Environmental Scientist with 3 years of experience with ESAs.
- ▶ Ms. Judy Davis is a Librarian and Information Resources Specialist with over 16 years of experience.

APPENDIX G

**IMPORTANT INFORMATION ABOUT YOUR
ENVIRONMENTAL SITE ASSESSMENT/EVALUATION REPORT**

**IMPORTANT INFORMATION ABOUT YOUR
ENVIRONMENTAL REPORT**



Dated: May 22, 1996

To: Dell Jackson & Associates, Inc.
Bellevue, Washington

Important Information About Your Environmental Site Assessment/Evaluation Report

ENVIRONMENTAL SITE ASSESSMENTS/EVALUATIONS ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

This report was prepared to meet the needs you specified with respect to your specific site and your risk management preferences. Unless indicated otherwise, we prepared your report expressly for you and for the purposes you indicated. No one other than you should use this report for any purpose without first conferring with us. No one is authorized to use this report for any purpose other than that originally contemplated without our prior written consent.

The findings and conclusions documented in this site assessment/evaluation have been prepared for specific application to this project and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in this area. The conclusions presented are based on interpretation of information currently available to us and are made within the operational scope, budget, and schedule constraints of this project. No warranty, express or implied, is made.

OUR REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

Our environmental site assessment is based on several factors and may include (but not be limited to): reviewing public documents to chronicle site ownership for the past 30, 40, or more years; investigating the site's regulatory history to learn about permits granted or citations issued; determining prior uses of the site and those adjacent to it; reviewing available topographic and real estate maps, historical aerial photos, geologic information, and hydrologic data; reviewing readily available published information about surface and subsurface conditions; reviewing federal and state lists of known and potentially contaminated sites; evaluating the potential for naturally occurring hazards; and interviewing public officials, owners/operators, and/or adjacent owners with respect to local concerns and environmental conditions.

Except as noted within the text of the report, no sampling or quantitative laboratory testing was performed by us as part of this site assessment. Where such analyses were conducted by an outside laboratory, Shannon & Wilson relied upon the data provided and did not conduct an independent evaluation regarding the reliability of the data.

CONDITIONS CAN CHANGE.

Site conditions, both surface and subsurface, may be affected as a result of natural processes or human influence. An environmental site assessment/evaluation is based on conditions that existed at the time of the evaluation. Because so many aspects of a historical review rely on third party information, most consultants will refuse to certify (warrant) that a site is free of contaminants, as it is impossible to know with absolute certainty if such a condition exists. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas that showed no signs of contamination at the time they were studied.

Unless your consultant indicates otherwise, your report should not be construed to represent geotechnical subsurface conditions at or adjacent to the site and does not provide sufficient information for construction-related activities. Your report also should not be used following floods, earthquakes, or other acts of nature; if the size or configuration of the site is altered; if the location of the site is modified; or if there is a change of ownership and/or use of the property.

INCIDENTAL DAMAGE MAY OCCUR DURING SAMPLING ACTIVITIES.

Incidental damage to a facility may occur during sampling activities. Asbestos and lead-based paint sampling often require destructive sampling of pipe insulation, floor tile, walls, doors, ceiling tile, roofing, and other building materials. Shannon & Wilson does not provide for paint repair. Limited repair of asbestos sample locations are provided. However, Shannon & Wilson neither warrants repairs made by our field personnel, nor are we held liable for injuries or damages as a result of those repairs. If you desire a specific form of repair, such as those provided by a licensed roofing contractor, you need to request the specific repair at the time of the proposal. The owner is responsible for repair methods that are not specified in the proposal.

READ RESPONSIBILITY CLAUSES CAREFULLY.

Environmental site assessments/evaluations are less exact than other design disciplines because they are based extensively on judgment and opinion, and there may not have been any (or very limited) investigation of actual subsurface conditions. Wholly unwarranted claims have been lodged against consultants. To limit this exposure, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses may appear in this report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

Consultants cannot accept responsibility for problems that may develop if they are not consulted after factors considered in their reports have changed, or conditions at the site have changed. Therefore, it is incumbent upon you to notify your consultant of any factors that may have changed prior to submission of the final assessment/evaluation.

An assessment/evaluation of a site helps reduce your risk, but does not eliminate it. Even the most rigorous professional assessment may fail to identify all existing conditions.

ONE OF THE OBLIGATIONS OF YOUR CONSULTANT IS TO PROTECT THE SAFETY, HEALTH, PROPERTY, AND WELFARE OF THE PUBLIC.

If our environmental site assessment/evaluation discloses the existence of conditions that may endanger the safety, health, property, or welfare of the public, we may be obligated under rules of professional conduct, statutory law, or common law to notify you and others of these conditions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland



Important Information About Your Geotechnical/Environmental Report

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland

APPENDIX C
SUPPLEMENTAL ENVIRONMENTAL
INVESTIGATION REPORT
SHANNON AND WILSON 1996b

***Supplemental Environmental
Investigation
Park 90/5 Site
Seattle, Washington***

September 1996

***Dell Jackson & Associates, Inc.
P. O. Box 6756
Bellevue, Washington 98008-0756***



SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

400 N. 34th St. ■ Suite 100
P.O. Box 300303
Seattle, Washington 98103
206 ■ 632 ■ 8020

September 17, 1996

Mr. Dell Jackson
Dell Jackson & Associates, Inc.
P. O. Box 6756
Bellevue, Washington 98008-0756

**RE: SUPPLEMENTAL ENVIRONMENTAL INVESTIGATION, PARK 90/5,
SEATTLE, WASHINGTON**

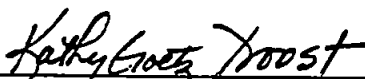
Dear Mr. Jackson:

The attached report provides the results of our Supplemental Environmental Investigation for the above-referenced property. The purpose of our work was to address the potential for soil and groundwater contamination on the northeast and southeast portions of the site. In addition, this report presents the results of additional historical research into the former 20,000-gallon underground storage tank near Building C.

We understand that Dalton, Olmsted, and Fuglevand, Inc., will be preparing an independent remedial action plan (IRAP) report. We are available to review their report and provide comments. Other than future meetings or report review, we have finished our scope of work. It has been a pleasure working with you on this project and we appreciate your confidence in us. Please call if you have any questions, would like further explanation of the materials or conclusions presented, or need help with other elements of your project.

Sincerely,

SHANNON & WILSON, INC.


Kathy Goetz Troost, R.P.G., R.E.P.A.
Associate

GMM:KAT/eet

Enclosure: Supplement Environmental Investigation Report (one copy)

cc: Valerie Margulis (nine copies)

9-17-96/T1678-01.TML/T1678-lkd/eet

T-1678-01

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**SUPPLEMENTAL ENVIRONMENTAL INVESTIGATION
PARK 90/5
SEATTLE, WASHINGTON**

1.0 INTRODUCTION AND SCOPE

A supplemental environmental investigation was performed at Park 90/5 at 2203 Airport Way South, Seattle, Washington. The purpose of the work was to provide additional information about the nature and extent of contamination identified in a previous Level 1 and 2 Environmental Site Assessment (ESA). The general layout of the site showing the locations of existing buildings is presented on Figure 1.

The scope of services was designed to address the potential for soil and/or groundwater contamination in the northeast corner of the site related to a former underground storage tank (UST), and in the central portion of the site adjacent to Building C, where diesel contamination was detected during the previous ESA. Specifically, the scope consisted of driving six additional probes. Four of the probes are located in the northeast portion of the site, near the former UST, to collect soil and groundwater samples. The other two probes are located in the southeast section of the site (potentially downgradient of Building C) to collect groundwater samples only. In addition to soil and groundwater sampling, this supplemental investigation included further historical research to identify prior site uses in the Building C area and, specifically, to determine the disposition of a 20,000-gallon UST, which was documented to be in the area.

2.0 BACKGROUND

The Level 1 and 2 ESA for the Park 90/5 site (Shannon & Wilson, 1996) determined that soil and groundwater contamination has occurred at the site from historical site practices. The site was first developed as a meat packing and rendering plant in 1913. The site was renovated in 1985 when most of the old buildings were demolished and new buildings were constructed. Approximately 12 to 17 feet of fill was placed on the site at various times. Based on our investigation and investigations by others, the fill consists of silty sand and gravel, with wood and brick fragments, concrete rubble, glass, metal debris, and slag.

Historical records indicate that at least four USTs were present on the site during operation of the rendering plant. More details are provided in the Level 1 and 2 ESA report.

As part of the Level 1 and 2 ESA, soil and groundwater samples were analyzed from five locations on the site (P-1 through P-5), as shown on Figure 1. The results of the sampling identified the following areas of concern:

1. Diesel contamination was found in the soil and groundwater at Building C (Probe P-2).
2. Oil contamination was found in the soil between Buildings D and E (Probe P-5).
3. Oil contamination was also found northeast of Building E (Probe P-4).
4. Chromium contamination was found in the soil east of Building B (Probe P-3).
5. Sporadic contamination was found in the fill.

The contaminated soils in the areas of P-2, P-4, and P-5 were excavated as part of a remedial action from June 11 through 15, 1996 (Dalton, Olmsted, and Fuglevand, 1996a). The excavations at P-4 and P-5 appear to have removed most of the total petroleum hydrocarbon (TPH) contamination. However, TPH is still present at concentrations above MTCA criteria in the soil at both locations. Based on one sample, the remaining concentration at the base of the P-4 excavation was 813 milligrams per kilogram (mg/kg) of oil. Based on limited sampling, the maximum remaining concentrations at the base of the P-5 excavation were 929 mg/kg oil and 437 mg/kg diesel. The remaining contamination is essentially inaccessible because of its closeness to buildings, utilities, groundwater, and/or the property boundary; therefore, the excavations were closed.

At P-2, the excavation activities have removed most of the accessible, diesel-contaminated soils. However, diesel is still present at concentrations above MTCA criteria in the fill at approximately 6.5 to 8 feet in depth at the north end of the excavation area and beneath Building C. Based on limited sampling, the maximum remaining concentrations were 2,300 mg/kg in the north wall and 10,000 to 20,000 mg/kg in the west wall adjacent to Building C. The excavation could not be extended farther north because of a main power vault located north of the excavation, and west because of Building C. The probe results indicate that diesel is present in the groundwater at concentrations above MTCA criteria in the P-2

area. A sheen and an odor were noted during excavation. Also, a concrete slab, which appeared to be a building foundation, was present at approximately 5 feet below ground surface (bgs) in the excavation.

On June 26 and 27, 1996, four monitoring wells were installed and sampled at the site. The wells were labeled MW-1 through MW-4, as shown on Figure 1. Sample results did not identify the presence of petroleum hydrocarbons in the soil or groundwater at the well locations (Dalton, Olmsted, and Fuglevand, 1996b). The groundwater in the monitoring wells was also analyzed for total and dissolved metals. The only metals detected in the groundwater were arsenic and barium. Arsenic concentrations were above MTCA criteria in two locations, MW-2 and MW-4 (Dalton, Olmsted, and Fuglevand, 1996e).

Survey data from the monitoring wells indicate that the groundwater flow direction at the site is to the east-southeast (Dalton, Olmsted, and Fuglevand, 1996d).

3.0 ADDITIONAL HISTORICAL RESEARCH

Based on an aerial photograph review, it was determined that the concrete slab seen in the P-2 excavation is likely from one or more buildings that previously occupied the southwest portion of the site, as seen in the 1936 aerial photograph, and not one of the three concrete slabs related to the former fuel pump and UST. In the 1985 aerial photograph, the three concrete slabs in the fuel pump area were no longer visible and the land appeared graded. Based on this photograph, and a comparison of previous and current site elevations, the slabs were likely removed during demolition.

In a telephone conversation on June 26, 1996, Mr. Al Clow, formerly of Berkeley Engineering and Construction, stated that he was on site during most of the demolition of the meat packing plant buildings in 1984/85 and witnessed the UST removals. He remembers a 20,000-gallon tank (a tank comparable to this size) being removed from the western portion of the site, in the fuel station area (near Building C), and a smaller tank being removed from the area of the engine and boiler rooms (near Building D).

4.0 ADDITIONAL SOIL AND GROUNDWATER INVESTIGATION

Additional subsurface investigation was conducted on June 11, 1996. Shannon & Wilson subcontracted Transglobal Environmental Geosciences Northwest, Inc. (TEG), to drive four soil probes at the site with a truck-mounted hydraulic Strataprobe. The probes were labeled P-6 through P-9, as shown on Figure 1. The probes were installed to investigate the potential for contamination associated with a UST in the northeast corner of the site. Soil and groundwater samples were collected at each location.

On July 5, 1996, Shannon & Wilson and TEG drove two additional probes to investigate the potential for off-site migration of the diesel contamination in the groundwater from the P-2 area. These probes were labeled P-10 and P-11, as shown on Figure 1. Only groundwater was sampled at these locations. Another probe was driven next to P-7, where a groundwater sample was collected for analysis of dissolved metals.

At each probe location, soil samples were collected continuously using a 3-foot-long, split-spoon sampler. Soils encountered were generally silty sand and gravel fill containing various amounts of organics, wood pieces and slag. The probes were driven to depths of 11 to 12 feet bgs. Probe logs showing soil stratigraphy are presented in Appendix A. Groundwater was encountered in the probes at 7 to 9 feet bgs. Sample collection depths are summarized in Tables 1 and 2.

The split-spoon samplers were decontaminated after each soil sample to prevent cross-contamination of the samples. Upon completion of soil and/or groundwater sampling at each location, the holes were backfilled with bentonite chips and patched with asphalt.

5.0 ANALYTICAL RESULTS

Soil samples were selected for chemical laboratory analysis based on visual observations and/or sample depth relative to the water table. One soil and one groundwater sample from probes P-6 through P-9 (two soil at P-8) were analyzed by TEG's mobile laboratory for diesel- and oil-range petroleum hydrocarbons by method WTPH-D/D Extended and for total metals analysis of the eight Resource Conservation and Recovery Act (RCRA) metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). The

T-1678-01

groundwater samples taken on July 5, 1996, were submitted to OnSite Environmental Inc., in Redmond, Washington, on a quick turnaround basis. The results of the analyses are summarized in Tables 1 and 2, and the full laboratory report is presented in Appendix B.

Metals and diesel- or oil-range petroleum hydrocarbons were either not detected or were detected below regulatory criteria in soil samples from P-6 through P-9. Petroleum hydrocarbons were not detected in the groundwater at locations P-6 through P-11. Total metals analysis of the groundwater from P-6 through P-8 indicated exceedences of arsenic, barium, chromium, lead, and mercury at one or more of these locations. However, when a groundwater sample from the P-7 area was reanalyzed for dissolved metals, only barium was detected and was below regulatory criteria.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Previous remedial excavations conducted at the site from June 11 to 15, 1996, removed most of the easily accessible TPH contamination at the locations of P-2, P-4, and P-5. Because the remaining contamination is essentially inaccessible (P-2, P-4, and P-5) and of low mobility (P-4 and P-5), it is unlikely that further removal action will be required by Washington State Department of Ecology (Ecology). However, Ecology may require a deed restriction because of the TPH left in the subsurface. The recent probe studies have indicated the following:

- ▶ The probe study conducted on June 11, 1996, in the northeast corner of the property indicated that petroleum hydrocarbons were only detected in the soil at the location of P-8, and these concentrations were well below MTCA cleanup criteria. Petroleum hydrocarbons were not detected in the groundwater in this portion of the site.
- ▶ The probe study conducted on July 5, 1996, in the southeast portion of the site indicated that TPH is not present in the groundwater at the locations of P-10 and P-11. These locations are downgradient of P-2 and, thus, appear to indicate that the diesel contamination has not migrated in the groundwater beyond the immediate source area.

Groundwater analyses indicate that dissolved metals concentrations did not exceed MTCA criteria, with the exception of arsenic. Arsenic is present at concentrations above MTCA

criteria in groundwater across the site and may be an areawide problem. Therefore, in our opinion, cleanup action may not be warranted. In addition, some metals are present, and suspected, at concentrations above the MTCA criteria at sporadic locations in the fill. Ecology will not likely require further action for the metals in the soil; however, future site excavation (such as utility trenching) will need to address the disposal of potentially contaminated soil.

As discussed, diesel is present in groundwater at concentrations above MTCA criteria in the P-2 area. A sheen and odor were noted during excavation. Because of diesel contamination remaining in groundwater, Ecology will likely require a deed restriction as a condition of a no-further-action (NFA) through the independent remedial action plan (IRAP) process. Furthermore, monitoring wells will most likely be required to confirm that diesel-contaminated groundwater does not migrate off site. A minimum of three wells will need to be monitored, one upgradient and two downgradient. With the apparent groundwater flow direction to the east-southeast, at least one more monitoring well may need to be installed. In addition, a monitoring well should also be installed in the P-2 area to monitor degradation of diesel in groundwater. Three years of groundwater monitoring may be required to confirm that diesel is not migrating off site.

Previous site investigations have focused on the areas determined most likely to be contaminated based on site history. Because of the nature of the fill and the past site use, other isolated areas or pockets of TPH or other contamination are possible and should be anticipated. Any future soil excavations should be monitored for contamination, and if contamination is suspected, analytical testing should be conducted. Disposal of soil may be restricted.

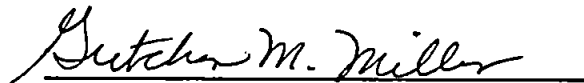
7.0 LIMITATIONS

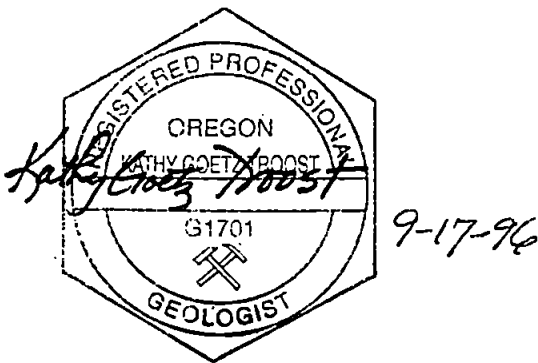
The data presented in this report are based on limited research at the site and should be considered representative at the time of our observations. Changes in the conditions of the property can occur with time from both natural processes and human activities. In addition, changes in governmental codes, regulations, or law may occur. Because of such changes beyond our control, our observations and recommendations applicable to this facility may need to be revised, either wholly or in part.

SHANNON & WILSON, INC.

This report was prepared for the exclusive use of Dell Jackson & Associates, Inc., and its representatives, and in no way guarantees that an agency or its staff will reach the same conclusions as Shannon & Wilson, Inc. We have prepared Appendix C, "Important Information About Your Environmental Report," to assist you and others in understanding the use and limitations of our reports.

SHANNON & WILSON, INC.


Gretchen M. Miller
Environmental Scientist



Kathy Goetz Troost, R.P.G., R.E.P.A.
Associate

GMM:KAT:JFZ/gmm

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TABLE 1
SOIL AND GROUNDWATER TPH AND BTEX ANALYTICAL RESULTS

Sample Data				Soil Sample Results						
Sample Location	Sample Number	Date Sampled	Sample Interval ^a	Oil (mg/kg)	Diesel (mg/kg)	Gas (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
P-1	167804	4/23/96	9-11	< 40	< 20	< 10	< 0.05	< 0.05	< 0.05	< 0.05
P-2	167809	4/23/96	6-9	< 40	20,900	NA	NA	NA	NA	NA
P-2	167810	4/23/96	9-11	52	118	< 10	< 0.05	< 0.05	< 0.05	< 0.05
P-3	167814	4/23/96	1-4	< 40	< 20	< 10	< 0.05	< 0.05	< 0.05	< 0.05
P-3	167815	4/23/96	3-6	83	< 20	< 10	< 0.05	< 0.05	< 0.05	< 0.05
P-4	167819	4/23/96	8-10	12,774	< 20	25	< 0.05	< 0.05	0.13	1.10
P-5	167824	4/23/96	8-10	21,700	< 20	< 10	< 0.05	0.84	< 0.05	< 0.05
P-6	167826	6/11/96	6-9	< 40	< 20	NA	NA	NA	NA	NA
P-7	167828	6/11/96	9-12	< 40	< 20	NA	NA	NA	NA	NA
P-8	167830	6/11/96	3-6	42	37	NA	NA	NA	NA	NA
P-8	167833	6/11/96	6-9	< 40	< 20	NA	NA	NA	NA	NA
P-9	167832	6/11/96	9-12	< 40	< 20	NA	NA	NA	NA	NA
MTCA Cleanup Levels ^b				200	200	100	0.5	40.0	20.0	20.0
Sample Data				Groundwater Sample Results						
Sample Location	Sample Number	Date Sampled	Screened Interval ^a	Oil (µg/L)	Diesel (µg/L)	Gas (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)
P-1	167806	4/23/96	6-8.5	< 400	< 200	< 100	< 1	< 1	< 1	< 1
P-2	167813	4/23/96	6.5-9	538	219,000	< 100	< 1	< 1	< 1	< 1
P-3	167816	4/23/96	7-9.5	< 400	< 200	< 100	< 1	< 1	< 1	< 1
P-4	167821	4/23/96	9-10.5	< 400	< 200	< 100	< 1	< 1	< 1	< 1
P-5	167825	4/23/96	9-11.5	< 400	233	< 100	< 1	1.75	< 1	9.40
P-6	167825	6/11/96	9-12	< 400	< 200	NA	NA	NA	NA	NA
P-7	167827	6/11/96	9-12	< 400	< 200	NA	NA	NA	NA	NA
P-8	167829	6/11/96	6-9	< 400	< 200	NA	NA	NA	NA	NA
P-9	167831	6/11/96	9-12	< 400	< 200	NA	NA	NA	NA	NA
P-10	167835	7/5/96	8.5-11.5	< 1,000	< 500	NA	NA	NA	NA	NA
P-11	167836	7/5/96	8.5-11.5	< 1,000	< 500	NA	NA	NA	NA	NA
MTCA Cleanup Levels ^b				1000 ^c	1000 ^c	1000 ^c	5.0	40.0	30.0	20.0

NOTES:

^a Measured in feet from existing ground surface.

^b Model Toxics Control Act Method A Industrial Standards, December 1993. Values presented for comparison purposes only.

^c Cleanup level is reported for the sum of hydrocarbons.

Soil and groundwater results analyzed by methods Washington Total Petroleum Hydrocarbons as Diesel and Oil (WTPH-D/Extended), and Washington Total Petroleum Hydrocarbons as Gasoline with benzene, toluene, ethylbenzene, and xylenes distinction (WTPH-G/BTEX).

TPH = Total petroleum hydrocarbons

BTEX = benzene, toluene, ethylbenzene, and xylenes

mg/kg = milligrams per kilogram

µg/L = micrograms per liter

NA = Not analyzed

< = Less than the method detection limit (MDL), limit reported.

Boldface concentrations exceed cleanup level.

Laboratory results reported by Transglobal Environmental Geosciences Northwest, Inc., Lacey, Washington.

TABLE 2
SOIL AND GROUNDWATER METALS ANALYTICAL RESULTS

Soil Sample Results											
Sample Location	Sample Number	Date Sampled	Sample Interval ^a	Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)
P-2	167810	4/23/96	9-11	4.0	290	< 0.34	7.4	41	< 0.13	< 27	< 1.3
P-3	167815	4/23/96	3-6	2.7	260	< 0.26	990	8.5	< 0.09	< 21	< 1.0
P-4	167817	4/23/96	1-4	4.8	200	0.36	23	47	0.1	< 21	< 1.1
P-6	167826	6/11/96	6-9	5.2	100	< 1.3	44	5.8	0.23	< 19	< 1.3
P-7	167828	6/11/96	9-12	2.5	94	< 1.2	27	8.4	0.18	< 18	< 1.2
P-8	167830	6/11/96	3-6	6.7	140	< 1.2	38	10	0.2	< 19	< 1.2
P-9	167832	6/11/96	9-12	1.6	110	< 1.1	8.4	57	< 0.1	< 17	< 1.1
MTCA Cleanup Levels ^b				200.0	5600 ^c	10.0	500.0	1000.0	1.0	400 ^c	400 ^c
Groundwater Sample Results											
Sample Location	Sample Number	Date Sampled	Screened Interval ^a	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Lead (mg/L)	Mercury (mg/L)	Selenium (mg/L)	Silver (mg/L)
Dissolved											
P-2	167813	4/23/96	6.5-9	0.003	0.190	< 0.0005	< 0.010	0.002	< 0.0002	< 0.20	< 0.010
P-3	167816	4/23/96	7-9.5	0.017	0.025	< 0.0005	< 0.010	< 0.0005	< 0.0002	< 0.20	< 0.010
P-4	167821	4/23/96	9-10.5	0.011	0.140	< 0.0005	< 0.010	0.004	< 0.0002	< 0.20	< 0.010
P-7	167834	7/5/96	9-12	< 0.0035	0.150	< 0.005	< 0.010	< 0.002	< 0.0005	< 0.0063	< 0.010
Total											
P-6	167825	6/11/96	9-12	0.012	0.940	< 0.001	0.020	0.160	< 0.0004	< 0.130	< 0.010
P-7	167827	6/11/96	9-12	0.011	3.200	0.003	0.040	6.100	< 0.028	< 0.150	< 0.010
P-8	167829	6/11/96	6-9	0.051	5.600	0.004	0.050	1.100	0.015	< 0.150	< 0.010
P-9	167831	6/11/96	9-12	< 0.001	0.360	< 0.001	< 0.010	< 0.050	< 0.0004	< 0.150	< 0.010
MTCA Cleanup Levels ^b				0.005	1.12 ^c	0.005	0.050	0.005	0.002	0.08 ^c	0.08 ^c

NOTES:

^a Measured in feet from existing ground surface.

^b Model Toxics Control Act (MTCA) Method A Industrial Standards, December 1993, unless otherwise noted. Values presented for comparison purposes only.

^c MTCA Method B Cleanup level for direct soil contact.

Soil samples were analyzed for total metals by EPA Methods 6010 (barium, chromium, selenium, and silver); 6020 (arsenic, cadmium, and lead); and 7471 (mercury).

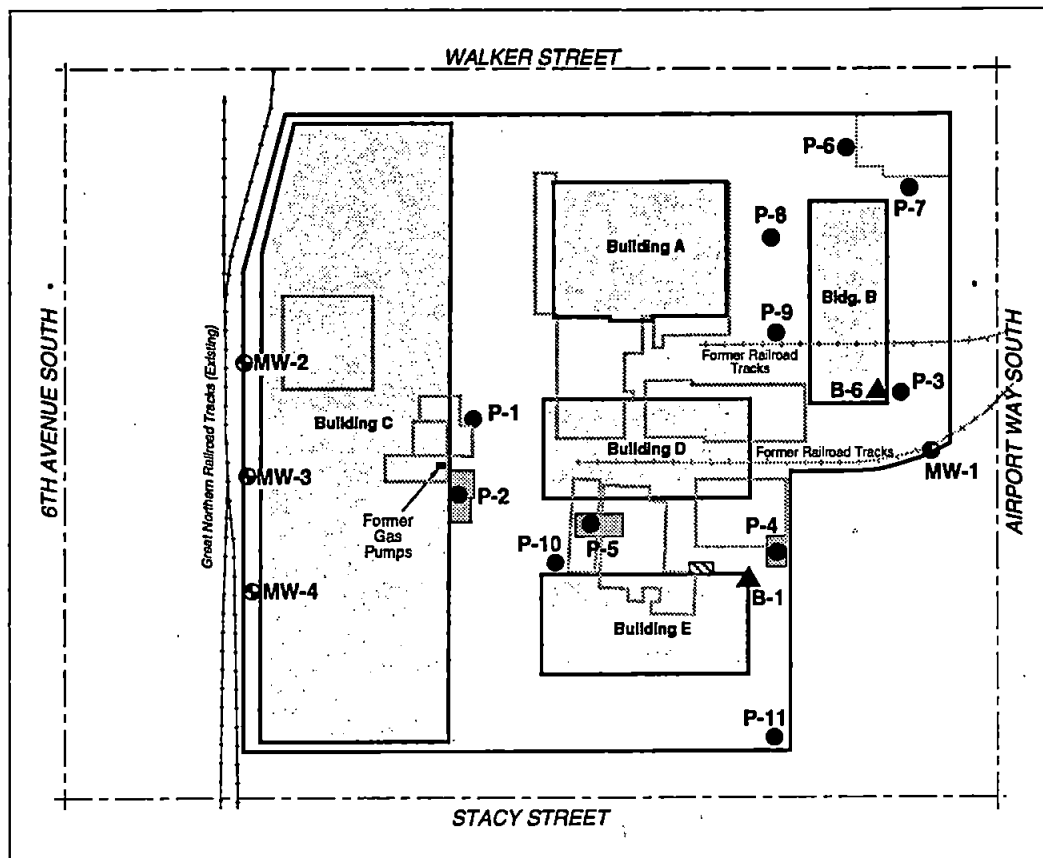
Groundwater samples were analyzed for dissolved metals by EPA Methods 200.7 (barium, chromium, selenium, and silver); 200.8 (arsenic, cadmium, and lead); and 245.2 (mercury); and total metals by EPA Methods 6010 (barium, chromium, lead, selenium, and silver); 200.8 (arsenic and cadmium); and 245.1 (mercury).

mg/kg = milligrams per kilogram

mg/L = milligrams per liter

Boldface concentrations exceed cleanup level.

Laboratory results reported by Transglobal Environmental Geosciences Northwest, Inc., Lacey, Washington.



0 100 200 400
Scale in Feet

LEGEND

- MW-1** ● Monitoring Well Designation and Approximate Location (installed by Dalton, Olmsted & Fuglevand, June 1996)
- B-1** ▲ Boring Designation and Approximate Location of ECI Borings of Concern
- P-1** ● Probe Designation and Approximate Location
- Existing Building
- Former Building / Structure
- Former Location of 300-gallon Waste Oil Tank
- Remedial Excavation (Completed in June 1996)

NOTE

Current and historical site features and structures are taken from drawings prepared by Triad Associates, dated 7-15-86 and 10-22-84.

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SITE AND EXPLORATION PLAN

September 1996

T-1678-01

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FIG. 1

APPENDIX A
PROBE LOGS

Shannon & Wilson, Inc., uses a soil classification system modified from the Unified Soil Classification (USC) System. Elements of the USC and other definitions are provided on this and the following page. Soil descriptions are based on visual-manual procedures (ASTM D 2488-93) unless otherwise noted.

S&W CLASSIFICATION OF SOIL CONSTITUENTS

- MAJOR constituents compose more than 50 percent, by weight, of the soil. Major constituents are capitalized (SAND).
- Minor constituents compose 12 to 50 percent of the soil and precede the major constituents (silty SAND). Minor constituents preceded by "slightly" compose 5 to 12 percent of the soil (slightly silty SAND).
- Trace constituents compose 0 to 5 percent of the soil (slightly silty SAND, trace of gravel).

MOISTURE CONTENT DEFINITIONS

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, from below water table

ABBREVIATIONS

ATD	At Time of Drilling
Elev.	Elevation
ft	feet
HSA	Hollow Stem Auger
ID	Inside Diameter
in	inches
lbs	pounds
Mon.	Monument cover
N	Blows for last two 6-inch increments
NA	Not Applicable or Not Available
OD	Outside Diameter
OVA	Organic Vapor Analyzer
PID	Photoionization Detector
ppm	parts per million
PVC	Polyvinyl Chloride
SS	Split Spoon sampler
SPT	Standard Penetration Test
USC	Unified Soil Classification
WLI	Water Level Indicator

GRAIN SIZE DEFINITIONS

DESCRIPTION	SIEVE SIZE
FINES	< #200 (0.08 mm)
SAND*	• #200 - #40 (0.4 mm) • #40 - #10 (2 mm) • #10 - #4 (5 mm)
GRAVEL*	• #4 - 3/4 inch • 3/4 - 3 inches
COBBLES	3 - 12 inches
BOULDERS	> 12 inches

* Unless otherwise noted, sand and gravel, when present, range from fine to coarse in grain size.

RELATIVE DENSITY / CONSISTENCY

COARSE-GRAINED SOILS		FINE-GRAINED/COHESIVE SOILS	
N, SPT, BLOWS/FT.	RELATIVE DENSITY	N, SPT, BLOWS/FT.	RELATIVE CONSISTENCY
0 - 4	Very loose	<2	Very soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium dense	4 - 8	Medium stiff
30 - 50	Dense	8 - 15	Stiff
Over 50	Very dense	15 - 30	Very stiff
		Over 30	Hard

WELL AND OTHER SYMBOLS

	Cement/Concrete		Asphalt or PVC Cap
	Bentonite Grout		Cobbles
	Bentonite Seal		Fill
	Slough		Ash
	Silica Sand		Bedrock
	2" I.D. PVC Screen (0.010-Inch Slot)		

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SOIL CLASSIFICATION AND LOG KEY

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FIG. A-1
Sheet 1 of 2

UNIFIED SOIL CLASSIFICATION SYSTEM (From ASTM D 2488-93 & 2487-93)					
MAJOR DIVISIONS			GROUP/GRAPHIC SYMBOL ^②		TYPICAL DESCRIPTION
Coarse-Grained Soils (more than 50% retained on No. 200 sieve) [Use Dual Symbols for 5 - 12% Fines (i.e. GP-GM)] ^①	Gravels (more than 50% of coarse fraction retained on No. 4 sieve)	Clean Gravels ^① (less than 5% fines)	GW		Well-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
			GP		Poorly Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
		Gravels with ^① Fines (more than 12% fines)	GM		Silty Gravels, Gravel-Sand-Silt Mixtures
			GC		Clayey Gravels, Gravel-Sand-Clay Mixtures
	Sands (50% or more of coarse fraction passes the No. 4 sieve)	Clean Sands ^① (less than 5% fines)	SW		Well-Graded Sands, Gravelly Sands, Little or No Fines
			SP		Poorly Graded Sand, Gravelly Sands, Little or No Fines
		Sands with ^① Fines (more than 12% fines)	SM		Silty Sands, Sand-Silt Mixtures
			SC		Clayey Sands, Sand-Clay Mixtures
Fine-Grained Soils (50% or more passes the No. 200 sieve)	Sils and Clays (liquid limit less than 50)	Inorganic	ML		Inorganic Silts of Low to Medium Plasticity, Rock Flour, or Clayey Silts with Slight Plasticity
			CL		Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
		Organic	OL		Organic Silts and Organic Silty Clays of Low Plasticity
	Sils and Clays (liquid limit 50 or more)	Inorganic	CH		Inorganic Clays of Medium to High Plasticity, Sandy Fat Clay, Gravelly Fat Clay
			MH		Inorganic Silts, Micaceous or Diatomaceous Fine Sands or Silty Soils, Elastic Silt
		Organic	OH		Organic Clays of Medium to High Plasticity, Organic Silts
Highly Organic Soils	Primarily organic matter, dark in color, and organic odor		PT		Peat, Humus, Swamp Soils with High Organic Content (See D 4427-92)

NOTES

- Dual symbols (symbols separated by a hyphen, i.e., SP-SM, slightly silty fine SAND) are used for soils with between 5% and 12% fines or when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart.
- Borderline symbols (symbols separated by a slash, i.e., CL/ML, silty CLAY/clayey SILT; GW/SW, sandy GRAVEL/gravelly SAND) indicated that the soil may fall into one of two possible basic groups.

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**SOIL CLASSIFICATION
AND LOG KEY**

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FIG. A-1
Sheet 2 of 2

ENVIRONMENTAL BOREHOLE LOG

Date Started 4/23/96	Location Building C	Depth Water First Encountered (Ft) 6.0
Date Completed 4/23/96	Drilling Company TEG	Drilling Method Strata-Probe
Total Depth (Ft) 12.0	Sampling Method Split-spoon	Hammer: Weight (lbs) Drop (in)
Borehole Diam. (In) 2	Ground Elev. (ft) NA	Monument Elev. (ft) PVC Elev. (ft)

Depth (Ft)	Sample Number	Interval	Blow Counts/8 In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
							0.5	Ground Surface Asphalt Surface.	ASPHAL			
	167801			75	1.3	0905		Gray to black, silty SAND; asphalt rubble and brick fragments; moist; (Fill).	SM			
6	167802			28	1.9	0914	4.0	Black, silty, sandy GRAVEL; rock and brick fragments; wet at 6 feet; (Fill).	GM			
	167803			50	2.5	0923		Sample 167806 of groundwater, screen at 6 to 8.5 feet.				
10	167804			50		0934		Wood fragments; slight oil/organic odor at 9 feet.				
	167805			50	2.6	0941						
							12.0	BOTTOM OF PROBE 12 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

- * USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | | | |
|--|----------------------------|--|---------------------------------|
| | 2" O.D. Split-Spoon Sample | | Water Level and Date Measured |
| | 3" O.D. Split-Spoon Sample | | Water Level at Time of Drilling |

Park 90/5
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LOG OF PROBE P-1

September 1996

T-1678-01

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GMM

Reviewed By

KAT

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FIG. A-2

ENVIRONMENTAL BOREHOLE LOG

Date Started 4/23/96	Location Building C	Depth Water First Encountered (Ft) 6.5
Date Completed 4/23/96	Drilling Company TEG	Drilling Method Strata-Probe
Total Depth (Ft) 15.0	Sampling Method Split-spoon	Hammer: Weight (lbs) Drop (In)
Borehole Diam. (In) 2	Ground Elev. (ft) NA	Monument Elev. (ft) NA
		PVC Elev. (ft)

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery (%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
							0.5	Ground Surface Asphalt surface.	ASPHAL			
	167807			100	2.4	1038	2.0	Gray, slightly sandy, gravelly SILT; brick and rock fragments; moist; (Fill).	ML			
							3.5	Black, silty sand and GRAVEL; asphalt rubble, slag; moist; (Fill).	GM			
	167808			33	1.7	1050	4.0	Gray, silty sand and GRAVEL; rock fragments; moist; (Fill).	GM SM			
							6.0	Black, silty SAND; rock fragments; moist; slight oil/petroleum odor; (Fill).	GM			
	167809			50	26.4	1101		Black, silty, sandy GRAVEL; slag; strong diesel odor; hydrocarbon sheen; wet; (Fill). Sample 167813 of groundwater, screen at 6.5 to 9 feet.	GM			
	167810			40	3.0	1116						
	167811			33	3.6	1125						
	167812			75	2.9	1139	13.5	Gray, sandy SILT; slight diesel odor; wet; (Fill).	ML			
							15.0	BOTTOM OF PROBE 15 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

- * USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | | | |
|--|----------------------------|--|---------------------------------|
| | 2" O.D. Split-Spoon Sample | | Water Level and Date Measured |
| | 3" O.D. Split-Spoon Sample | | Water Level at Time of Drilling |

Park 90/5
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LOG OF PROBE P-2

September 1996

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FIG. A-3

ENVIRONMENTAL BOREHOLE LOG

Date Started 4/23/96	Location Building B	Depth Water First Encountered (Ft) 7.0
Date Completed 4/23/96	Drilling Company TEG	Drilling Method Strata-Probe
Total Depth (Ft) 11.0	Sampling Method Split-spoon	Hammer: Weight (lbs) Drop (In)
Borehole Diam. (In) 2	Ground Elev. (ft) NA	Monument Elev. (ft) PVC Elev. (ft)

Depth (Ft)	Sample Number	Interval	Blow Counts/8 In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
							0.5	Ground Surface				
							0.5	Asphalt surface.	ASPHAL			
							1.5	Gray to black, silty, sandy GRAVEL; rock fragments; moist; (Fill).	GM			
	167814			100	2.0	1229	3.5	Brownish-gray, sandy SILT; iron-oxide staining at 3 feet; rock fragments; moist; (Fill).	ML			
	167815			50	1.3	1337		Gray, silty SAND and GRAVEL; moist; (Fill).	GM			
				15		1352						
				10		1402		Concrete rubble; rock fragments; wet at 7 feet. Sample 167816 of groundwater, screen at 7 to 9.5 feet.				
							11.0	BOTTOM OF PROBE 11 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

- USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | | | |
|--|----------------------------|--|---------------------------------|
| | 2" O.D. Split-Spoon Sample | | Water Level and Date Measured |
| | 3" O.D. Split-Spoon Sample | | Water Level at Time of Drilling |

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LOG OF PROBE P-3

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FIG. A-4

ENVIRONMENTAL BOREHOLE LOG

Date Started 4/23/96		Location Building E		Depth Water First Encountered (Ft) 9.0	
Date Completed 4/23/96		Drilling Company TEG		Drilling Method Strata-Probe	
Total Depth (Ft) 12.0		Sampling Method Split-spoon		Hammer: Weight (lbs) Drop (In)	
Borehole Diam. (In) 2		Ground Elev. (ft) NA		Monument Elev. (ft) 	
PVC Elev. (ft) 					

Depth (Ft)	Sample Number	Interval	Blow Count/8 In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
								Ground Surface				
							0.5	Asphalt surface.	ASPHAL			
							1.5	Brown, silty SAND; metal and brick fragments; wood pieces; moist; (Fill).	SM			
							2.3	Brownish-gray, sandy SILT; moist; (Fill).	ML			
							4.5	Wood chunk; moist; (Fill).	PT			
							5.0	Brown, slightly sandy SILT; rock and brick fragments; moist; (Fill).	ML			
							8.0	Gray, silty, sandy GRAVEL; rock fragments; moist; (Fill).	GM			
							8.3	Brownish-gray SILT; wood and brick fragments; moist; (Fill).	ML			
							12.0	Gray to black, silty SAND and GRAVEL; wet at 9 feet; slight solvent odor; (Fill). Sample 167821 of groundwater, screen at 9 to 10.5 feet. Pieces of slag at 11 feet.	GM			
								BOTTOM OF PROBE 12 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

- * USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | | | |
|--|----------------------------|--|---------------------------------|
| | 2" O.D. Split-Spoon Sample | | Water Level and Date Measured |
| | 3" O.D. Split-Spoon Sample | | Water Level at Time of Drilling |

Park 90/5
Supplemental Environmental Investigation
Seattle, Washington

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FIG. A-5

ENVIRONMENTAL BOREHOLE LOG

Date Started 4/23/96		Location Building D		Depth Water First Encountered (Ft)	
Date Completed 4/23/96		Drilling Company TEG		Drilling Method Strata-Probe	
Total Depth (Ft) 12.0		Sampling Method Split-spoon		Hammer: Weight (lbs) Drop (In)	
Borehole Diam. (In) 2		Ground Elev. (ft) NA		Monument Elev. (ft) PVC Elev. (ft)	

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
							0.5	Asphalt surface.	ASPHAL			
	167822			100	3.0	1600		Gray, silty SAND and GRAVEL; scattered wood and brick fragments; slight animal/organic odor; moist; (Fill).	SM/GM			
5	167823			100	2.4	1608	4.0	Dark gray SILT; occasional sand and gravel; rock and brick fragments; occasional layers of light gray sand; slight manure/animal odor; moist; (Fill).	ML			
	167824			80		1619	8.0	Black, silty SAND and GRAVEL; brick fragments, metal pieces; moist; animal odor; (Fill).	GM			
10				15		1631	11.0	Black, silty SAND; slight organic/animal odor; moist; (Fill).	SM			
							12.0	BOTTOM OF PROBE 12 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

- * USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | | | |
|-----|----------------------------|---|---------------------------------|
| II | 2" O.D. Split-Spoon Sample | ▽ | Water Level and Date Measured |
| III | 3" O.D. Split-Spoon Sample | ▽ | Water Level at Time of Drilling |

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FIG. A-6

ENVIRONMENTAL BOREHOLE LOG

Date Started 6/11/96		Location Building B		Depth Water First Encountered (Ft) 8.8	
Date Completed 6/11/96		Drilling Company TEG		Drilling Method Strata-Probe	
Total Depth (Ft) 11.0		Sampling Method Split-spoon		Hammer: Weight (lbs) NA Drop (In)	
Borehole Diam. (in) 2		Ground Elev. (ft) NA		Monument Elev. (ft) NA PVC Elev. (ft) NA	

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
							0.5	Asphalt. _____ Ground Surface _____	ASPHAL			
				100	7	0924		Gray, silty SAND and GRAVEL; moist; scattered brick fragments; slight organic odor; (Fill).	SM/GM			
							3.0	Gray, fine sandy SILT; moist; (Fill).	ML			
				100	20	0930	4.4	Gray, fine silty SAND, trace gravel; moist; (Fill).	SM			
							5.0	Dark gray SILT; moist; blocky.	ML			
	167825			67	25	0940						
								Wet at 8.8 feet. Sample 167825 of groundwater, screen at 9 to 12 feet.				
				90	15	0950	10.2	Black SAND; wet; with orange and white medium to coarse organic debris? or slag?; (Fill).	SP			
							11.0	BOTTOM OF PROBE 11 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

- * USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | | | |
|--|----------------------------|--|---------------------------------|
| | 2" O.D. Split-Spoon Sample | | Water Level and Date Measured |
| | 3" O.D. Split-Spoon Sample | | Water Level at Time of Drilling |

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FIG. A-7

ENVIRONMENTAL BOREHOLE LOG

Date Started 6/11/96	Location Building B	Depth Water First Encountered (Ft) 9.3
Date Completed 6/11/96	Drilling Company TEG	Drilling Method Strata-Probe
Total Depth (Ft) 11.0	Sampling Method Split-spoon	Hammer: Weight (lbs) NA Drop (in)
Borehole Diam. (in) 2	Ground Elev. (ft) NA	Monument Elev. (ft) NA
		PVC Elev. (ft) NA

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
							0.5	Asphalt. Ground Surface	ASPHAL			
				100	12	0925		Gray, slightly silty, gravelly SAND; moist; (Fill).	SP-SM			
5				100	11	0928						
				100	4	0935	6.0	Gray, slightly silty, fine to medium SAND, trace gravel; moist; (Fill).	SP-SM			
				40	30	0945	9.6	Sample 167827 of groundwater, screen at 9 to 12 feet. Wet at 9.3 feet.	SP			
10	167828						11.0	Black, sandy, organic debris; wood in shoe; (Charcoal?) (Fill). BOTTOM OF PROBE 11 FEET				
15												

Remarks: Refer to key for explanation of terminology and symbols.

- USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

I 2" O.D. Split-Spoon Sample	≡ Water Level and Date Measured
II 3" O.D. Split-Spoon Sample	≡ Water Level at Time of Drilling

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FIG. A-8

ENVIRONMENTAL BOREHOLE LOG

Date Started 6/11/96		Location Building B		Depth Water First Encountered (Ft) 7.0	
Date Completed 6/11/96		Drilling Company TEG		Drilling Method Strata-Probe	
Total Depth (Ft) 12.0		Sampling Method Split-spoon		Hammer: Weight (lbs) NA Drop (In) NA	
Borehole Diam. (In) 2		Ground Elev. (ft) NA		Monument Elev. (ft) NA PVC Elev. (ft) NA	

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
							0.5	Asphalt. Ground Surface	ASPHAL			
				100	60	1118		Gray, slightly silty, gravelly SAND; moist; slight hydrocarbon odor at 3 feet; (Fill).	SP-SM			
	167830			100	600	1122	3.5	Gray, slightly fine sandy SILT; moist; possible hydrocarbon odor; (Fill).	ML			
				100	400	1136		Sample 167829 of groundwater, screen at 6 to 9 feet. Slickensides and wet at 7 feet.				
				93	200	1142	10.5	Black SAND and GRAVEL; wet; with sea barnacles and other organics; wood.	SP/GP			
							12.0	BOTTOM OF PROBE 12 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

* USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | | | |
|--|----------------------------|--|---------------------------------|
| | 2" O.D. Split-Spoon Sample | | Water Level and Date Measured |
| | 3" O.D. Split-Spoon Sample | | Water Level at Time of Drilling |

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Seattle, Washington

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FIG. A-9

ENVIRONMENTAL BOREHOLE LOG

Date Started 6/11/96	Location Building B	Depth Water First Encountered (Ft) 9.5
Date Completed 6/11/96	Drilling Company TEG	Drilling Method Strata-Probe
Total Depth (Ft) 12.0	Sampling Method Split-spoon	Hammer: Weight (lbs) NA Drop (In)
Borehole Diam. (In) 2	Ground Elev. (ft) NA	Monument Elev. (ft) NA PVC Elev. (ft) NA

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
							0.5	Asphalt. _____ Ground Surface _____	ASPHAL			
				67	6	1215		Gray, silty, gravelly SAND; moist; scattered wood and asphalt and concrete debris (Fill).	SM			
							3.5	0.5 feet of black and tan ash and charcoal at 3 feet.	GP			
5				77	3	1218	4.0	Gray, sandy fine to medium GRAVEL; moist; (Fill).	ML			
							6.0	Gray and brown, fine sandy SILT; moist; (Fill).				
				50	2	1225		Brown, slightly silty, sandy GRAVEL; wet; (Fill).	GP-GM			
10	167832							Sample 167831 of groundwater, screen at 9 to 12 feet.				
				53	12	1230	10.5	Black SAND and GRAVEL; wet, with sea floor organics.	SP/GP			
							12.0	BOTTOM OF PROBE 12 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

- * USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | | | |
|--|----------------------------|--|---------------------------------|
| | 2" O.D. Split-Spoon Sample | | Water Level and Date Measured |
| | 3" O.D. Split-Spoon Sample | | Water Level at Time of Drilling |

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FIG. A-10

SHANNON & WILSON, INC.

APPENDIX B
LABORATORY REPORT

T-1678-01

QA/QC FOR ANALYTICAL METHODS

GENERAL

The TEG Northwest Laboratory quality assurance and quality control (QA/QC) procedures are conducted following the guidelines and objectives which meet or exceed certification/-accreditation requirements of California DOHS, Washington DOE, and Oregon DEQ. The Quality Control Program is a consistent set of procedures which assures data quality through the use of appropriate blanks, replicate analyses, surrogate spikes, and matrix spikes, and with the use of reference standards that meet or exceed EPA standards.

When analyses are taking place on-site with the mobile lab, the need for Field Blanks or Travel/Trip Blanks is eliminated. If there is going to be a delay before sample preparation for analysis, the sample is stored at 4° C.

ANALYTICAL METHODS

TEG Northwest Labs use analytical methodologies which are in conformity with U. S. Environmental Protection Agency (EPA), Washington DOE, and Oregon DEQ methodologies. When necessary and appropriate due to the nature or composition of the sample, TEG may use variations of the methods which are consistent with recognized standards or variations used by the industry and government laboratories.

TPH-Gasoline, TPH-Diesel (Gasoline and/or Diesel, Modified EPA 8015, WTPH-G and WTPH-D)

A blank and a calibration standard are run at the beginning of the day. The standard must be within 15% of the continuing calibration curve value. The standard is rerun at the end of the day. All samples are prepared with a surrogate spike, and the recovery must be between 65% and 135%. A duplicate sample is run at a rate of 1 per 10 samples (or a matrix spike sample is prepared and analyzed). At least 1 method blank is run per 10 samples analyzed.

PARK 90/5 PROJECT
 Seattle, Washington
 Shannon and Wilson, Inc.
 Project No. T-1678-01

Diesel and Oil in Soil by WTPH-D/D-Extended

Sample Number	Date	Recovery %	Diesel mg/kg	Heavy Oil mg/kg
Meth. Blank	06/11/96	95	nd	nd
167826	06/11/96	118	nd	nd
167828	06/11/96	97	nd	nd
167830	06/11/96	102	37	42
MDL			20	40

"nd" Indicates not detected at the listed detection limit.

"int" Indicates that interference peaks prevent determination.

PARK 90/5 PROJECT
 Seattle, Washington
 Shannon and Wilson, Inc.
 Project No. T-1678-01

Diesel and Oil in Water by WTPH-D/D-Extended

Sample Number	Date	Recovery %	Diesel ug/l	Heavy Oil ug/l
Meth. Blank	06/11/96	105	nd	nd
167825	06/11/96	99	nd	nd
167827	06/11/96	97	nd	nd
167829	06/11/96	102	nd	nd
167829 Dup	06/11/96	97	nd	nd
MDL			200	400

"nd" Indicates not detected at the listed detection Limit.

"int" Indicates that interference peaks prevent determination.

PARK 90/5 PROJECT
 Seattle, Washington
 Shannon and Wilson, Inc.
 Project No. T-1678-01

Diesel and Oil in Soil by WTPH-D/D-Extended

Sample Number	Date	Recovery %	Diesel mg/kg	Heavy Oil mg/kg
Meth. Blank	06/12/96	92	nd	nd
167832	06/12/96	92	nd	nd
167833	06/12/96	91	nd	nd
167833 Dup	06/12/96	89	nd	nd
MDL			20	40

"nd" Indicates not detected at the listed detection limit.

"int" Indicates that interference peaks prevent determination.

PARK 90/5 PROJECT
 Seattle, Washington
 Shannon and Wilson, Inc.
 Project No. T-1678-01

Diesel and Oil in Water by WTPH-D/D-Extended

Sample Number	Date	Recovery %	Diesel ug/l	Heavy Oil ug/l
Meth. Blank	06/12/96	97	nd	nd
167831	06/12/96	92	nd	nd
167831 Dup	06/12/96	90	nd	nd
MDL			200	400

"nd" Indicates not detected at the listed detection Limit.

"int" Indicates that interference peaks prevent determination.

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167826
Lab ID:	57273-01
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/20/96
Dilution Factor	10
% Solids	77.57

ICP-MS Metals by USEPA Method 200.8

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	Flags
Arsenic	5.2	1.3	
Cadmium	ND	1.3	
Lead	5.8	1.3	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167826
Lab ID:	57273-01
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/20/96
Dilution Factor	1
% Solids	77.57

ICP Metals by USEPA Method 6010

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	Flags
Barium	100	0.63	
Chromium	44	1.3	
Selenium	ND	19	
Silver	ND	1.3	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167826
Lab ID:	57273-01
Date Received:	6/11/96
Date Prepared:	6/20/96
Date Analyzed:	6/20/96
Dilution Factor	1
% Solids	77.57

Mercury by CVAA - USEPA Method 245.5

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	MDL	Flags
Mercury	0.23	0.11	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167828
Lab ID:	57273-02
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/20/96
Dilution Factor	10
% Solids	81.22

ICP-MS Metals by USEPA Method 200.8

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	Flags
Arsenic	2.5	1.2	
Cadmium	ND	1.2	
Lead	8.4	1.2	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167828
Lab ID:	57273-02
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/20/96
Dilution Factor	1
% Solids	81.22

ICP Metals by USEPA Method 6010

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	Flags
Barium	94	0.61	
Chromium	27	1.2	
Selenium	ND	18	
Silver	ND	1.2	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167828
Lab ID:	57273-02
Date Received:	6/11/96
Date Prepared:	6/20/96
Date Analyzed:	6/20/96
Dilution Factor	1
% Solids	81.22

Mercury by CVAA - USEPA Method 245.5

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	MDL	Flags
Mercury	0.18	0.095	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167832
Lab ID:	57273-03
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/20/96
Dilution Factor	10
% Solids	86.54

ICP-MS Metals by USEPA Method 200.8

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	Flags
Arsenic	1.6	1.1	
Cadmium	ND	1.1	
Lead	57	1.1	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167832
Lab ID:	57273-03
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/20/96
Dilution Factor	1
% Solids	86.54

ICP Metals by USEPA Method 6010

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	Flags
Barium	110	0.56	
Chromium	8.4	1.1	
Selenium	ND	17	
Silver	ND	1.1	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167832
Lab ID:	57273-03
Date Received:	6/11/96
Date Prepared:	6/20/96
Date Analyzed:	6/20/96
Dilution Factor	1
% Solids	86.54

Mercury by CVAA - USEPA Method 245.5

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	MDL	Flags
Mercury	ND	0.1	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167825
Lab ID:	57273-04
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/20/96
Dilution Factor	1

ICP-MS Metals by USEPA Method 200.8

Analyte	Result (ug/L)	PQL	Flags
Arsenic	12	1	
Cadmium	ND	1	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167825
Lab ID:	57273-04
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/18/96
Dilution Factor	1

ICP Metals by USEPA Method 6010

Analyte	Result (ug/L)	PQL	Flags
Barium	940	5	
Chromium	20	10	
Lead	160	50	
Selenium	ND	150	
Silver	ND	10	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167825
Lab ID:	57273-04
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/18/96
Dilution Factor	1

Mercury by CVAA - USEPA Method 245.1

Analyte	Result (ug/L)	MDL	Flags
Mercury	ND	0.4	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167827
Lab ID:	57273-05
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/20/96
Dilution Factor	1

ICP-MS Metals by USEPA Method 200.8

Analyte	Result (ug/L)	PQL	Flags
Arsenic	11	1	
Cadmium	3	1	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167827
Lab ID:	57273-05
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/18/96
Dilution Factor	1

ICP Metals by USEPA Method 6010

Analyte	Result (ug/L)	PQL	Flags
Barium	3200	5	
Chromium	40	10	
Lead	6100	50	
Selenium	ND	150	
Silver	ND	10	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167827
Lab ID:	57273-05
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/18/96
Dilution Factor	1

Mercury by CVAA - USEPA Method 245.1

Analyte	Result (ug/L)	MDL	Flags
Mercury	2.8	0.4	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167829
Lab ID:	57273-06
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/20/96
Dilution Factor	1

ICP-MS Metals by USEPA Method 200.8

Analyte	Result (ug/L)	PQL	Flags
Arsenic	51	1	
Cadmium	4	1	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167829
Lab ID:	57273-06
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/18/96
Dilution Factor	1

ICP Metals by USEPA Method 6010

Analyte	Result (ug/L)	PQL	Flags
Barium	5600	5	
Chromium	50	10	
Lead	1100	50	
Selenium	ND	150	
Silver	ND	10	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167829
Lab ID:	57273-06
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/18/96
Dilution Factor	1

Mercury by CVAA - USEPA Method 245.1

Analyte	Result (ug/L)	MDL	Flags
Mercury	1.5	0.4	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167831
Lab ID:	57273-07
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/20/96
Dilution Factor	1

ICP-MS Metals by USEPA Method 200.8

Analyte	Result (ug/L)	PQL	Flags
Arsenic	ND	1	
Cadmium	ND	1	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167831
Lab ID:	57273-07
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/18/96
Dilution Factor	1

ICP Metals by USEPA Method 6010

Analyte	Result (ug/L)	PQL	Flags
Barium	360	5	
Chromium	ND	10	
Lead	ND	50	
Selenium	ND	150	
Silver	ND	10	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167831
Lab ID:	57273-07
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/18/96
Dilution Factor	1

Mercury by CVAA - USEPA Method 245.1

Analyte	Result (ug/L)	MDL	Flags
Mercury	ND	0.4	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167830
Lab ID:	57273-08
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/20/96
Dilution Factor	10
% Solids	74.11

ICP-MS Metals by USEPA Method 200.8

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	Flags
Arsenic	6.7	1.2	
Cadmium	ND	1.2	
Lead	10	1.2	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167830
Lab ID:	57273-08
Date Received:	6/11/96
Date Prepared:	6/18/96
Date Analyzed:	6/20/96
Dilution Factor	1
% Solids	74.11

ICP Metals by USEPA Method 6010

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	Flags
Barium	140	0.62	
Chromium	38	1.2	
Selenium	ND	19	
Silver	ND	1.2	

SOUND ANALYTICAL SERVICES, INC.

Client Name	TEG Northwest, Inc.
Client ID:	167830
Lab ID:	57273-08
Date Received:	6/11/96
Date Prepared:	6/20/96
Date Analyzed:	6/20/96
Dilution Factor	1
% Solids	74.11

Mercury by CVAA - USEPA Method 245.5

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	MDL	Flags
Mercury	0.2	0.12	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:
Date Received:
Date Prepared:
Date Analyzed:
Dilution Factor

Method Blank - T012

-
6/18/96
6/20/96
1

ICP-MS Metals by USEPA Method 200.8

Analyte	Result (ug/L)	PQL	Flags
Arsenic	ND	1	
Cadmium	ND	1	

SOUND ANALYTICAL SERVICES, INC.

Duplicate Report

Client Sample ID: 167831
Lab ID: 57273-07
Date Prepared: 6/18/96
Date Analyzed: 6/20/96
QC Batch ID: T012

ICP-MS Metals by USEPA Method 200.8

Parameter Name	Sample Result (ug/L)	Duplicate Result (ug/L)	RPD %	Flag
Arsenic	0	0	0.0	
Cadmium	0	0	0.0	

SOUND ANALYTICAL SERVICES, INC.

Matrix Spike Report

Client Sample ID: 167831
Lab ID: 57273-07
Date Prepared: 6/18/96
Date Analyzed: 6/20/96
QC Batch ID: T012

ICP-MS Metals by USEPA Method 200.8

Parameter Name	Sample Result (ug/L)	Spike Amount (ug/L)	MS Result (ug/L)	MS % Rec.	Flag
Arsenic	0	4000	4200	105	
Cadmium	0	100	110	110	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:
Date Received:
Date Prepared:
Date Analyzed:
Dilution Factor

Method Blank - T012

-
6/18/96
6/18/96
1

ICP Metals by USEPA Method 6010

Analyte	Result (ug/L)	PQL	Flags
Barium	ND	5	
Chromium	ND	10	
Lead	ND	50	
Selenium	ND	150	
Silver	ND	10	

SOUND ANALYTICAL SERVICES, INC.

Duplicate Report

Client Sample ID: 167831
Lab ID: 57273-07
Date Prepared: 6/18/96
Date Analyzed: 6/18/96
QC Batch ID: T012

ICP Metals by USEPA Method 6010

Parameter Name	Sample Result (ug/L)	Duplicate Result (ug/L)	RPD %	Flag
Barium	360	360	0.0	
Chromium	0	0	0.0	
Lead	0	0	0.0	
Selenium	0	0	0.0	
Silver	0	0	0.0	

SOUND ANALYTICAL SERVICES, INC.

Matrix Spike Report

Client Sample ID: 167831
Lab ID: 57273-07
Date Prepared: 6/18/96
Date Analyzed: 6/18/96
QC Batch ID: T012

ICP Metals by USEPA Method 6010

Parameter Name	Sample Result (ug/L)	Spike Amount (ug/L)	MS Result (ug/L)	MS % Rec.	Flag
Barium	360	4000	4300	99	
Chromium	0	400	380	95	
Lead	0	1000	860	86	
Selenium	0	4000	3800	95	
Silver	0	100	60	60	X7

SOUND ANALYTICAL SERVICES, INC.

Blank Spike Report

Lab ID: T012
Date Prepared: 6/18/96
Date Analyzed: 6/18/96
QC Batch ID: T012

ICP Metals by USEPA Method 6010

Parameter Name	Blank Result (ug/L)	Spike Amount (ug/L)	BS Result (ug/L)	BS % Rec.	Flag
Silver	0	100	90	90	

SOUND ANALYTICAL SERVICES, INC.

ANALYTICAL & ENVIRONMENTAL CHEMISTS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

QUALITY CONTROL REPORT

Metals

Client: TEG Northwest, Inc.
Lab No: 57273q1
Units: mg/kg

QC Batch No. S013
Date Analyzed: 6-20-96

METHOD BLANK

Parameter	Result	PQL
Arsenic	ND	20
Barium	ND	0.50
Cadmium	ND	5.0
Chromium	ND	1.0
Lead	ND	5.0
Selenium	ND	20
Silver	ND	1.0

ND - Not Detected
PQL - Practical Quantitation Limit

SOUND ANALYTICAL SERVICES, INC.

QUALITY CONTROL REPORT

Metals

Client: TEG Northwest, Inc.
Lab No: 57273q1
Units: mg/kg

QC Batch No. S013
Date Analyzed: 6-20-96

BLANK SPIKE

Parameter	BS Result	BS Amount	%R
Arsenic	0.50	0.50	100
Cadmium	0.50	0.50	100
Lead	0.50	0.50	100

%R = Percent Recovery

BS = Blank Spike

SOUND ANALYTICAL SERVICES, INC.

QUALITY CONTROL REPORT

Metals

Client: TEG Northwest, Inc.
Lab No: 57273q1
Units: mg/kg

QC Batch No. M013
Date Analyzed: 6-20-96

METHOD BLANK

Parameter	Result	PQL
Arsenic	ND	0.10
Cadmium	ND	0.50
Lead	ND	0.50

ND - Not Detected

PQL - Practical Quantitation Limit

SOUND ANALYTICAL SERVICES, INC.

QUALITY CONTROL REPORT

Metals

Client: TEG Northwest, Inc.
Lab No: 57273q1
Units: mg/kg

QC Batch No. S013
Date Analyzed: 6-20-96

DUPLICATE

Parameter	Sample Result	Duplicate Result	RPD	Flag
Arsenic	ND	ND	NC	
Barium	8.5	6.4	28	
Cadmium	ND	ND	NC	
Chromium	10	6.3	45	X4a
Lead	ND	ND	NC	
Selenium	ND	ND	NC	
Silver	ND	ND	NC	

NC = Not Calculated

RPD = Relative Percent Difference

SOUND ANALYTICAL SERVICES, INC.

QUALITY CONTROL REPORT

Metals

Client: TEG Northwest, Inc.
Lab No: 57273q1
Units: mg/kg

QC Batch No. S013
Date Analyzed: 6-20-96

MATRIX SPIKE

Parameter	Sample Result	MS Result	MS Amount	%R	Flag
Arsenic	ND	370	390	95	
Barium	8.5	380	390	95	
Cadmium	ND	9.6	9.8	98	
Chromium	10	45	39	90	
Lead	ND	98	98	100	
Selenium	ND	360	390	92	
Silver	ND	8.7	9.8	89	

MS = Matrix Spike

%R = Percent Recovery

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - T128A
Date Received:	-
Date Prepared:	6/18/96
Date Analyzed:	6/18/96
Dilution Factor	1

Mercury by CVAA - USEPA Method 245.1

Analyte	Result (ug/L)	MDL	Flags
Mercury	ND	0.2	

SOUND ANALYTICAL SERVICES, INC.

Duplicate Report

Client Sample ID: 167825
Lab ID: 57273-04
Date Prepared: 6/18/96
Date Analyzed: 6/18/96
QC Batch ID: T128A

Mercury by CVAA - USEPA Method 245.1

Parameter Name	Sample Result (ug/L)	Duplicate Result (ug/L)	RPD %	Flag
Mercury	0	0	0.0	

SOUND ANALYTICAL SERVICES, INC.

Matrix Spike Report

Client Sample ID: 167825
Lab ID: 57273-04
Date Prepared: 6/18/96
Date Analyzed: 6/18/96
QC Batch ID: T128A

Mercury by CVAA - USEPA Method 245.1

Parameter Name	Sample Result (ug/L)	Spike Amount (ug/L)	MS Result (ug/L)	MS % Rec.	Flag
Mercury	0	4	4.1	102	

SOUND ANALYTICAL SERVICES, INC.

ANALYTICAL & ENVIRONMENTAL CHEMISTS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

QUALITY CONTROL REPORT

Mercury

Client: TEG Northwest, Inc.
Lab No: 57273q2
Units: mg/kg

QC Batch No. S135
Date Analyzed: 6-20-96

METHOD BLANK

Parameter	Result	PQL
Mercury	ND	0.10

ND - Not Detected

PQL - Practical Quantitation Limit

DUPLICATE

Parameter	Sample Result	Duplicate Result	RPD	Flag
Mercury	0.22	0.40	58	X4

NC = Not Calculated

RPD = Relative Percent Difference

MATRIX SPIKE

Parameter	Sample Result	MS Result	MS Amount	%R	Flag
Mercury	0.22	1.3	1.0	108	

MS = Matrix Spike

%R = Percent Recovery

SOUND ANALYTICAL SERVICES, INC.

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 • TELEPHONE 206-922-2310 • FAX 206-922-5047

DATA QUALIFIERS AND ABBREVIATIONS

- B1: This analyte was detected in the associated method blank. The analyte concentration was determined not to be significantly higher than the associated method blank (less than ten times the concentration reported in the blank).
- 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 ten times the concentration reported in the blank).
- C: Additional confirmation performed.
- D: The reported result for this analyte is calculated based on a secondary dilution factor.
- E: The concentration of this analyte exceeded the instrument calibration range.
- J: The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.
- MCL: Maximum Contaminant Level
- MDL: Method Detection Limit
- N: See analytical narrative.
- ND: Not Detected
- PQL: Practical Quantitation Limit
- X1: Contaminant does not appear to be "typical" product. Elution pattern suggests it may be _____.
- X2: Contaminant does not appear to be "typical" product. Further testing is suggested for identification.
- X3: Identification and quantification of peaks was complicated by matrix interference; GC/MS confirmation is recommended.
- X4: RPD for duplicates outside advisory QC limits. Sample was re-analyzed with similar results.
- X4a: RPD for duplicates outside advisory QC limits due to analyte concentration near the method practical quantitation limit/detection limit.
- X5: Matrix spike was diluted out during analysis.
- X6: Recovery of matrix spike was outside advisory QC limits. Sample was re-analyzed with similar results.
- X7: Recovery of matrix spike outside advisory QC limits. Matrix interference is indicated by blank spike recovery data.
- X7a: Recovery and/or RPD values for MS/MSD outside advisory QC limits due to high contaminant levels.
- X8: Surrogate was diluted out during analysis.
- X9: Surrogate recovery outside advisory QC limits due to matrix composition.

CHAIN-OF-CUSTODY RECORD

[illegible]



**OnSite
Environmental Inc.**

Analytical Testing and Mobile Laboratory Services

July 16, 1996

Kathy Troost
Shannon & Wilson, Inc.
400 N 34th Street, Suite 100
Seattle, WA 98103

Re: Analytical Data for Project T-1678-01
Laboratory Reference No. 9607-023

Dear Kathy:

Enclosed are the results of the analyses, and associated quality control data, of samples submitted on July 5, 1996.

The standard policy of OnSite Environmental Inc., is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Chemist

Enclosures

Date of Report: July 16, 1996
Samples Submitted: July 5, 1996
Lab Traveler: 07-023
Project: T-1678-01

**DISSOLVED METALS
EPA 6010/7000 SERIES**

Date Extracted: 07-05-96
Date Analyzed: 07-05-09-96

Matrix: Water
Units: ug/L (ppb)

Lab ID: 07-023-1
Client ID: 167834

Analyte	Method	Dilution Factor	Result	PQL
Arsenic	7060	1.0	ND	3.5
Barium	6010	1.0	150	10
Cadmium	6010	1.0	ND	5.0
Chromium	6010	1.0	ND	10
Lead	7421	1.0	ND	2.0
Mercury	7470	1.0	ND	0.50
Selenium	7740	1.0	ND	6.3
Silver	6010	1.0	ND	10

Date of Report: July 16, 1996
Samples Submitted: July 5, 1996
Lab Traveler: 07-023
Project: T-1678-01

**DISSOLVED METALS
EPA 6010/7000 SERIES
METHOD BLANK QUALITY CONTROL**

Date Extracted: 07-05-96
Date Analyzed: 07-05-09-96

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0705W1

Analyte	Method	Dilution Factor	Result	PQL
Arsenic	7060	1.0	ND	3.5
Barium	6010	1.0	ND	10
Cadmium	6010	1.0	ND	5.0
Chromium	6010	1.0	ND	10
Lead	7421	1.0	ND	2.0
Mercury	7470	1.0	ND	0.50
Selenium	7740	1.0	ND	6.3
Silver	6010	1.0	ND	10

Date of Report: July 16, 1996
Samples Submitted: July 5, 1996
Lab Traveler: 07-023
Project: T-1678-01

**DISSOLVED METALS
EPA 6010/7000 SERIES
DUPLICATE QUALITY CONTROL**

Date Extracted: 06-27&30-96
Date Analyzed: 06-27-30& 7-01-96

Matrix: Water
Units: ug/L (ppb)

Lab ID: 06-116-1

Analyte	Method	Dilution Factor	Sample Result	Duplicate Result	RPD	Flags	PQL
Arsenic	7060	1.0	ND	ND	NA		3.5
Barium	6010	1.0	10.6	ND	NA		10
Cadmium	6010	1.0	ND	ND	NA		5.0
Chromium	6010	1.0	ND	ND	NA		10
Lead	7421	1.0	ND	ND	NA		2.0
Mercury	7470	1.0	ND	ND	NA		0.50
Selenium	7740	1.0	ND	ND	NA		6.5
Silver	6010	1.0	ND	ND	NA		10

Date of Report: July 16, 1996
Samples Submitted: July 5, 1996
Lab Traveler: 07-023
Project: T-1678-01

**DISSOLVED METALS
EPA 6010/7000 SERIES
MS/MSD QUALITY CONTROL**

Date Extracted: 06-27&30-96
Date Analyzed: 06-27-30& 7-01-96

Matrix: Water
Units: ug/L (ppb)

Lab ID: 06-116-1

Analyte	Spike Level	MS	% Rec	MSD	% Rec	RPD	Flags
Arsenic	50	50.3	101	56.0	112	11	
Barium	2000	2090	104	2100	104	0.5	
Cadmium	1000	1030	103	1020	102	0.7	
Chromium	2000	2040	102	2040	102	0.2	
Lead	25	22.3	89	22.5	90	1.0	
Mercury	5.0	4.63	93	5.25	105	13	
Selenium	50	48.5	97	48.4	97	0.2	
Silver	1000	936	94	977	98	4.3	

Date of Report: July 16, 1996
Samples Submitted: July 5, 1996
Lab Traveler: 07-023
Project: T-1678-01

WTPH-D

Date Extracted: 7-05-96
Date Analyzed: 7-05-96

Matrix: Water
Units: mg/L (ppm)

Client ID	Lab ID	Dilution Factor	TPH-Diesel C12-C24	TPH-Oil C24-C34	Surrogate Recovery*	Flags	Diesel MRL	Oil MRL
167834	07-023-1	0.02	ND	ND	99%		0.50	1.0
167835	07-023-2	0.02	ND	ND	99%		0.50	1.0
167836	07-023-3	0.02	ND	ND	94%		0.50	1.0

* o-Terphenyl

Date of Report: July 16, 1996
Samples Submitted: July 5, 1996
Lab Traveler: 07-023
Project: T-1678-01

WTPH-D
METHOD BLANK QUALITY CONTROL

Date Extracted: 7-05-96
Date Analyzed: 7-05-96

Matrix: Water
Units: mg/L (ppm)

Lab ID: MB0705W1

	Dilution Factor	Total Petroleum Hydrocarbons	Surrogate Recovery*	Flags	MRL
Method Blank	0.02	ND	110%		0.50

* o-Terphenyl

Date of Report: July 16, 1996
Samples Submitted: July 5, 1996
Lab Traveler: 07-023
Project: T-1678-01

WTPH-D
DUPLICATE QUALITY CONTROL

Date Extracted: 6-24-96
Date Analyzed: 6-24-96

Matrix: Water
Units: mg/L (ppm)

Lab ID: 06-116-1

	Dilution Factor	Total Petroleum Hydrocarbons	Surrogate Recovery*	Flags	MRL
Sample	0.02	ND	99%		0.50
Duplicate	0.02	ND	89%		0.50
RPD		NA			

* o-Terphenyl

Date of Report: July 16, 1996
Samples Submitted: July 5, 1996
Lab Traveler: 07-023
Project: T-1678-01

WTPH-D
SB/SBD QUALITY CONTROL

Date Extracted: 6-24-96
Date Analyzed: 6-24-96

Matrix: Water
Units: mg/L (ppm)

Lab ID: SB0624W1

	Dilution Factor	Total Petroleum Hydrocarbons	Percent Recovery	Surrogate Recovery*	Flags	MRL
Spike @ 2 ppm	0.02	1.93	96%	132%		0.50
Spike Duplicate	0.02	1.81	90%	123%		0.50
RPD		6.5%				

* o-Terphenyl

SHANNON & WILSON, INC.

Geotechnical and Environmental Consultants

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

1500 Olive Blvd., Suite 276
St. Louis, MO 63141
(314) 872-8170

2055 Mill Road
Fairbanks, AK 99709
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

1354 N. Grandridge Blvd.
Kennewick, WA 99336
(509) 735-1280

2412 N. 30th St., Suite 201
Tacoma, WA 98407
(206) 759-0156

CHAIN OF CUSTODY RECORD

Page 1 of 1
Laboratory Grants
Attn: David B

07 - 023

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	Disalred metals	Rect. B	WTPH-D/Ext.	Dual Quant.	Total Number of Containers	Remarks/Matrix
1678 34	1	1037	070596	✓	✓	✓	✓			250ml	1L gw
1678 35	2	1157	↓	✓		✓	✓			1L	↓
1678 36	3	1241	↓	✓		✓	✓			1L	↓

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>T-1678-01</u>		Total Number of Containers		Signature: <u>[Signature]</u> Time: <u>1420</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: <u>Duck 90/5</u>		COC Seats/Intact? Y/N/NA		Printed Name: <u>Gretchen M. Miller</u> Date: <u>070596</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: <u>Kathy Troost</u>		Received Good Cond./Cold		Company: <u>S + W</u>		Company: _____		Company: _____	
Ongoing Project? Yes ☒ No ☐		Delivery Method:		Received By: 1. Signature: <u>[Signature]</u> Time: <u>1420</u>		Received By: 2. Signature: _____ Time: _____		Received By: 3. Signature: _____ Time: _____	
Sampler: <u>G Miller</u>		(attach shipping bill, if any)		Printed Name: <u>Teresa Hanson</u> Date: <u>7/5/96</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Instructions				Company: <u>[Signature]</u>		Company: _____		Company: _____	
Requested Turn Around Time: <u>RUSH - Monday AM</u>				Special Instructions: <u>Filter + Preserve metals sample</u>		Distribution: <u>White - w/shipment - returned to Shannon & Wilson w/ Laboratory report</u>		Yellow - w/shipment - for consignee files	
Pink - Shannon & Wilson - Job File									

APPENDIX C

IMPORTANT INFORMATION ABOUT YOUR ENVIRONMENTAL REPORT



Dated: September 17, 1996

To: Mr. Dell Jackson
Dell Jackson & Associates, Inc.

Important Information About Your Geotechnical/Environmental Report

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

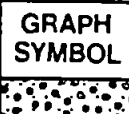
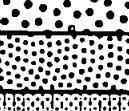
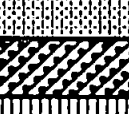
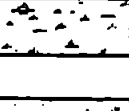
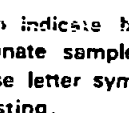
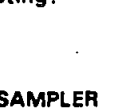
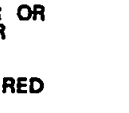
To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland

APPENDIX D
BORING, TEST PIT AND WELL LOGS

MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTION
Coarse Grained Soils	Gravel And Gravelly Soils	Clean Gravels (little or no fines)		GW / gw	Well-Graded Gravels, Gravel-Sand Mixtures, Little Or No Fines
				GP / gp	Poorly-Graded Gravels, Gravel-Sand Mixtures, Little Or No Fines
	More Than 50% Coarse Fraction Retained On No. 4 Sieve	Gravels With Fines (appreciable amount of fines)		GM / gm	Silty Gravels, Gravel-Sand-Silt Mixtures
				GC / gc	Clayey Gravels, Gravel-Sand-Clay Mixtures
	Sand And Sandy Soils	Clean Sand (little or no fines)		SW / sw	Well-Graded Sands, Gravelly Sands, Little Or No Fines
				SP / sp	Poorly-Graded Sands, Gravelly Sands, Little Or No Fines
More Than 50% Material Larger Than No. 200 Sieve Size	More Than 50% Coarse Fraction Passing No. 4 Sieve	Sands With Fines (appreciable amount of fines)		SM / sm	Silty Sands, Sand-Silt Mixtures
				SC / sc	Clayey Sands, Sand-Clay Mixtures
Fine Grained Soils	Silts And Clays	Liquid Limit Less Than 50		ML / ml	Inorganic Silts & Very Fine Sands, Rock Flour, Silty-Clayey Fine Sands; Clayey Silts w/ Slight Plasticity
				CL / cl	Inorganic Clays Of Low To Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean
				OL / ol	Organic Silts And Organic Silty Clays Of Low Plasticity
	Silts And Clays	Liquid Limit Greater Than 50		MH / mh	Inorganic Silts, Micaceous Or Diatomaceous Fine Sand Or Silty Soils
				CH / ch	Inorganic Clays Of High Plasticity, Fat Clays
				OH / oh	Organic Clays Of Medium To High Plasticity, Organic Silts
Highly Organic Soils				PT / pt	Peat, Humus, Swamp Soils With High Organic Contents
Topsoil				Humus And Duff Layer	
Fill				Highly Variable Constituents	

The Discussion In The Text Of This Report Is Necessary For A Proper Understanding Of The Nature Of The Material Presented In The Attached Logs

Notes:

Dual symbols are used to indicate borderline soil classification. Upper case letter symbols designate sample classifications based upon laboratory testing; lower case letter symbols designate classifications not verified by laboratory testing.

- I 2" O.D. SPLIT SPOON SAMPLER
- II 2.4" I.D. RING SAMPLER OR SHELBY TUBE SAMPLER
- P SAMPLER PUSHED
- * SAMPLE NOT RECOVERED
- Σ WATER LEVEL (DATE)
- | WATER OBSERVATION WELL

- C TORVANE READING, tsf
- qu PENETROMETER READING, tsf
- W MOISTURE, percent of dry weight
- pcf DRY DENSITY, pounds per cubic ft.
- LL LIQUID LIMIT, percent
- PI PLASTIC INDEX



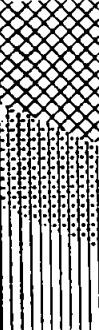
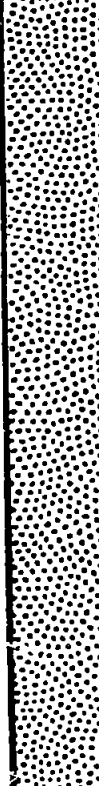
LEGEND

BORING NO. 1

Logged By SB

Date 10-3-84

ELEV. 5.5⁺

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
	sm	brown-black silty SAND with trace gravel, medium coarse, moist, dense, (fill)	10/5/84	I	62	27.2	
		becomes light brown, wet, loose to very loose	10/31/84	I	4	46.9	
		becomes interbedded with gray silt with trace clay		I	1		
			10	I	2	81.2	
				I	5		
			15	I			
				I	18		
			20	I			
				I	14		
			25	I			
	SP	black SAND, fine, medium dense		I	4		
		interbedded with silt lenses, loose	30	I			
		becomes medium dense		I	23		
			35	I			
		becomes finer with isolated wood fragments		I	13		
			40	I			
				I	30		
			45	I			
				I	30		
			50	I			
			55	I	13		
				I	10		

Earth Consultants Inc.
GEOTECHNICAL ENGINEERING & GEOLOGY



BORING LOG

BAR-S PROPERTY
SEATTLE, WASHINGTON

Proj. No. 2453

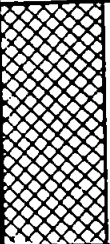
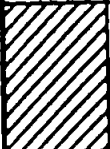
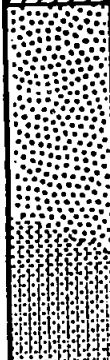
Date Nov. '84

Plate 4

BORING NO. 2

Logged By SB
Date 10-5-84

ELEV. 6.6⁺

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
	SP- SM	SAND, gravel, and wood fragments, moist, loose (fill) possible cobbles	5	I	15	39.3	$q_u < 0.25 \text{ tsf}$ LL=45 PL=24 PI=21
			10/5/84	I	13	41.6	
				I	18	66.7	
			10	I	100+		
	cl	silty CLAY, very soft, trace fine sand	15	I			
			20	II	2	46.6	
	sp sm	black SAND with trace silt, fine to very fine, loose becomes dense becomes medium dense with increasing silt content	25	I	8		
			30	I	48		
			35	I	24		
				I	18		
				I			

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BORING LOG

BAR-S PROPERTY
SEATTLE, WASHINGTON

Proj. No. 2453

Date Nov. '84

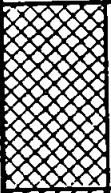
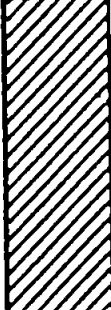
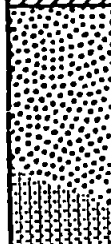
Plate 5

BORING NO. 3

Logged By SB

ELEV. 12.6⁺

Date 10-4-84

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
	ml	gray SILT with clay, above plastic limit, stiff (till) becomes gravelly encountered concrete at 7', moved twice becomes sandy and loose, wood fragments	5	I	10	25.4	LL=40
			8	I	8	23.7	PL=25
			10	I	8	45.2	PI=15
			10	I	3	68.2	Tv=.35 $q_u > 4.5 \text{ tsf}$
	CL	gray silty CLAY, wet	10/4/84				LL=45
			15	I			PL=24
			20	I	4		PI=21
			25	I	1	41.3	
	sp SP/SM	black SAND with trace silt silt content increases, becomes dense to medium dense	30	I	8		
			35	I	38		
				I	25		

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BORING LOG

BAR-S PROPERTY
SEATTLE, WASHINGTON

Proj. No. 2453

Date Nov. '84

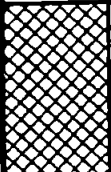
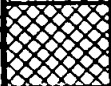
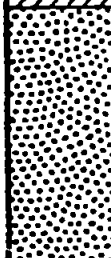
Plate 6

BORING NO. 4

Logged By SB

Date 10-5-84

ELEV. 9.6⁺

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
	ML- SM	gray gravelly sandy SILT, with scattered cobbles, moist, medium dense (fill)	5	I	16	11.5	Tv=0.125
			10/5/84	I	14	18.3	
				I	N/A		
	sm	brown silty gravelly SAND, medium dense (fill)	10	I	19	35.6	
				I	10		
	sm	gray SAND with silt, loose	15				
	ml CL	gray silty CLAY with wood fragments and organics, wet, soft SEE LAB DATA	20	I	3		
			25	I	10		
	SP	black SAND with trace silt, very fine to fine, dense becomes very dense	30	I	43		
			35	I	26		
				I	51		

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BORING LOG
BAR-S PROPERTY
SEATTLE, WASHINGTON

Proj. No. 2453

Date Nov. '84

Plate 7

BORING NO. 5

Current Elev 12.5

Logged By SB

Date 10-5-84

ELEV. 9.8⁺

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
	ML	gray clayey SILT with trace sand, stiff to very stiff	5	I	11		Tv=0.175 qu=0.25
			10	I	10		
		large wood fragment (log?)	10/5/84	I			
			10	I	5		
	ol	black organic clay to organic silt fragments	15	I	1		
		SEE LAB DATA	20	I			
	ML	gray fine sandy SILT, very loose	25	I	1		
	sp sm	black SAND with silt, fine to very fine, loose	30	I	10		
		medium dense at 33 feet	35	I	27		
		silt content increases		I	8		
	SM	black silty SAND with minor organic layer at 38 feet, very fine to fine, loose	40	I	13		
			45	I			
	ml	gray very fine sandy SILT, loose	50	I	6		
	GM	gray, silty, sandy GRAVEL with shell fragments, fine, very dense		I	53		

J. finding indicated
25' pile would probably
work for bldg B

A1/
1-27-85

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BORING LOG

BAR-S PROPERTY
SEATTLE, WASHINGTON

Proj. No. 2453

Date Nov. '84

Plate 8

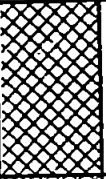
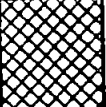
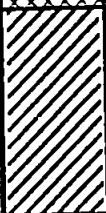
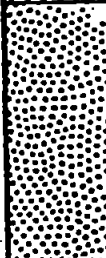
BORING NO. 6

Current Elev 12.3

Logged By SB

Date 10-5-84

ELEV. 11.4⁺

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
	SM	silty gravelly fine SAND, moist, medium dense (fill) with increased gravel (slag) brick and concrete fragments	5	I	22	5.4	Tv=0.05tsf
				II	11	3.7	
				III	13	9.4	
	GM	brown, silty, sandy GRAVEL, fine wet, loose, (possible fill)	10	IV	4		
			10/5/84	V	5	37.6	
	cl	silty CLAY, trace fine sand, very soft, layer of wood fragments from 18.8 to 19 feet	15				
			20	VI	0		
			25	VII			
	SP	black SAND with trace silt, very fine to fine, loose with trace silt, dense becomes medium dense	30	III	7		
			35	IV	34		
				V	28		

Jim F. Family Int. Ltd
 ~ 35' p.l. would work
 in bldg. B
 21 4/20/85

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BORING LOG

BAR-S PROPERTY
 SEATTLE, WASHINGTON

Proj. No. 2453

Date Nov. '84

Plate 9

BORING NO. 7

Logged By SP

ELEV. 18±

Date 5-2-85

aph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
		Silty SAND with gravel and occasional concrete rubble (FILL)	5				
		Concrete rubble from 6.5 to 11 feet	10				
	SM	Light brown silty SAND, fine with gravel, moist to wet, medium dense (FILL) grades to dark brown to black SAND with silt, gravel and brick fragments, saturated, loose	15	I	24		
			15	5/2/85	9		
			20	I			
	CL	Gray/black silty CLAY, above plastic limit, very soft	25	I	4		qu < 0.25 tsf
		increased silt content	30	I	1		qu < 0.25 tsf
	sp	Black SAND, very fine to fine with trace of silt, medium dense	35	I	19		
		wood fragments from 27.5 to 27.8 feet	40	I	39		
		isolated wood fragment at 43 feet	45	I	88		
	sp sm	Black fine SAND with silt interbeds, saturated, medium dense	50	I	20		
	sp	grades to very fine to fine SAND with isolated silt lenses, very dense	55	I	50		
		no silt lenses encountered, medium dense	60	I	26		

BORING CONTINUED ON NEXT PLATE

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GEOTECHNICAL ENGINEERING & GEOLOGY



BORING LOG
BAR-S PROPERTY
SEATTLE, WASHINGTON

Proj. No. 2453

Date May '85

Plate 10

BORING NO. 7

Logged By S.B.

Date 5-2-85

ELEV. 18

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
	sp sm	Grades to black very fine to fine SAND with silt, medium dense	65	I	20		
	sm	increased silt content	70	I	21		
	ML	Black clayey SILT, near plastic limit, soft	75	I	2	37	qu=1.0tsf LL:33 PL:27 PI:6
	sm	Black silty SAND, very fine to fine, medium dense grades to black very fine sandy SILT with clayey silt lenses, above plastic limit, soft	80	II	24	36 30 41	
	ML		85	II	4		LL:37 PL:30 PI:7
	sm	Grades to black silty SAND, fine, medium dense at 88 feet	90	I	26	32	
	ML	Black/gray SILT with very fine sand/ clay, above plastic limit, soft	95	I	4	36	qu=.75tsf LL:36 PL:29 PI:7
				II		34	
				T	7	34	

Boring terminated at 9.9 feet below existing ground surface.
Groundwater encountered at 17 feet while drilling.

**Earth
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GEOTECHNICAL ENGINEERING & GEOLOGY



BORING LOG
BAR-S PROPERTY
SEATTLE, WASHINGTON

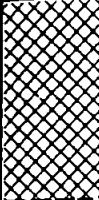
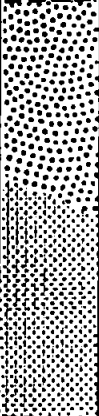
Proj. No. 2453	Date May '85	Plate 10A
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BORING NO. 8

Logged By SB

Date 5-2-85

ELEV. 13.7±

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
		Concrete rubble to two feet in depth (FILL)	0				
		Brown silty SAND, fine with brick fragments, saturated, loose	5	I	6		
			10	I	5		
	ml	Gray clayey SILT with sand lenses, above plastic limit, very soft	15	I	4		
	sp sm	Black SAND, very fine to fine with silt, saturated, loose	20	I	2		
		becomes medium dense at 23 feet	25	I	13		
			30	I	24		
			35	I	44		
	sm	Gray silty SAND, fine, with silt lenses, loose	40	I	8		
	sp sm	Gray SAND, very fine with silty lenses, medium dense		I	19		

Boring terminated at 44 feet below existing grade.
Groundwater encountered at 3 feet while drilling.

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BORING LOG

BAR-S PROPERTY
SEATTLE, WASHINGTON

Proj. No. 2453

Date May '85

Plate 11

**Earth Consultant Geotechnical Test Pit Logs
(Earth Consultants 1987)**

MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTION
Coarse Grained Soils	Gravel And Gravelly Soils	Clean Gravels (little or no fines)		GW / gw	Well-Graded Gravels, Gravel-Sand Mixtures, Little Or No Fines
				GP / gp	Poorly-Graded Gravels, Gravel-Sand Mixtures, Little Or No Fines
		Gravels With Fines (appreciable amount of fines)		GM / gm	Silty Gravels, Gravel-Sand-Silt Mixtures
				GC / gc	Clayey Gravels, Gravel-Sand-Clay Mixtures
	Sand And Sandy Soils	Clean Sand (little or no fines)		SW / sw	Well-Graded Sands, Gravelly Sands, Little Or No Fines
				SP / sp	Poorly-Graded Sands, Gravelly Sands, Little Or No Fines
		Sands With Fines (appreciable amount of fines)		SM / sm	Silty Sands, Sand-Silt Mixtures
				SC / sc	Clayey Sands, Sand-Clay Mixtures
Fine Grained Soils	Silt And Clays	Liquid Limit Less Than 50		ML / ml	Inorganic Silts & Very Fine Sands, Rock Flour, Silty-Clayey Fine Sands; Clayey Silts w/ Slight Plasticity
				CL / cl	Inorganic Clays Of Low To Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean
				OL / ol	Organic Silts And Organic Silty Clays Of Low Plasticity
				MH / mh	Inorganic Silts Micaceous Or Diatomaceous Fine Sand Or Silty Soils
	Silt And Clays	Liquid Limit Greater Than 50		CH / ch	Inorganic Clays Of High Plasticity, Fat Clays
				OH / oh	Organic Clays Of Medium To High Plasticity, Organic Silts
				PT / pt	Peat, Humus Swamp Soils With High Organic Contents
			Highly Organic Soils		

Topsoil		Humus And Duff Layer
Fill		Highly Variable Constituents

The Discussion In The Text Of This Report Is Necessary For A Proper Understanding Of The Nature Of The Material Presented In The Attached Logs

Notes :

Dual symbols are used to indicate borderline soil classification. Upper case letter symbols designate sample classifications based upon laboratory testing; lower case letter symbols designate classifications not verified by laboratory testing.

I 2" O.D. SPLIT SPOON SAMPLER
II 2 1/4" I.D. RING SAMPLER OR
SHELBY TUBE SAMPLER
P SAMPLER PUSHED
* SAMPLE NOT RECOVERED
Σ WATER LEVEL (DATE)
| WATER OBSERVATION WELL

C TORVANE READING, tsf
qu PENETROMETER READING, tsf
W MOISTURE, percent of dry weight
pcf DRY DENSITY, pounds per cubic ft.
LL LIQUID LIMIT, percent
PI PLASTIC INDEX

TEST PIT NO. 1

Logged By STL

Date 9/2/87

Elev. _____

Depth (ft.)	USCS	Soil Description	W (%)
0		(2" AC/4" CRB) Gray gravelly SILT, low PI, moist, medium stiff to stiff (fill)	
5			
10		4" diameter metal pipe, wet below 9.5', soft	Σ
15	Test pit terminated at 10 feet below existing grade. Groundwater seepage encountered at 9.5 feet during excavation.		

Logged By STL

Date 92/87

TEST PIT NO. 2

Elev. _____

0		(2" AC) Gray gravelly sandy SILT (fill)	9	
5		Fill: Gray gravelly clayey SILT, moist, medium stiff to stiff Bricks at 4.5'	13	
		Large rock at 7.5'	10	
10		Fill: Gray sandy SILT with gravel, moist to wet, soft	Σ 15	qu=4.5 tsf qu<0.2tsf
15	Test pit terminated at 11.5 feet below existing grade. Groundwater seepage encountered at 10.5 feet during excavation.			

**Earth
Consultants Inc.**

GEOTECHNICAL ENGINEERING & GEOLOGY



TEST PIT LOGS

BAR S PROPERTY/BLDG. D
SEATTLE, WASHINGTON

Proj. No. 2453-2

Date Sept '87

Plate 4

TEST PIT NO. 3

Logged By STL

Date 9-2-87

Elev. _____

Depth (ft.)	USCS	Soil Description	W (%)	
0		2-3" AC, 4" CRB (fill)		
		Tan gravelly silty SAND, moist, loose to medium dense, gray clay 1/2' to 1' (fill)	9	
		Gray silty CLAY with scattered gravel, moist, stiff	18	qu=2.5 tsf
		Tan gravelly silty SAND, moist, loose to medium dense (fill)		
5		Gray gravelly SILT, moist, very stiff (fill)	10	qu=4.5 tsf
		4"x4"x6" wood @ 5'		
		Concrete block @ 5.5'		
		Pieces of angle iron @ 8'	14	qu=3.5 tsf
		Pieces of rebar @ 8-10'		
		Concrete blocks @ 9-10'		
10		Gray clayey SILT, soft to very soft, moist to wet, (fill)	17	qu=0 tsf
Test pit terminated at 12 feet below existing grade. No Groundwater seepage encountered during excavation.				
15				

Logged By STL

Date 9-2-87

TEST PIT NO. 4

Elev. _____

0		2" AC, 4" CRB		
		Fill: Gray gravelly sandy SILT, moist, stiff.	11	qu=4. tsf
		Concrete block @ 2'		
		Fill: Gray silty CLAY, moist, medium stiff	23	qu=1. tsf
		With bricks @ 5'		
5		Fill: Gray gravelly SILT, moist, medium stiff	21	qu=1.25 tsf
		Concrete blocks @ 8.5'		
		Fill: Clayey SAND/SILT with gravel, soft to very soft, moist to wet	12	
10				
Test pit terminated at 11.5 feet below existing grade. No groundwater seepage encountered during excavation.				
15				

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TEST PIT LOGS

BAR S PROPERTY / BUILDING D
SEATTLE, WASHINGTON

Proj. No. 2453-2

Date Sept '87

Plate 5

TEST PIT NO. 5

Logged By ST1

Date 9-2-87

Elev. _____

Depth (ft.)	USCS	Soil Description	W (%)	
0		(2" AC/4" CRB) Gray gravelly silty SAND, moist, medium dense (fill)	10	
		Fill: Gray clayey SAND, moist, very soft	13	
		Fill: Gray clayey SILT with gravel, moist, very stiff	15	
5		Concrete blocks and wood @ 5'		qu=4.5 _{tsf}
		Fill: Gray sandy SILT with gravel, moist, medium dense	14	
10		Fill: Gray clayey SAND with gravel, wet, very soft Bricks @ 11'	17	
		Test pit terminated at 11 feet below existing grade. Groundwater seepage encountered at 11 feet during : excavation.		
15				



Shannon & Wilson Probe Logs
(Shannon & Wilson 1996)

Shannon & Wilson, Inc. uses a soil classification system modified from the Unified Soil Classification (USC) System. Elements of the USC and other definitions are provided on this and the following page. Soil descriptions are based on visual-manual procedures (ASTM D 2488-93) unless otherwise noted.

S&W CLASSIFICATION OF SOIL CONSTITUENTS

- MAJOR constituents compose more than 50 percent, by weight, of the soil. Major constituents are capitalized (SAND).
- Minor constituents compose 12 to 50 percent of the soil and precede the major constituents (silty SAND). Minor constituents preceded by "slightly" compose 5 to 12 percent of the soil (slightly silty SAND).
- Trace constituents compose 0 to 5 percent of the soil (slightly silty SAND, trace of gravel).

MOISTURE CONTENT DEFINITIONS

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, from below water table

ABBREVIATIONS

ATD	At Time of Drilling
Elev.	Elevation
ft	feet
HSA	Hollow Stem Auger
iD	Inside Diameter
in	inches
lbs	pounds
Mon.	Monument cover
N	Blows for last 2 six-inch increments
NA	Not Applicable or Not Available
OD	Outside Diameter
OVA	Organic Vapor Analyzer
PID	Photoionization Detector
ppm	parts per million
PVC	Polyvinyl Chloride
SS	Split Spoon sampler
SPT	Standard Penetration Test
USC	Unified Soil Classification
WLI	Water Level Indicator

GRAIN SIZE DEFINITIONS

DESCRIPTION	SIEVE SIZE
FINES	< #200 (0.08 mm)
SAND* • Fine • Medium • Coarse	• #200 - #40 (0.4 mm) • #40 - #10 (2 mm) • #10 - #4 (5 mm)
GRAVEL* • Fine • Coarse	• #4 - 3/4 inch • 3/4 - 3 inches
COBBLES	3 - 12 inches
BOULDERS	> 12 inches

* Unless otherwise noted, sand and gravel, when present, range from fine to coarse in grain size.

RELATIVE DENSITY / CONSISTENCY

COARSE-GRAINED SOILS		FINE-GRAINED/COHESIVE SOILS	
N, SPT, BLOWS/FT.	RELATIVE DENSITY	N, SPT, BLOWS/FT.	RELATIVE CONSISTENCY
0 - 4	Very loose	<2	Very soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium dense	4 - 8	Medium stiff
30 - 50	Dense	8 - 15	Stiff
Over 50	Very dense	15 - 30	Very stiff
		Over 30	Hard

WELL AND OTHER SYMBOLS

	Cement		Asphalt or PVC Cap
	Bentonite Grout		Cobbles
	Bentonite Seal		Fill
	Slough		Ash
	Silica Sand		Bedrock
	2" I.D. PVC Screen (0.010-inch Slot)		

Park 90/5
Level 1 and 2 Environmental Site Assessment
Seattle, Washington

SOIL CLASSIFICATION AND LOG KEY

May 1996

T-1678-01

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FIG. C-1
Sheet 1 of 2

UNIFIED SOIL CLASSIFICATION SYSTEM (From ASTM D-2488-93 & 2487-93)					
MAJOR DIVISIONS			GROUP/GRAPHIC SYMBOL ^②		TYPICAL DESCRIPTION
Coarse-Grained Soils (more than 50% retained on No. 200 sieve) [Use Dual Symbols for 5 - 12% Fines (i.e. GP-GM)] ^①	Gravels (more than 50% of coarse fraction retained on No. 4 sieve)	Clean Gravels ^① (less than 5% fines)	GW		Well-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
			GP		Poorly-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
		Gravels with ^① Fines (more than 12% fines)	GM		Silty Gravels, Gravel-Sand-Silt Mixtures
			GC		Clayey Gravels, Gravel-Sand-Clay Mixtures
	Sands (50% or more of coarse fraction passes the No. 4 sieve)	Clean Sands ^① (less than 5% fines)	SW		Well-Graded Sands, Gravelly Sands, Little or No Fines
			SP		Poorly-Graded Sand, Gravelly Sands, Little or No Fines
		Sands with ^① Fines (more than 12% fines)	SM		Silty Sands, Sand-Silt Mixtures
			SC		Clayey Sands, Sand-Clay Mixtures
Fine-Grained Soils (50% or more passes the No. 200 sieve)	Silt and Clays (liquid limit less than 50)	Inorganic	ML		Inorganic Silts of Low to Medium Plasticity, Rock Flour, or Clayey Silts with Slight Plasticity
			CL		Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
		Organic	OL		Organic Silts and Organic Silty Clays of Low Plasticity
	Silt and Clays (liquid limit 50 or more)	Inorganic	CH		Inorganic Clays of Medium to High Plasticity, Sandy Fat Clay, Gravelly Fat Clay
			MH		Inorganic Silts, Micaceous or Diatomaceous Fine Sands or Silty Soils, Elastic Silt
		Organic	OH		Organic Clays of Medium to High Plasticity, Organic Silts
Highly Organic Soils	Primarily organic matter, dark in color, and organic odor		PT		Peat, Humus, Swamp Soils with High Organic Content (See D 4427-92)

NOTES

- Dual symbols (symbols separated by a hyphen, i.e. SP-SM, slightly silty fine SAND) are used for soils with between 5% and 12% fines or when the liquid limit and plasticity Index values plot in the CL-ML area of the plasticity chart.
- Borderline symbols (symbols separated by a slash, i.e. CL/ML, silty CLAY/clayey SILT; GW/SW, sandy GRAVEL/gravelly SAND) indicated that the soil may fall into one of two possible basic groups.

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SOIL CLASSIFICATION AND LOG KEY

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FIG. C-1
Sheet 2 of 2

ENVIRONMENTAL BOREHOLE LOG

Date Started 4/23/96	Location Building C	Depth Water First Encountered (Ft) 6.0
Date Completed 4/23/96	Drilling Company TEG	Drilling Method Strata-Probe
Total Depth (Ft) 12.0	Sampling Method Split-spoon	Hammer: Weight (lbs) Drop (In)
Borehole Diam. (In) 2	Ground Elev. (ft) NA	Monument Elev. (ft) PVC Elev. (ft)

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS Symbol	Soil Log	Well Log	Depth (Ft)
							0.5	Ground Surface Asphalt Surface. Gray to black, silty SAND; asphalt rubble and brick fragments; moist; (Fill).	ASPHAL SM			
5	167801			75	1.3	0905	4.0	Black, silty, sandy GRAVEL; rock and brick fragments; wet at 6 feet; (Fill). Sample 167806 of groundwater, screen at 6 to 8.5 feet. Wood fragments; slight oil/organic odor at 9 feet.	GM			
	167802			28	1.9	0914						
	167803			50	2.5	0923						
10	167804			50		0934						
	167805			50	2.6	0941	12.0	BOTTOM OF PROBE 12 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

- USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | |
|--------------------------------|-----------------------------------|
| II 2" O.D. Split-Spoon Sample | ▽ Water Level and Date Measured |
| III 3" O.D. Split-Spoon Sample | ▽ Water Level at Time of Drilling |

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Seattle, Washington

LOG OF PROBE P-1

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FIG. C-2

ENVIRONMENTAL BOREHOLE LOG

Date Started 4/23/96	Location Building C	Depth Water First Encountered (Ft) 6.5
Date Completed 4/23/96	Drilling Company TEG	Drilling Method Strata-Probe
Total Depth (Ft) 15.0	Sampling Method Split-spoon	Hammer: Weight (lbs) Drop (In)
Borehole Diam. (In) 2	Ground Elev. (ft) NA	Monument Elev. (ft) PVC Elev. (ft)

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS Symbol	Soil Log	Well Log	Depth (Ft)
								Ground Surface				
	167807			100	2.4	1038	0.5	Asphalt surface.	ASPHAL			
							2.0	Gray, slightly sandy, gravelly SILT; brick and rock fragments; moist; (Fill).	ML			
							3.5	Black, silty sand and GRAVEL; asphalt rubble, slag; moist; (Fill).	GM			
	167808			33	1.7	1050	4.0	Gray, silty sand and GRAVEL; rock fragments; moist; (Fill).	GM			
							6.0	Black, silty SAND; rock fragments; moist; slight oil/petroleum odor; (Fill).	SM			
	167809			50	26.4	1101		Black, silty, sandy GRAVEL; slag; strong diesel odor; hydrocarbon sheen; wet; (Fill). Sample 167813 of groundwater, screen at 6.5 to 9 feet.	GM			
	167810			40	3.0	1116						
	167811			33	3.6	1125						
	167812			75	2.9	1139	13.5	Gray, sandy SILT; slight diesel odor; wet; (Fill).	ML			
							15.0	BOTTOM OF PROBE 15 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

- USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | |
|----------------------------|---------------------------------|
| 2" O.D. Split-Spoon Sample | Water Level and Date Measured |
| 3" O.D. Split-Spoon Sample | Water Level at Time of Drilling |

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FIG. C-3

ENVIRONMENTAL BOREHOLE LOG

Date Started 4/23/96	Location Building B	Depth Water First Encountered (Ft) 7.0
Date Completed 4/23/96	Drilling Company TEG	Drilling Method Strata-Probe
Total Depth (Ft) 11.0	Sampling Method Split-spoon	Hammer: Weight (lbs) Drop (In)
Borehole Diam. (In) 2	Ground Elev. (ft) NA	Monument Elev. (ft) PVC Elev. (ft)

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
								Ground Surface				
							0.5	Asphalt surface.	ASPHAL			
							1.5	Gray to black, silty, sandy GRAVEL; rock fragments; moist; (Fill).	GM			
	167814			100	2.0	1229		Brownish-gray, sandy SILT; iron-oxide staining at 3 feet; rock fragments; moist; (Fill).	ML			
							3.5	Gray, silty SAND and GRAVEL; moist; (Fill).	GM			
5	167815			50	1.3	1337						
				15		1352		Concrete rubble; rock fragments; wet at 7 feet. Sample 167816 of groundwater, screen at 7 to 9.5 feet.				
10				10		1402						
15							11.0	BOTTOM OF PROBE 11 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

- USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | |
|-------------------------------|-----------------------------------|
| I 2" O.D. Split-Spoon Sample | W Water Level and Date Measured |
| II 3" O.D. Split-Spoon Sample | W Water Level at Time of Drilling |

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FIG. C-4

ENVIRONMENTAL BOREHOLE LOG

Date Started 4/23/96		Location Building E		Depth Water First Encountered (Ft) 9.0	
Date Completed 4/23/96		Drilling Company TEG		Drilling Method Strata-Probe	
Total Depth (Ft) 12.0		Sampling Method Split-spoon		Hammer: Weight (lbs) Drop (In)	
Borehole Diam. (In) 2		Ground Elev. (ft) NA		Monument Elev. (ft) PVC Elev. (ft)	

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS Symbol	Soil Log	Well Log	Depth (Ft)
							0.5	Asphalt surface.	ASPHAL			
	167817			75	2.4	1446	1.5	Brown, silty SAND; metal and brick fragments; wood pieces; moist; (Fill).	SM			
							2.3	Brownish-gray, sandy SILT; moist; (Fill).	ML			
								Wood chunk; moist; (Fill).	PT			
	167818			50	2.4	1455	4.5	Brown, slightly sandy SILT; rock and brick fragments; moist; (Fill).	ML			
							5.0	Gray, silty, sandy GRAVEL; rock fragments; moist; (Fill).	GM			
	167819			50	4.0	1501	8.0	Brownish-gray SILT; wood and brick fragments; moist; (Fill).	ML			
							8.3	Gray to black, silty SAND and GRAVEL; wet at 9 feet; slight solvent odor; (Fill).	GM			
	167820			50	2.4	1511		Sample 167821 of groundwater, screen at 9 to 10.5 feet.				
								Pieces of slag at 11 feet.				
							12.0	BOTTOM OF PROBE 12 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

- USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | |
|--------------------------------|-----------------------------------|
| I 2" O.D. Split-Spoon Sample | ▽ Water Level and Date Measured |
| III 3" O.D. Split-Spoon Sample | ▽ Water Level at Time of Drilling |

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FIG. C-5

ENVIRONMENTAL BOREHOLE LOG

Date Started 4/23/96		Location Building D		Depth Water First Encountered (Ft)	
Date Completed 4/23/96		Drilling Company TEG		Drilling Method Strata-Probe	
Total Depth (Ft) 12.0		Sampling Method Split-spoon		Hammer: Weight (lbs) Drop (In)	
Borehole Diam. (In) 2		Ground Elev. (ft) NA		Monument Elev. (ft) PVC Elev. (ft)	

Depth (Ft)	Sample Number	Interval	Blow Count/6 In	Recovery (%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
								Ground Surface				
	167822			100	3.0	1600	0.5	Asphalt surface.	ASPHAL			
								Gray, silty SAND and GRAVEL; scattered wood and brick fragments; slight animal/organic odor; moist; (Fill).	SM/GM			
5	167823			100	2.4	1608	4.0	Dark gray SILT; occasional sand and gravel; rock and brick fragments; occasional layers of light gray sand; slight manure/animal odor; moist; (Fill).	ML			
	167824			80		1619	8.0	Black, silty SAND and GRAVEL; brick fragments, metal pieces; moist; animal odor; (Fill).	GM			
10												
				15		1631	11.0	Black, silty SAND; slight organic/animal odor; moist; (Fill).	SM			
							12.0	BOTTOM OF PROBE 12 FEET				
15												

Remarks: Refer to key for explanation of terminology and symbols.

- USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | |
|-------------------------------|-----------------------------------|
| I 2" O.D. Split-Spoon Sample | W Water Level and Date Measured |
| II 3" O.D. Split-Spoon Sample | W Water Level at Time of Drilling |

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FIG. C-6

ENVLOG2 8/17/96

ENVIRONMENTAL BOREHOLE LOG													
Date Started 8/11/96		Location Building B				Depth Water First Encountered (Ft) 8.8							
Date Completed 8/11/96		Drilling Company TEG				Drilling Method Strata-Probe							
Total Depth (Ft) 11.0		Sampling Method Split-spoon				Hammer: Weight (lbs) NA Drop (In)							
Borehole Diam. (In) 2		Ground Elev. (ft) NA		Monument Elev. (ft) NA		PVC Elev. (ft) NA							
Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery (%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS Symbol	Soil Log	Well Log	Depth (Ft)	
							0.5	Asphalt. Ground Surface	ASPHAL				
				100	7	0924		Gray, silty SAND and GRAVEL; moist; scattered brick fragments; slight organic odor; (Fill).	SM/GM				
							3.0	Gray, fine sandy SILT; moist; (Fill).	ML				
				100	20	0930	4.4	Gray, fine silty SAND, trace gravel; moist; (Fill).	SM				
							5.0	Dark gray SILT; moist; blocky.	ML				
	167826			87	25	0940							
								Wet at 8.8 feet.					
				90	15	0950	10.2	Sample 167825 of groundwater, screen at 9 to 12 feet.					
							11.0	Black SAND; wet; with orange and white medium to coarse organic debris? or slag?; (Fill).	SP				
								BOTTOM OF PROBE 11 FEET					

Remarks: Refer to key for explanation of terminology and symbols.

- USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

I 2" O.D. Split-Spoon Sample W Water Level and Date Measured

II 3" O.D. Split-Spoon Sample W Water Level at Time of Drilling

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LOG OF PROBE P-6

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FIG. A-7

ENVLOG2 9/17/96

ENVIRONMENTAL BOREHOLE LOG

Date Started 6/11/96		Location Building B		Depth Water First Encountered (Ft) 9.3	
Date Completed 6/11/96		Drilling Company TEG		Drilling Method Strata-Probe	
Total Depth (Ft) 11.0		Sampling Method Split-spoon		Hammer: Weight (lbs) NA Drop (in)	
Borehole Diam. (in) 2		Ground Elev. (ft) NA		Monument Elev. (ft) NA	
				PVC Elev. (ft) NA	

Depth (Ft)	Sample Number	Interval	Blow Counts/6 in	Recovery (%)	P/D (ppm)	Time	Depth (Ft)	Lithologic Description	USCS Symbol	Soil Log	Well Log	Depth (Ft)
							0.5	Asphalt. Ground Surface	ASPHAL			
				100	12	0925		Gray, slightly silty, gravelly SAND; moist; (Fill).	SP-SM			
5				100	11	0928						
				100	4	0935	6.0	Gray, slightly silty, fine to medium SAND, trace gravel; moist; (Fill).	SP-SM			
10	167828			40	30	0945	9.6	Sample 167827 of groundwater, screen at 9 to 12 feet. Wet at 9.3 feet.	SP			
							11.0	Black, sandy, organic debris; wood in shoe; (Charcoal?) (Fill). BOTTOM OF PROBE 11 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

- * USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | |
|-------------------------------|-----------------------------------|
| I 2" O.D. Split-Spoon Sample | W Water Level and Data Measured |
| II 3" O.D. Split-Spoon Sample | W Water Level at Time of Drilling |

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FIG. A-8

ENVLOG2 9/17/96

ENVIRONMENTAL BOREHOLE LOG

Date Started 6/11/96		Location Building B		Depth Water First Encountered (Ft) 7.0	
Date Completed 6/11/96		Drilling Company TEG		Drilling Method Strata-Probe	
Total Depth (Ft) 12.0		Sampling Method Split-spoon		Hammer: Weight (lbs) NA Drop (in) NA	
Borehole Diam. (in) 2		Ground Elev. (ft) NA		Monument Elev. (ft) NA PVC Elev. (ft) NA	

Depth (Ft)	Sample Number	Interval	Blow Count/ft In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS Symbol	Soil Log	Well Log	Depth (Ft)
							0.5	Asphalt.	ASPHAL			
				100	80	1118		Gray, slightly silty, gravelly SAND; moist; slight hydrocarbon odor at 3 feet; (Fill).	SP-SM			
	167830			100	800	1122	3.5	Gray, slightly fine sandy SILT; moist; possible hydrocarbon odor; (Fill).	ML			
				100	400	1136		Sample 167829 of groundwater, screen at 6 to 9 feet. Slickensides and wet at 7 feet.				
				93	200	1142	10.5	Black SAND and GRAVEL; wet; with sea barnacles and other organics; wood.	SP/GP			
							12.0	BOTTOM OF PROBE 12 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

- USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | |
|-------------------------------|-----------------------------------|
| I 2" O.D. Split-Spoon Sample | ≡ Water Level and Date Measured |
| II 3" O.D. Split-Spoon Sample | ≡ Water Level at Time of Drilling |

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Seattle, Washington

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FIG. A-9

ENVLOG2 8/17/96

ENVIRONMENTAL BOREHOLE LOG

Date Started		6/11/96		Location		Building B		Depth Water First Encountered (Ft)		9.5	
Date Completed		6/11/96		Drilling Company		TEG		Drilling Method		Strata-Probe	
Total Depth (Ft)		12.0		Sampling Method		Split-spoon		Hammer: Weight (lbs)		NA	
Borehole Diam. (In)		2		Ground Elev. (ft)		NA		Monument Elev. (ft)		NA	
PVC Elev. (ft)		NA									

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery (%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS Symbol	Soil Log	Well Log	Depth (Ft)
							0.5	Asphalt.	ASPHAL			
				67	6	1215		Gray, silty, gravelly SAND; moist; scattered wood and asphalt and concrete debris (Fill).	SM			
							3.5	0.5 feet of black and tan ash and charcoal at 3 feet.	GP			
				77	3	1218	4.0	Gray, sandy fine to medium GRAVEL; moist; (Fill).	ML			
								Gray and brown, fine sandy SILT; moist; (Fill).				
							6.0	Brown, slightly silty, sandy GRAVEL; wet; (Fill).	GP-GM			
				50	2	1225						
								Sample 167831 of groundwater, screen at 9 to 12 feet.				
	167832			53	12	1230	10.5	Black SAND and GRAVEL; wet, with sea floor organics.	SP/GP			
							12.0	BOTTOM OF PROBE 12 FEET				

Remarks: Refer to key for explanation of terminology and symbols.

- USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | |
|-------------------------------|-----------------------------------|
| I 2" O.D. Split-Spoon Sample | W Water Level and Date Measured |
| II 3" O.D. Split-Spoon Sample | W Water Level at Time of Drilling |

- Park 90/6
Supplemental Environmental Investigation
Seattle, Washington

LOG OF PROBE P-9

September 1996

T-1678-01

Logged By

TLF

Reviewed By

KAT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-10

**Geologic Logs of Probes P-10 AND P-11 were not prepared
because they were advanced to sample ground water.
NO SOIL SAMPLES WERE OBTAINED.**

Dalton, Olmsted & Fuglevand, Inc. Well Logs

MONITORING WELL NO. MW-1 - DESCRIPTION OF SAMPLES, TESTS, AND INSTALLATION

Field Rep: D. Cooper

Drilling Co.: Holt

Driller: Mike

Drill Type: Mobile B59

Size/Type Casing: 4" I.D. Hollow-Stem Auger

Location:

Elevation:

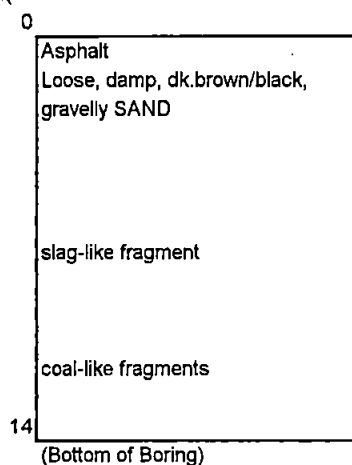
Date Completed: 6/26/96

Weather: clear & warm

Spl.No.	Type	Drill Action	Spl Depth (Ft.) From - To	Blows/ 6 inches	Spl length	Field Test	Sample Description
1	3"Drive	Easy	2.5 - 4	4/5/5	18"	none	Loose, damp, dk.brown/black, gravelly SAND w/wood
2	3"Drive	Easy	5 - 6.5	2/2/2	18"	none	Loose, damp, mottled brown/black, gravelly SAND
3	3"Drive	Easy	7.5 - 9	1/1/2	18"	none	Loose, wet, mottled brown/black, gravelly SAND w/ (1)
4	3"Drive	Easy	10 - 11.5	0/1/1	12"	none	Loose, wet, mottled brown/black, gravelly SAND
5	3"Drive	Easy	12.5 - 14	0/1/2	12"	none	Loose, wet, mottled brown/black, gravelly SAND w/ (2)

Notes: (1) slag-like fragment
(2) coal-like fragments

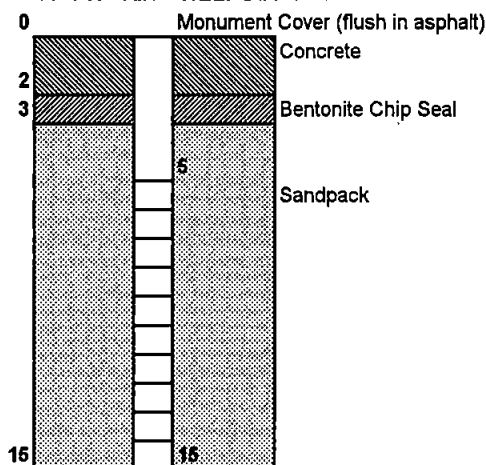
Depth(ft. SUMMARY LOG



NOTES:

1. No sheens observed during drilling or sampling.
2. The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.

MONITORING WELL DIAGRAM



MONITORING WELL INFORMATION

Riser Length: 5'	Diameter: 2-inches
Sandpack: 10-20 Sand (top/bot) 3'/15'	Seal: Bentonite/Concrete (top/bot) 0/3'
Screen: PVC/0.010" length 10' (top/bot) 5'/15'	Monument Cast Iron - flush

MONITORING WELL NO. MW-2 - DESCRIPTION OF SAMPLES, TESTS, AND INSTALLATION

Field Rep:D. Cooper

Drilling Co.: Holt

Driller: Mike

Drill Type: Mobile B59

Size/Type Casing: 4" I.D. Hollow-Stem Auger

Location:

Elevation:

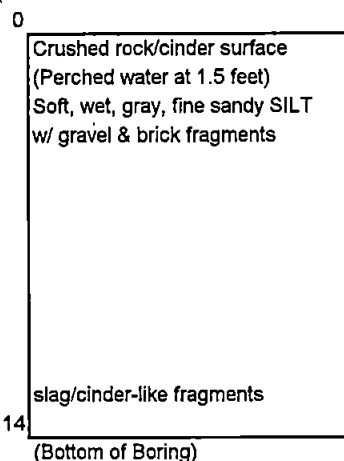
Date Completed: 6/26/96

Weather: clear & warm

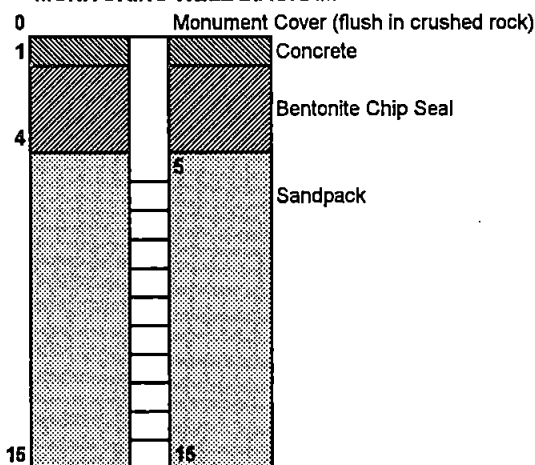
Spl.No.	Type	Drill Action	Spl Depth (Ft.) From - To	Blows/ 6 inches	Spl length	Field Test	Sample Description
1	3"Drive	Easy	2.5 - 4	1/3/3	18"	none	Soft, wet, gray, fine sandy SILT w/gravel/brick
2	3"Drive	Easy	5 - 6.5	1/2/2	18"	none	Same
3	3"Drive	Hard	7.5 - 9	3/1/1	18"	none	Soft, wet, gray, gravelly SILT w/some sand
4	3"Drive	Hard	10 - 11.5	1/19/5	12"	none	Soft, wet, gray, gravelly, silty SAND w/wood in shoe
5	3"Drive	Hard	12.5 - 14	0/1/1	12"	none	Loose, wet, mottled brown/black, gravelly SAND w/ (1)

Notes: (1) slag/cinder-like fragment

Depth(ft.) SUMMARY LOG



MONITORING WELL DIAGRAM



NOTES:

1. No sheens observed during drilling or sampling.
2. The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.

MONITORING WELL INFORMATION

Riser Length: 5'	Diameter: 2-inches
Sandpack: 10-20 Sand (top/bot) 4'/15'	Seal: Bentonite/Concrete (top/bot) 0'/4'
Screen: PVC/0.010" length 10' (top/bot) 5'/15'	Monument Cast Iron - flush

MONITORING WELL NO. MW-3 - DESCRIPTION OF SAMPLES, TESTS, AND INSTALLATION

Field Rep:D. Cooper			Location:				
Drilling Co.: Holt			Elevation:				
Driller: Mike			Date Completed: 6/26/96				
Drill Type: Mobile B59			Weather: clear & warm				
Size/Type Casing: 4" I.D. Hollow-Stem Auger							
Spl.No.	Type	Drill Action	Spl Depth (Ft.) From - To	Blows/ 6 inches	Spl length	Field Test	Sample Description
1	3"Drive	Easy	2.5 - 4	3/4/7	18"	none	M.dense, damp, gray, gravelly silty SAND (2)
2	3"Drive	Easy	5 - 6.5	2/1/1	18"	none	Loose, wet, gray, gravelly SAND over soft, gray SILT
3	3"Drive	Easy	7.5 - 9	0/1/1	18"	none	V.soft, wet, brown/orange SILT w/ wood; sand in tip of shoe
4	3"Drive	Hard(1)	10 - 11.5	50/6(1)	6"	none	Wet, mottled brown, gravelly SAND
5	3"Drive	Hard	12.5 - 14	1/1/1	12"	none	V.soft, gray, gravelly SILT

Note: (1) Concrete obstruction

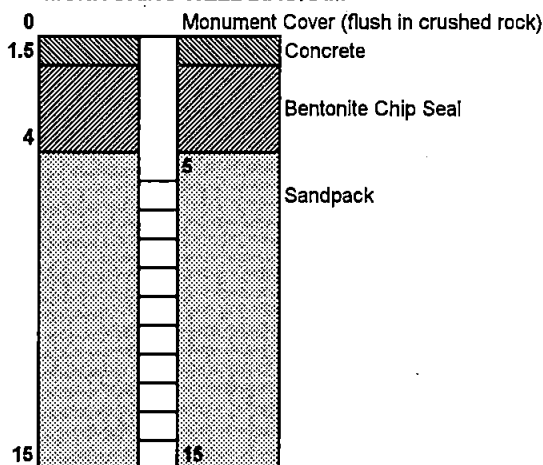
10.5'-11.5' - No obstruction
in third attempt.

Notes: (2) over fine to medium SAND in shoe

Depth(ft. SUMMARY LOG

0	Crushed rock/cinder surface
	M. dense to loose, gray, gravelly silty SAND
6	
	V. soft, brown/orange, SILT w/ some wood
9	
	Wet, mottled, brown, gravelly SAND (concrete at 10'-11')
12	
	V. soft, gray, gravelly SILT
14	
	(Bottom of Boring)

MONITORING WELL DIAGRAM



NOTES:

1. No sheens observed during drilling or sampling.
2. The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.

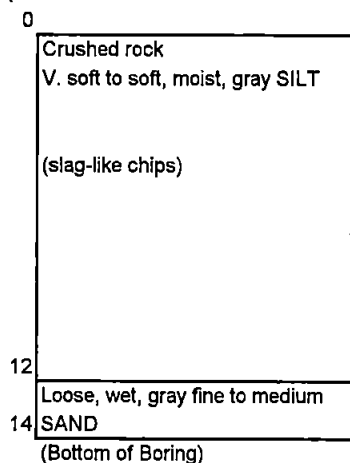
MONITORING WELL INFORMATION

Riser Length: 5'	Diameter: 2-inches
Sandpack: 10-20 Sand (top/bot) 4'/15'	Seal: Bentonite/Concrete (top/bot) 0/4'
Screen: PVC/0.010" length 10' (top/bot) 5'/15'	Monument Cast Iron - flush

MONITORING WELL NO. MW-4 - DESCRIPTION OF SAMPLES, TESTS, AND INSTALLATION

Field Rep:D. Cooper			Location:				
Drilling Co.: Holt			Elevation:				
Driller: Mike			Date Completed: 6/26/96				
Drill Type: Mobile B59			Weather: clear & warm				
Size/Type Casing: 4" I.D. Hollow-Stem Auger							
Spl.No.	Type	Drill Action	Spl Depth (Ft.) From - To	Blows/ 6 inches	Spl length	Field Test	Sample Description
1	3"Drive	Smooth	2.5 - 4	4/3/3	18"	none	Soft, moist, gray SILT
2	3"Drive	Smooth	5 - 6.5	4/3/5	18"	none	Soft, moist, mottled gray/brown SILT; slag-like chips
3	3"Drive	Smooth	7.5 - 9	1/1/1	18"	none	V. soft, wet, gray SILT (root casts)
4	3"Drive	Smooth	10 - 11.5	0/1/1	18"	none	V. soft, wet, gray, clayey SILT
5	3"Drive	Smooth	12.5 - 14	1/3/6	18"	none	Loose, wet, gray, fine to medium SAND

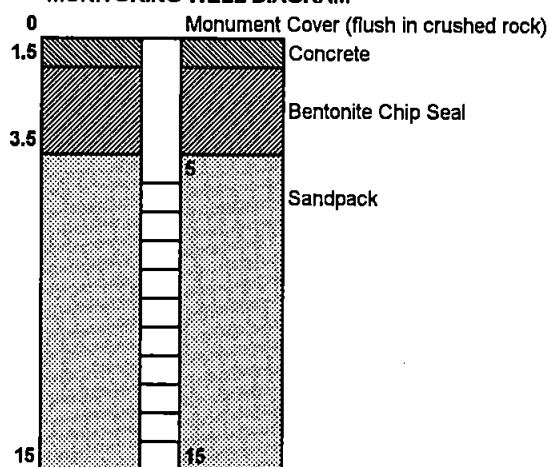
Depth(ft. SUMMARY LOG



NOTES:

1. No sheens observed during drilling or sampling.
2. The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.

MONITORING WELL DIAGRAM



MONITORING WELL INFORMATION

Riser Length: 5'	Diameter: 2-inches
Sandpack: 10-20 Sand (top/bot) 3.5'/15'	Seal: Bentonite/Concrete (top/bot) 0/3.5'
Screen: PVC/0.010" length 10' (top/bot) 5'/15'	Monument Cast Iron - flush

APPENDIX E
GEOTECHNICAL RECOMMENDATIONS
EARTH CONSULTANTS 1996

**Earth Consultants Inc.**

Geotechnical Engineers, Geologists & Environmental Scientists

June 12, 1996**E-2543-4**

**DAS Construction
101 Elliott Avenue, Suite 400
Seattle, Washington 98119**

Attention: Mr. Bernie Martell

**Subject: Remediation of Contaminated Soil
Park 9015
Seattle, Washington**

- References:**
- 1. Clean-Up Plan dated May 1996
Ref. Dalton Olmstead & Fuglevand**
 - 2. Earth Consultants, Inc.
Geotechnical Engineering Study
Buildings C, D and E
Dated May 31, 1985**
 - 3. Earth Consultants, Inc.
Geotechnical Engineering Study
Bar S Property
Dated November 12, 1984**
 - 4. Earth Consultants, Inc.
Geotechnical Engineering Study
Building 17
Dated September 21, 1987**

Dear Bernie:

In accordance with your request, we have reviewed the referenced report No. 1 with reference to our knowledge of site conditions and building design.

It is planned to remediate portions of the site by removal of soils containing petroleum hydrocarbons that exceed MTCA levels. It is suspected some of the contaminated soils may extend beneath some of the buildings.

DAS Construction
June 12, 1996

E-2543-4
Page 2

The purpose of our review is to provide guidelines to the environmental consultant DOF on how close the excavations can be to the buildings.

In our review of Earth Consultants, Inc.'s (ECI) previous work on the site (References 2, 3 and 4), in addition to a review of our files, it appears Buildings C and D are supported on conventional shallow footings bearing on two feet of structural fill. The other buildings are pile supported. Buildings C and D were surcharged with at least six feet of fill. Settlements greater than one foot were realized before the surcharges were removed.

Due to the unstable nature of the site's subsurface conditions, it is our professional opinion the excavations should not extend closer than ten feet from the building at the ground surface, then slope down to the bottom of the excavation at a 1:1 gradient. We also recommend this setback distance for pile supported buildings in order to maintain lateral support of the piles.

The clean-up plan (Reference 1) also calls for pumping of water below the existing water table in order to allow excavation of contaminated soils below the water.

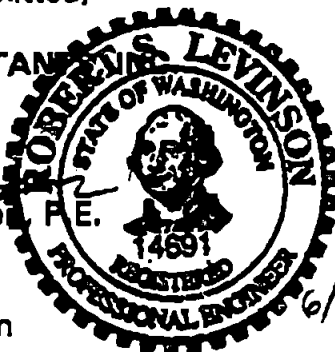
We strongly recommend not lowering the water table below its present level. The settlements due to the surcharge fills were high and most likely due to a deep compressible layer. Lowering of the water table may cause settlements of the existing structures. The shallow foundations of Buildings C and D are most susceptible to settlement. The pile supported structures may also experience minor settlements due to downdrag on the piles.

It has been a pleasure to prepare this report. Please call if you have any questions.

Respectfully submitted,

EARTH CONSULTANTS, INC.


Robert S. Levinson, P.E.
Principal



cc: Matt Dalton
DOF

6/12/96
EX-108 03/07/98

RSL/hnd

APPENDIX F
RESULTS OF SEMIVOLATILE ANALYSES
COMPLETED FOR DISPOSAL PURPOSES

SOUND ANALYTICAL SERVICES, INC.

ANALYTICAL & ENVIRONMENTAL CHEMISTS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

TRANSMITTAL MEMORANDUM

DATE: June 10, 1996

TO: Matthew Dalton
Dalton, Olmsted & Fuglevand, Inc.

PROJECT: SAB-004 Park 9015

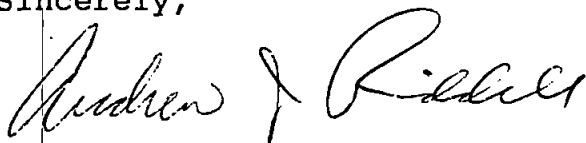
REPORT NUMBER: 57150

Enclosed are the test results for two samples received at Sound Analytical Services on June 6, 1996.

The report consists of this transmittal memo, analytical results, quality control reports, a copy of the chain-of-custody, a list of data qualifiers when applicable, and a copy of any requested raw data.

Should there be any questions regarding this report, please contact me at (206) 922-2310.

Sincerely,



Andrew J. Riddell
Project Manager

AJR:tm

SOUND ANALYTICAL SERVICES, INC.

Client Name	Dalton, Olmsted & Fuglevand, Inc.
Client ID:	P-2 6'-8'
Lab ID:	57150-01
Date Received:	6/6/96
Date Prepared:	6/6/96
Date Analyzed:	6/6/96
% Solids	67.32

Semivolatile Organics by USEPA Method 8270

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Nitrobenzene - d5	119		23	120
2 - Fluorobiphenyl	70		30	115
p - Terphenyl - d14	85		18	137
Phenol - d5	76		24	113
2 - Fluorophenol	73		25	121
2,4,6 - Tribromophenol	135	X9	19	122

Sample results are on a dry weight basis.

Analyte	Result (ug/kg)	PQL	Flags
Phenol	ND	2800	
bis(2-Chloroethyl)ether	ND	2800	
2-Chlorophenol	ND	2800	
1,3-Dichlorobenzene	ND	2800	
1,4-Dichlorobenzene	ND	2800	
Benzyl Alcohol	ND	5500	
1,2-Dichlorobenzene	ND	2800	
2-Methylphenol	ND	2800	
bis(2-Chloroisopropyl)ether	ND	2800	
3- & 4-Methylphenol	ND	2800	
N-nitroso-di-n-propylamine	ND	2800	
Hexachloroethane	ND	2800	
Nitrobenzene	ND	2800	
Isophorone	ND	2800	
2-Nitrophenol	ND	2800	
2,4-Dimethylphenol	ND	2800	
Benzoic Acid	ND	14000	
bis(2-Chloroethoxy)methane	ND	2800	
2,4-Dichlorophenol	ND	2800	
1,2,4-Trichlorobenzene	ND	2800	
Naphthalene	ND	2800	
4-Chloroaniline	ND	5500	
Hexachlorobutadiene	ND	2800	
4-Chloro-3-methylphenol	ND	5500	
2-Methylnaphthalene	9400	2800	
Hexachlorocyclopentadiene	ND	2800	

SOUND ANALYTICAL SERVICES, INC.

Semivolatile Organics by USEPA Method 8270 data for 57150-01 continued...

Analyte	Result (ug/kg)	PQL	Flags
2,4,6-Trichlorophenol	ND	2800	
2,4,5-Trichlorophenol	ND	2800	
2-Chloronaphthalene	ND	2800	
2-Nitroaniline	ND	14000	
Dimethylphthalate	ND	2800	
Acenaphthylene	ND	2800	
2,6-Dinitrotoluene	ND	2800	
3-Nitroaniline	ND	14000	
Acenaphthene	4700	2800	
2,4-Dinitrophenol	ND	14000	
4-Nitrophenol	ND	14000	
Dibenzofuran	1800	2800	J
2,4-Dinitrotoluene	ND	2800	
Diethylphthalate	ND	2800	
4-Chlorophenylphenylether	ND	2800	
Fluorene	12000	2800	
4-Nitroaniline	ND	14000	
4,6-Dinitro-2-methylphenol	ND	14000	
N-Nitrosodiphenylamine	ND	2800	
4-Bromophenylphenylether	ND	2800	
Hexachlorobenzene	ND	2800	
Pentachlorophenol	ND	14000	
Phenanthrene	15000	2800	
Anthracene	1900	2800	J
Di-n-butylphthalate	ND	2800	
Fluoranthene	ND	2800	
Pyrene	ND	2800	
Butylbenzylphthalate	ND	2800	
3,3'-dichlorobenzidine	ND	2800	
Benzo(a)anthracene	ND	2800	
Chrysene	ND	2800	
bis(2-Ethylhexyl)phthalate	1700	2800	J B1
Di-n-octylphthalate	ND	2800	
Benzo(b)fluoranthene	ND	2800	
Benzo(k)fluoranthene	ND	2800	
Benzo(a)pyrene	ND	2800	
Indeno(1,2,3-cd)pyrene	ND	2800	
Dibenz(a,h)anthracene	ND	2800	
Benzo(g,h,i)perylene	ND	2800	

SOUND ANALYTICAL SERVICES, INC.

Client Name	Dalton, Olmsted & Fuglevand, Inc.
Client ID:	P-5 (6'-9')
Lab ID:	57150-02
Date Received:	6/6/96
Date Prepared:	6/6/96
Date Analyzed:	6/6/96
% Solids	82.74

Semivolatile Organics by USEPA Method 8270

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Nitrobenzene - d5	88		23	120
2 - Fluorobiphenyl	82		30	115
p - Terphenyl - d14	93		18	137
Phenol - d5	142	X9	24	113
2 - Fluorophenol	91		25	121
2,4,6 - Tribromophenol	111		19	122

Sample results are on a dry weight basis.

Analyte	Result (ug/kg)	PQL	Flags
Phenol	1200	210	
bis(2-Chloroethyl)ether	ND	210	
2-Chlorophenol	ND	210	
1,3-Dichlorobenzene	ND	210	
1,4-Dichlorobenzene	ND	210	
Benzyl Alcohol	ND	420	
1,2-Dichlorobenzene	ND	210	
2-Methylphenol	ND	210	
bis(2-Chloroisopropyl)ether	ND	210	
3- & 4-Methylphenol	ND	210	
N-nitroso-di-n-propylamine	ND	210	
Hexachloroethane	ND	210	
Nitrobenzene	ND	210	
Isophorone	ND	210	
2-Nitrophenol	ND	210	
2,4-Dimethylphenol	ND	210	
Benzoic Acid	1100	1000	
bis(2-Chloroethoxy)methane	ND	210	
2,4-Dichlorophenol	ND	210	
1,2,4-Trichlorobenzene	ND	210	
Naphthalene	1700	210	
4-Chloroaniline	ND	420	
Hexachlorobutadiene	ND	210	
4-Chloro-3-methylphenol	ND	420	
2-Methylnaphthalene	640	210	
Hexachlorocyclopentadiene	ND	210	

SOUND ANALYTICAL SERVICES, INC.

Semivolatile Organics by USEPA Method 8270 data for 57150-02 continued...

Analyte	Result (ug/kg)	PQL	Flags
2,4,6-Trichlorophenol	ND	210	
2,4,5-Trichlorophenol	ND	210	
2-Chloronaphthalene	ND	210	
2-Nitroaniline	ND	1000	
Dimethylphthalate	220	210	
Acenaphthylene	ND	210	
2,6-Dinitrotoluene	ND	210	
3-Nitroaniline	ND	1000	
Acenaphthene	760	210	
2,4-Dinitrophenol	ND	1000	
4-Nitrophenol	ND	1000	
Dibenzofuran	470	210	
2,4-Dinitrotoluene	ND	210	
Diethylphthalate	ND	210	
4-Chlorophenylphenylether	ND	210	
Fluorene	690	210	
4-Nitroaniline	ND	1000	
4,6-Dinitro-2-methylphenol	ND	1000	
N-Nitrosodiphenylamine	ND	210	
4-Bromophenylphenylether	ND	210	
Hexachlorobenzene	ND	210	
Pentachlorophenol	ND	1000	
Phenanthrene	4600	210	
Anthracene	2200	210	
Di-n-butylphthalate	280	210	
Fluoranthene	4400	210	
Pyrene	3300	210	
Butylbenzylphthalate	ND	210	
3,3'-dichlorobenzidine	ND	210	
Benzo(a)anthracene	1200	210	
Chrysene	950	210	
bis(2-Ethylhexyl)phthalate	380	210	
Di-n-octylphthalate	ND	210	B1
Benzo(b)fluoranthene	1300	210	
Benzo(k)fluoranthene	390	210	
Benzo(a)pyrene	1100	210	
Indeno(1,2,3-cd)pyrene	650	210	
Dibenz(a,h)anthracene	ND	210	
Benzo(g,h,i)perylene	650	210	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:
Date Received:
Date Prepared:
Date Analyzed:
% Solids

Method Blank - SV951

6/6/96

6/6/96

Semivolatile Organics by USEPA Method 8270

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Nitrobenzene - d5	89		23	120
2 - Fluorobiphenyl	92		30	115
p - Terphenyl - d14	85		18	137
Phenol - d5	82		24	113
2 - Fluorophenol	100		25	121
2,4,6 - Tribromophenol	115		19	122

Sample results are on an as received basis.

Analyte	Result (ug/kg)	PQL	Flags
Phenol	ND	200	
bis(2-Chloroethyl)ether	ND	200	
2-Chlorophenol	ND	200	
1,3-Dichlorobenzene	ND	200	
1,4-Dichlorobenzene	ND	200	
Benzyl Alcohol	ND	400	
1,2-Dichlorobenzene	ND	200	
2-Methylphenol	ND	200	
bis(2-Chloroisopropyl)ether	ND	200	
3- & 4-Methylphenol	ND	200	
N-nitroso-di-n-propylamine	ND	200	
Hexachloroethane	ND	200	
Nitrobenzene	ND	200	
Isophorone	ND	200	
2-Nitrophenol	ND	200	
2,4-Dimethylphenol	ND	200	
Benzoic Acid	ND	1000	
bis(2-Chloroethoxy)methane	ND	200	
2,4-Dichlorophenol	ND	200	
1,2,4-Trichlorobenzene	ND	200	
Naphthalene	ND	200	
4-Chloroaniline	ND	400	
Hexachlorobutadiene	ND	200	
4-Chloro-3-methylphenol	ND	400	
2-Methylnaphthalene	ND	200	
Hexachlorocyclopentadiene	ND	200	

SOUND ANALYTICAL SERVICES, INC.

Semivolatile Organics by USEPA Method 8270 data for SV951 continued...

Analyte	Result (ug/kg)	PQL	Flags
2,4,6-Trichlorophenol	ND	200	
2,4,5-Trichlorophenol	ND	200	
2-Chloronaphthalene	ND	200	
2-Nitroaniline	ND	1000	
Dimethylphthalate	ND	200	
Acenaphthylene	ND	200	
2,6-Dinitrotoluene	ND	200	
3-Nitroaniline	ND	1000	
Acenaphthene	ND	200	
2,4-Dinitrophenol	ND	1000	
4-Nitrophenol	ND	1000	
Dibenzofuran	ND	200	
2,4-Dinitrotoluene	ND	200	
Diethylphthalate	ND	200	
4-Chlorophenylphenylether	ND	200	
Fluorene	ND	200	
4-Nitroaniline	ND	1000	
4,6-Dinitro-2-methylphenol	ND	1000	
N-Nitrosodiphenylamine	ND	200	
4-Bromophenylphenylether	ND	200	
Hexachlorobenzene	ND	200	
Pentachlorophenol	ND	1000	
Phenanthrene	ND	200	
Anthracene	ND	200	
Di-n-butylphthalate	ND	200	
Fluoranthene	ND	200	
Pyrene	ND	200	
Butylbenzylphthalate	ND	200	
3,3'-dichlorobenzidine	ND	200	
Benzo(a)anthracene	ND	200	
Chrysene	ND	200	
bis(2-Ethylhexyl)phthalate	150	200	J
Di-n-octylphthalate	ND	200	
Benzo(b)fluoranthene	ND	200	
Benzo(k)fluoranthene	ND	200	
Benzo(a)pyrene	ND	200	
Indeno(1,2,3-cd)pyrene	ND	200	
Dibenz(a,h)anthracene	ND	200	
Benzo(g,h,i)perylene	ND	200	

SOUND ANALYTICAL SERVICES, INC.

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID: P-5 (6'-9')
Lab ID: 57150-02
Date Prepared: 6/6/96
Date Analyzed: 6/6/96
QC Batch ID: SV951

Semivolatile Organics by USEPA Method 8270

Compound Name	Sample Result (ug/kg)	Spike Amount (ug/kg)	MS Result (ug/kg)	MS % Rec.	MSD Result (ug/kg)	MSD % Rec.	RPD	Flag
Phenol	1200	11300	11100	87.5	11400	96.7	10	
2-Chlorophenol	0	11300	8690	77	8930	84.9	9.8	
1,4-Dichlorobenzene	0	11300	9860	87.3	10800	103	17	
N-nitroso-di-n-propylamine	0	11300	9860	87.3	12000	114	27	
1,2,4-Trichlorobenzene	0	11300	10000	88.5	10900	104	16	
4-Chloro-3-methylphenol	0	11300	11000	97.7	9670	91.9	6.1	
Acenaphthene	760	11300	11100	91.7	9020	78.5	16	
4-Nitrophenol	0	11300	7720	68.3	7600	72.2	5.6	
2,4-Dinitrotoluene	0	11300	11100	98.3	8850	84	16	
Pentachlorophenol	0	11300	9480	83.9	8970	85.2	1.5	
Pyrene	3300	11300	11500	72.5	10100	64.8	11	

SOUND ANALYTICAL SERVICES, INC.

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 • TELEPHONE 206-922-2310 • FAX 206-922-5047

DATA QUALIFIERS AND ABBREVIATIONS

- B1: This analyte was detected in the associated method blank. The analyte concentration was determined not to be significantly higher than the associated method blank (less than ten times the concentration reported in the blank).
- 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 ten times the concentration reported in the blank).
- C: Additional confirmation performed.
- D: The reported result for this analyte is calculated based on a secondary dilution factor.
- E: The concentration of this analyte exceeded the instrument calibration range.
- J: The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.
- MCL: Maximum Contaminant Level
- MDL: Method Detection Limit
- N: See analytical narrative.
- ND: Not Detected
- PQL: Practical Quantitation Limit
- X1: Contaminant does not appear to be "typical" product. Elution pattern suggests it may be _____.
- X2: Contaminant does not appear to be "typical" product. Further testing is suggested for identification.
- X3: Identification and quantification of peaks was complicated by matrix interference; GC/MS confirmation is recommended.
- X4: RPD for duplicates outside advisory QC limits. Sample was re-analyzed with similar results.
- X4a: RPD for duplicates outside advisory QC limits due to analyte concentration near the method practical quantitation limit/detection limit.
- X5: Matrix spike was diluted out during analysis.
- X6: Recovery of matrix spike was outside advisory QC limits. Sample was re-analyzed with similar results.
- X7: Recovery of matrix spike outside advisory QC limits. Matrix interference is indicated by blank spike recovery data.
- X7a: Recovery and/or RPD values for MS/MSD outside advisory QC limits due to high contaminant levels.
- X8: Surrogate was diluted out during analysis.
- X9: Surrogate recovery outside advisory QC limits due to matrix composition.

Dalton, Olmsted & Fuglevand, Inc. Environmental Consultants

11711 Northcrest Pkwy South #101
10015 128th Avenue NE, Suite 107 • Bothell, Washington 98011
Telephone (206) 486-7905 (FAX 486-7651)

57150

LABORATORY Sound Analytical

CHAIN OF CUSTODY REPORT

next day per conversation

CLIENT: DOF				REPORT TO: DOF				SAME DAY (2-8 HR.) RUSH (+150%)																																												
ADDRESS: Same				BILLING TO: DOF				NEXT DAY RUSH (+100%)																																												
PHONE:				P.O. NUMBER:				2 DAY RUSH (+80%)																																												
FAX:				NCA QUOTE #:				3 DAY RUSH (+60%)																																												
PROJECT NAME: Park 9015				ANALYSIS REQUESTED				5 DAY RUSH (+40%)																																												
PROJECT NUMBER: SAB-004								10 DAY STANDARD (LIST PRICE)																																												
SAMPLED BY: MGD				EPA 8270				COMMENTS & PRESERVATIVES USED				LABORATORY NUMBER																																								
<table border="1"> <thead> <tr> <th>SAMPLE IDENTIFICATION: NUMBER OR DESCRIPTION</th> <th>SAMPLING DATE / TIME</th> <th>MATRIX (W,S,O)</th> <th># OF CONT.</th> </tr> </thead> <tbody> <tr> <td>1 P-2 6'-8'</td> <td>6/6/96 0855</td> <td>S</td> <td>1</td> </tr> <tr> <td>2 P-5 (6'-9')</td> <td>6/6/96 1030</td> <td>S</td> <td>1</td> </tr> <tr><td>3</td><td></td><td></td><td></td></tr> <tr><td>4</td><td></td><td></td><td></td></tr> <tr><td>5</td><td></td><td></td><td></td></tr> <tr><td>6</td><td></td><td></td><td></td></tr> <tr><td>7</td><td></td><td></td><td></td></tr> <tr><td>8</td><td></td><td></td><td></td></tr> <tr><td>9</td><td></td><td></td><td></td></tr> <tr><td>10</td><td></td><td></td><td></td></tr> </tbody> </table>								SAMPLE IDENTIFICATION: NUMBER OR DESCRIPTION	SAMPLING DATE / TIME	MATRIX (W,S,O)	# OF CONT.		1 P-2 6'-8'	6/6/96 0855	S	1	2 P-5 (6'-9')	6/6/96 1030	S	1	3				4				5				6				7				8				9				10			
SAMPLE IDENTIFICATION: NUMBER OR DESCRIPTION	SAMPLING DATE / TIME	MATRIX (W,S,O)	# OF CONT.																																																	
1 P-2 6'-8'	6/6/96 0855	S	1																																																	
2 P-5 (6'-9')	6/6/96 1030	S	1																																																	
3																																																				
4																																																				
5																																																				
6																																																				
7																																																				
8																																																				
9																																																				
10																																																				
RELINQUISHED BY: <u>Michael Ball</u>				DATE: 6/6/96				RECEIVED BY: <u>DL</u>				DATE: 6/6/96																																								
FIRM: DOF				TIME: 10:25 AM.				FIRM: <u>CA</u>				TIME: 10:25																																								
RELINQUISHED BY: <u>DL</u>				DATE: 6/6/96				RECEIVED BY: <u>DL</u>				DATE: 6/6/96																																								
FIRM: <u>CA</u>				TIME: 11:15				FIRM: <u>CA</u>				TIME: 11:15																																								
SAMPLE RECEIPT INFORMATION:				CONTAINER CONDITION?: GOOD VIOLATED				COOL (4°C)? YES NO				PAGE 1 OF 1																																								
CUSTODY SEALS? GOOD VIOLATED NOT USED				HAZARDOUS SAMPLES?: NO YES; DESCRIBE ON BACK																																																

APPENDIX G
LABORATORY DATA SHEETS OF
SAMPLES COLLECTED BY DALTON, OLMSTED & FUGLEVAND, INC.

**CHARACTERIZATION SOIL AND
GROUND WATER SAMPLE DATA SHEETS**



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

Dalton, Olmstead and Fuglevand
11711 Northcreek Pkwy S, Ste # D101
Bothell, WA 98011

Project: Park 95
Project Number: SAB-004
Project Manager: Mathew Dalton

Sampled: 6/12/96
Received: 6/17/96
Reported: 7/2/96

Project Summary

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
P5-MET	B606270-01	Soil	6/12/96
P4-MET	B606270-02	Soil	6/12/96
P2-MET	B606270-03	Soil	6/12/96

North Creek Analytical, Inc.

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Laura Dutton

Laura L Dutton, Project Manager



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Dalton, Olmstead and Fuglevand	Project: Park 95	Sampled: 6/12/96
11711 Northcreek Pkwy S, Ste # D101	Project Number: SAB-004	Received: 6/17/96
Bothell, WA 98011	Project Manager: Mathew Dalton	Reported: 7/2/96

Metals by EPA 6010/7000 Series Methods

Analyte	Batch Number	Date Prepared	Date Analyzed	Specific Method	Reporting Limit	Result	Units	Notes*
<u>P5-MET</u> Chromium	6060638	6/25/96	6/25/96	<u>B606270-01</u>	0.500	18.8	<u>Soil, dry wt.</u> mg/kg (ppm)	
<u>P4-MET</u> Chromium	6060638	6/25/96	6/25/96	<u>B606270-02</u>	0.500	32.9	<u>Soil, dry wt.</u> mg/kg (ppm)	
<u>P2-MET</u> Chromium	6060638	6/25/96	6/25/96	<u>B606270-03</u>	0.500	13.6	<u>Soil, dry wt.</u> mg/kg (ppm)	

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*Refer to end of report for text of notes.

Laura Dutton

Laura L Dutton, Project Manager



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Dalton, Olmstead and Fuglevand	Project: Park 95	Sampled: 6/12/96
11711 Northcreek Pkwy S, Ste # D101	Project Number: SAB-004	Received: 6/17/96
Bothell, WA 98011	Project Manager: Mathew Dalton	Reported: 7/2/96

Dry Weight Determination

Sample Name	Lab ID	Matrix	Result	Units
P5-MET	B606270-01	Soil	84.0	%
P4-MET	B606270-02	Soil	84.6	%
P2-MET	B606270-03	Soil	87.2	%

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Dalton, Olmstead and Fuglevand
11711 Northcreek Pkwy S, Ste # D101
Bothell, WA 98011

Project: Park 95
Project Number: SAB-004
Project Manager: Mathew Dalton

Sampled: 6/12/96
Received: 6/17/96
Reported: 7/2/96

Metals by EPA 6010/7000 Series Methods Quality Control

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Reporting Limit Units	Recovery Limits	Recovery %	RPD Limit	RPD %	Notes*
Batch: 6060638										
Date Prepared: 6/25/96										
Blank	6060638-BLK1									
Chromium	6/25/96			ND	Soil, dry wt. mg/kg (ppm)	0.500				
Blank Spike	6060638-BS1									
Chromium	6/25/96	50.0		39.5	Soil, dry wt. mg/kg (ppm)	70.0-130	79.0			
Duplicate	6060638-DUP1 B606402-01									
Chromium	6/25/96		7.42	7.98	Soil, dry wt. mg/kg (ppm)			20.0	7.27	
Matrix Spike	6060638-MS1 B606402-01									
Chromium	6/25/96	55.4	7.42	47.4	Soil, dry wt. mg/kg (ppm)	80.0-120	72.2			
Matrix Spike Dup	6060638-MSD1 B606402-01									
Chromium	6/25/96	55.4	7.42	45.4	Soil, dry wt. mg/kg (ppm)	80.0-120	68.6	20.0	5.11	

Laura L Dutton

Dalton, Olmsted & Fuglevand, Inc

Environmental Consultants

B606270

Contract Laboratory: NCA, Bothell WA

CHAIN OF CUSTODY REPORT

CLIENT: Dalton, Olmstead & Fuglevand				REPORT TO: Matt Dalton, Terry Olmstead, Paul Fuglevand				SAME DAY RUSH (+150%)					
ADDRESS: 19017 120th Avenue N.E., Suite 107 Bothell, Washington 98011-9508				BILLING TO: DDF				1 BUSINESS DAY RUSH (+100%)					
PHONE: (206) 486-7905 FAX: (206) 486-7651				P.O. NUMBER:				2 BUSINESS DAY RUSH (+80%)					
PROJECT NAME: PARK 95				QUOTE #:				3 BUSINESS DAY RUSH (+60%)					
PROJECT NUMBER: SAB-004				Analysis Request				5 BUSINESS DAY RUSH (+40%)					
SAMPLED BY: G. COOPER								10 BUS. DAY STANDARD (LIST) X					
								5 BUS. DAY HYDROCARBON (LIST)					
SAMPLE IDENTIFICATION: (NUMBER OR DESCRIPTION)		SAMPLING DATE / TIME	MATRIX (W,S,O)	# OF CONT.	COMMENTS & PRESERVATIVES USED								LABORATORY SAMPLE NUMBER
1. P5-MET	6/17/96 1135	SOIL	1	X									B606270-01
2. P4-MET	6/17/96 1520	↓	↓	X									-02
3. P2-MET	6/15/96	↓	↓	X									-03
4.													
5.													
6.													
7.													
8.													
9.													
10.													
RELINQUISHED BY: [Signature]		DATE: 6/17/96		RECEIVED BY: Dana H		DATE: 6/17/96							
FIRM: DDF		TIME: 1100		FIRM: NCA-B		TIME: 11:00							
RELINQUISHED BY:		DATE:		RECEIVED BY:		DATE:							
FIRM:		TIME:		FIRM:		TIME:							
SAMPLE RECEIPT INFORMATION:		CONTAINER CONDITION?: GOOD VIOLATED		COOL (4° C)? YES NO									
CUSTODY SEALS? GOOD VIOLATED NOT USED		HAZARDOUS SAMPLES?: NO YES; DESCRIBE ON BACK		PAGE 1		OF 1							



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Dalton, Olmstead and Fuglevand
11711 Northcreek Pkwy S, Ste # D101
Bothell, WA 98011

Project: Park 95
Project Number: SAB-004
Project Manager: Mathew Dalton

Sampled: 6/27/96
Received: 6/28/96
Reported: 7/3/96

Project Summary

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
MW-1	B606504-01	Water	6/27/96
MW-2	B606504-02	Water	6/27/96
MW-3	B606504-03	Water	6/27/96
MW-4	B606504-04	Water	6/27/96
DUPL	B606504-05	Water	6/27/96

North Creek Analytical, Inc.

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Laura Dutton

Laura L Dutton, Project Manager



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Dalton, Olmstead and Fuglevand
11711 Northcreek Pkwy S, Ste # D101
Bothell, WA 98011

Project: Park 95
Project Number: SAB-004
Project Manager: Mathew Dalton

Sampled: 6/27/96
Received: 6/28/96
Reported: 7/3/96

Metals by EPA 6010/7000 Series Methods

Analyte	Batch Number	Date Prepared	Date Analyzed	Specific Method	Reporting Limit	Result	Units	Notes*
				<u>B606504-01</u>				
<u>MW-1</u>								<u>Water</u>
Barium	6070106	7/2/96	7/3/96		0.0100	0.136	mg/l (ppm)	
Chromium	"	"	"		0.0100	ND	"	
Arsenic	6070139	7/1/96	"		0.00400	ND	"	
Cadmium	6070092	"	7/2/96		0.000100	ND	"	
Lead	"	"	"		0.00200	ND	"	
Mercury	6070122	7/2/96	7/3/96		0.00100	ND	"	
Selenium	6070100	7/1/96	"		0.00500	ND	"	
Silver	6070118	7/2/96	"		0.0200	ND	"	
				<u>B606504-03</u>				
<u>MW-3</u>								<u>Water</u>
Barium	6070106	7/2/96	7/3/96		0.0100	0.0894	mg/l (ppm)	
Chromium	"	"	"		0.0100	ND	"	
Arsenic	6070139	7/1/96	"		0.00400	ND	"	
Cadmium	6070092	"	7/2/96		0.000100	ND	"	
Lead	"	"	"		0.00200	ND	"	
Mercury	6070122	7/2/96	7/3/96		0.00100	ND	"	
Selenium	6070100	7/1/96	"		0.00500	ND	"	
Silver	6070118	7/2/96	"		0.0200	ND	"	
				<u>B606504-04</u>				
<u>MW-4</u>								<u>Water</u>
Barium	6070106	7/2/96	7/3/96		0.0100	0.125	mg/l (ppm)	
Chromium	"	"	"		0.0100	ND	"	
Arsenic	6070139	7/1/96	"		0.00400	0.0225	"	
Cadmium	6070092	"	7/2/96		0.000100	ND	"	
Lead	"	"	"		0.00200	ND	"	
Mercury	6070122	7/2/96	7/3/96		0.00100	ND	"	
Selenium	6070100	7/1/96	"		0.00500	ND	"	
Silver	6070118	7/2/96	"		0.0200	ND	"	
				<u>B606504-05</u>				
<u>DUPL</u>								<u>Water</u>
Barium	6070106	7/2/96	7/3/96		0.0100	0.0803	mg/l (ppm)	
Chromium	"	"	"		0.0100	ND	"	
Arsenic	6070139	7/1/96	"		0.00400	ND	"	
Cadmium	6070092	"	7/2/96		0.000100	ND	"	
Lead	"	"	"		0.00200	ND	"	
Mercury	6070122	7/2/96	7/3/96		0.00100	ND	"	
Selenium	6070100	7/1/96	"		0.00500	ND	"	
Silver	6070118	7/2/96	"		0.0200	ND	"	

North Creek Analytical, Inc.

*Refer to end of report for text of notes.

Laura Dutton

Laura L Dutton, Project Manager



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Dalton, Olmstead and Fuglevand
11711 Northcreek Pkwy S, Ste # D101
Bothell, WA 98011

Project: Park 95
Project Number: SAB-004
Project Manager: Mathew Dalton

Sampled: 6/27/96
Received: 6/28/96
Reported: 7/3/96

Dissolved Metals by EPA 6010/7000 Series Methods

Analyte	Batch Number	Date Prepared	Date Analyzed	Specific Method	Reporting Limit	Result	Units	Notes*
MW-1				B606504-01			Water	
Barium	6070049	7/1/96	7/1/96		0.0100	0.158	mg/l (ppm)	
Chromium	"	"	"		0.0100	ND	"	
Arsenic	6070138	7/3/96	7/3/96		0.00400	ND	"	
Cadmium	6070097	7/2/96	7/2/96		0.000100	ND	"	
Lead	"	"	"		0.00200	ND	"	
Mercury	6070123	"	7/3/96		0.00100	ND	"	
Selenium	6070101	7/3/96	"		0.00500	ND	"	
Silver	6070119	"	"		0.0200	ND	"	
MW-2				B606504-02			Water	
Barium	6070049	7/1/96	7/1/96		0.0100	0.115	mg/l (ppm)	
Chromium	"	"	"		0.0100	ND	"	
Arsenic	6070138	7/3/96	7/3/96		0.00400	0.0185	"	
Cadmium	6070097	7/2/96	7/2/96		0.000100	ND	"	
Lead	"	"	"		0.00200	ND	"	
Mercury	6070123	"	7/3/96		0.00100	ND	"	
Selenium	6070101	7/3/96	"		0.00500	ND	"	
Silver	6070119	"	"		0.0200	ND	"	
MW-3				B606504-03			Water	
Barium	6070049	7/1/96	7/1/96		0.0100	0.0989	mg/l (ppm)	
Chromium	"	"	"		0.0100	ND	"	
Arsenic	6070138	7/3/96	7/3/96		0.00400	ND	"	
Cadmium	6070097	7/2/96	7/2/96		0.000100	ND	"	
Lead	"	"	"		0.00200	ND	"	
Mercury	6070123	"	7/3/96		0.00100	ND	"	
Selenium	6070101	7/3/96	"		0.00500	ND	"	
Silver	6070119	"	"		0.0200	ND	"	
MW-4				B606504-04			Water	
Barium	6070049	7/1/96	7/1/96		0.0100	0.158	mg/l (ppm)	
Chromium	"	"	"		0.0100	ND	"	
Arsenic	6070138	7/3/96	7/3/96		0.00400	0.0208	"	
Cadmium	6070097	7/2/96	7/2/96		0.000100	ND	"	
Lead	"	"	"		0.00200	ND	"	
Mercury	6070123	"	7/3/96		0.00100	ND	"	
Selenium	6070101	7/3/96	"		0.00500	ND	"	
Silver	6070119	"	"		0.0200	ND	"	

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*Refer to end of report for text of notes.

Laura Dutton

Laura L Dutton, Project Manager



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Dalton, Olmstead and Fuglevand
11711 Northcreek Pkwy S, Ste # D101
Bothell, WA 98011

Project: Park 95
Project Number: SAB-004
Project Manager: Mathew Dalton

Sampled: 6/27/96
Received: 6/28/96
Reported: 7/3/96

Dissolved Metals by EPA 6010/7000 Series Methods

Analyte	Batch Number	Date Prepared	Date Analyzed	Specific Method	Reporting Limit	Result	Units	Notes*
DUPL				<u>B606504-05</u>			<u>Water</u>	
Barium	6070049	7/1/96	7/1/96		0.0100	0.0989	mg/l (ppm)	
Chromium	"	"	"		0.0100	ND	"	
Arsenic	6070138	7/3/96	7/3/96		0.00400	ND	"	
Cadmium	6070097	7/2/96	7/2/96		0.000100	ND	"	
Lead	"	"	"		0.00200	ND	"	
Mercury	6070123	"	7/3/96		0.00100	ND	"	
Selenium	6070101	7/3/96	"		0.00500	ND	"	
Silver	6070119	"	"		0.0200	ND	"	

Laura L Dutton



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Bothell, WA 98011

Project: Park 95
Project Number: SAB-004
Project Manager: Mathew Dalton

Sampled: 6/27/96
Received: 6/28/96
Reported: 7/3/96

Metals by EPA 6010/7000 Series Methods Quality Control

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Reporting Limit Units	Recovery Limits	Recovery %	RPD Limit	RPD %	Notes*
Batch: 6070092										
Date Prepared: 7/1/96										
Blank 6070092-BLK1										
Cadmium	7/2/96			ND	Water mg/l (ppm)	0.000100				
Lead	"			ND	"	0.00200				
Blank Spike 6070092-BS1										
Cadmium	7/2/96	0.00200		0.00213	Water mg/l (ppm)	70.0-130	106			
Lead	"	0.0500		0.0586	"	70.0-130	117			
Duplicate 6070092-DUP1 B606504-01										
Cadmium	7/2/96		ND	ND	Water mg/l (ppm)			20.0		2
Lead	"		ND	ND	"			20.0		2
Matrix Spike 6070092-MS1 B606504-01										
Cadmium	7/2/96	0.00200	ND	0.00239	Water mg/l (ppm)	75.0-125	119			
Lead	"	0.0500	ND	0.0538	"	75.0-125	108			
Matrix Spike Dup 6070092-MSD1 B606504-01										
Cadmium	7/2/96	0.00200	ND	0.00197	Water mg/l (ppm)	75.0-125	98.5	20.0	18.9	
Lead	"	0.0500	ND	0.0650	"	75.0-125	130	20.0	18.5	1
Batch: 6070100										
Date Prepared: 7/1/96										
Blank 6070100-BLK1										
Selenium	7/3/96			ND	Water mg/l (ppm)	0.00500				
Blank Spike 6070100-BS1										
Selenium	7/3/96	0.0250		0.0217	Water mg/l (ppm)	70.0-130	86.8			
Duplicate 6070100-DUP1 B606504-01										
Selenium	7/3/96		ND	ND	Water mg/l (ppm)			20.0		2
Matrix Spike 6070100-MS1 B606504-01										
Selenium	7/3/96	0.0250	ND	0.0208	Water mg/l (ppm)	75.0-125	83.2			
Matrix Spike Dup 6070100-MSD1 B606504-01										
Selenium	7/3/96	0.0250	ND	0.0211	Water mg/l (ppm)	75.0-125	84.4	20.0	1.43	

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Laura Dutton

Laura L Dutton, Project Manager



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Dalton, Olmstead and Fuglevand
11711 Northcreek Pkwy S, Ste # D101
Bothell, WA 98011

Project: Park 95
Project Number: SAB-004
Project Manager: Mathew Dalton

Sampled: 6/27/96
Received: 6/28/96
Reported: 7/3/96

Metals by EPA 6010/7000 Series Methods Quality Control

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Reporting Limit Units	Recov. %	RPD Limit	RPD %	Notes*
Batch: 6070106									
Blank									
6070106-BLK1									
Barium	7/3/96			ND	Water mg/l (ppm)	0.0100			
Chromium	"			ND	"	0.0100			
Blank Spike									
6070106-BS1									
Barium	7/3/96	2.00		1.63	Water mg/l (ppm)	70.0-130	81.5		
Chromium	"	1.00		0.802	"	70.0-130	80.2		
Duplicate									
6070106-DUP1 B606515-01									
Barium	7/3/96		0.0740	0.0770	Water mg/l (ppm)			20.0	3.97
Chromium	"		0.0276	0.0302	"			20.0	9.00
Matrix Spike									
6070106-MS1 B606515-01									
Barium	7/3/96	2.00	0.0740	1.58	Water mg/l (ppm)	80.0-120	75.3		
Chromium	"	1.00	0.0276	0.782	"	80.0-120	75.4		
Matrix Spike Dup									
6070106-MSD1 B606515-01									
Barium	7/3/96	2.00	0.0740	1.63	Water mg/l (ppm)	80.0-120	77.8	20.0	3.27
Chromium	"	1.00	0.0276	0.786	"	80.0-120	75.8	20.0	0.529
Batch: 6070118									
Blank									
6070118-BLK1									
Silver	7/3/96			ND	Water mg/l (ppm)	0.0200			
Blank Spike									
6070118-BS1									
Silver	7/3/96	0.250		0.238	Water mg/l (ppm)	70.0-130	95.2		
Duplicate									
6070118-DUP1 B606515-01									
Silver	7/3/96		ND	ND	Water mg/l (ppm)			20.0	
Matrix Spike									
6070118-MS1 B606515-01									
Silver	7/3/96	0.250	ND	0.265	Water mg/l (ppm)	75.0-125	106		
Matrix Spike Dup									
6070118-MSD1 B606515-01									
Silver	7/3/96	0.250	ND	0.270	Water mg/l (ppm)	75.0-125	108	20.0	1.87

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*Refer to end of report for text of notes.

Laura Dutton

Laura L Dutton, Project Manager

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Dalton, Olmstead and Fuglevand
11711 Northcreek Pkwy S, Ste # D101
Bothell, WA 98011

Project: Park 95
Project Number: SAB-004
Project Manager: Mathew Dalton

Sampled: 6/27/96
Received: 6/28/96
Reported: 7/3/96

Metals by EPA 6010/7000 Series Methods Quality Control

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Reporting Limit Units	Recovery %	RPD Limit	RPD %	Notes*
Batch: 6070122									
Date Prepared: 7/2/96									
<u>Blank</u>	<u>6070122-BLK1</u>								
Mercury	7/3/96			ND	Water mg/l (ppm)	0.000200			
<u>Blank Spike</u>	<u>6070122-BS1</u>								
Mercury	7/3/96	0.00500		0.00529	Water mg/l (ppm)	70.0-130	106		
<u>Duplicate</u>	<u>6070122-DUP1</u> <u>B607031-01</u>								
Mercury	7/3/96		ND	ND	Water mg/l (ppm)			20.0	2
<u>Matrix Spike</u>	<u>6070122-MS1</u> <u>B607031-01</u>								
Mercury	7/3/96	0.00500	ND	0.00503	Water mg/l (ppm)	80.0-120	101		
<u>Matrix Spike Dup</u>	<u>6070122-MSD1</u> <u>B607031-01</u>								
Mercury	7/3/96	0.00500	ND	0.00504	Water mg/l (ppm)	80.0-120	101	20.0	0
Batch: 6070139									
Date Prepared: 7/1/96									
<u>Blank</u>	<u>6070139-BLK1</u>								
Arsenic	7/3/96			ND	Water mg/l (ppm)	0.00400			
<u>Blank Spike</u>	<u>6070139-BS1</u>								
Arsenic	7/3/96	0.0500		0.0471	Water mg/l (ppm)	70.0-130	94.2		
<u>Duplicate</u>	<u>6070139-DUP1</u> <u>B606504-01</u>								
Arsenic	7/3/96		ND	ND	Water mg/l (ppm)			20.0	2
<u>Matrix Spike</u>	<u>6070139-MS1</u> <u>B606504-01</u>								
Arsenic	7/3/96	0.0500	ND	0.0407	Water mg/l (ppm)	75.0-125	81.4		
<u>Matrix Spike Dup</u>	<u>6070139-MSD1</u> <u>B606504-01</u>								
Arsenic	7/3/96	0.0500	ND	0.0420	Water mg/l (ppm)	75.0-125	84.0	20.0	3.14

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Dalton, Olmstead and Fuglevand
11711 Northcreek Pkwy S, Ste # D101
Bothell, WA 98011

Project: Park 95
Project Number: SAB-004
Project Manager: Mathew Dalton

Sampled: 6/27/96
Received: 6/28/96
Reported: 7/3/96

Dissolved Metals by EPA 6010/7000 Series Methods Quality Control

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Reporting Limit Units	Recovery Limits	Recovery %	RPD Limit	RPD %	Notes
Batch: 6070049										
Date Prepared: 7/1/96										
Blank										
6070049-BLK1										
Barium	7/1/96			ND	mg/l (ppm)	0.0100				
Chromium	"			ND	"	0.0100				
Blank Spike										
6070049-BS1										
Barium	7/1/96	2.00		1.99	mg/l (ppm)	70.0-130	99.5			
Chromium	"	1.00		1.06	"	70.0-130	106			
Duplicate										
6070049-DUP1 B606450-01										
Barium	7/1/96		0.0669	0.0650	mg/l (ppm)			20.0	2.88	
Chromium	"		ND	ND	"			20.0		
Matrix Spike										
6070049-MS1 B606450-01										
Barium	7/1/96	2.00	0.0669	1.97	mg/l (ppm)	80.0-120	95.2			
Chromium	"	1.00	ND	0.998	"	80.0-120	99.8			
Matrix Spike Dup										
6070049-MSD1 B606450-01										
Barium	7/1/96	2.00	0.0669	2.04	mg/l (ppm)	80.0-120	98.7	20.0	3.61	
Chromium	"	1.00	ND	1.01	"	80.0-120	101	20.0	1.20	
Batch: 6070097										
Date Prepared: 7/2/96										
Blank										
6070097-BLK1										
Cadmium	7/2/96			ND	mg/l (ppm)	0.000100				
Lead	"			ND	"	0.00200				
Blank Spike										
6070097-BS1										
Cadmium	7/2/96	0.00100		0.000977	mg/l (ppm)	70.0-130	97.7			
Lead	"	0.0250		0.0248	"	70.0-130	99.2			
Duplicate										
6070097-DUP1 B606504-01										
Cadmium	7/2/96		ND	ND	mg/l (ppm)			20.0		
Lead	"		ND	ND	"			20.0		
Matrix Spike										
6070097-MS1 B606504-01										
Cadmium	7/2/96	0.00100	ND	0.000905	mg/l (ppm)	75.0-125	90.5			
Lead	"	0.0250	ND	0.0255	"	75.0-125	102			

Laura L Dutton

Laura L Dutton, Project Manager



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Dalton, Olmstead and Fuglevand
11711 Northcreek Pkwy S, Ste # D101
Bothell, WA 98011

Project: Park 95
Project Number: SAB-004
Project Manager: Mathew Dalton

Sampled: 6/27/96
Received: 6/28/96
Reported: 7/3/96

Dissolved Metals by EPA 6010/7000 Series Methods Quality Control

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Matrix Spike Dup	6070097-MSD1	B606504-01			Water					
Cadmium	7/2/96	0.00100	ND	0.000964	mg/l (ppm)	75.0-125	96.4	20.0	6.31	
Lead	"	0.0250	ND	0.0250	"	75.0-125	100	20.0	1.98	
Batch: 6070101	Date Prepared: 7/3/96									
Blank	6070101-BLK1				Water					
Selenium	7/3/96			ND	mg/l (ppm)	0.00500				
Blank Spike	6070101-BS1				Water					
Selenium	7/3/96	0.0250		0.0298	mg/l (ppm)	70.0-130	119			
Duplicate	6070101-DUP1	B606504-01			Water					
Selenium	7/3/96		ND	ND	mg/l (ppm)			20.0		2
Matrix Spike	6070101-MS1	B606504-01			Water					
Selenium	7/3/96	0.0250	ND	0.0200	mg/l (ppm)	75.0-125	80.0			
Matrix Spike Dup	6070101-MSD1	B606504-01			Water					
Selenium	7/3/96	0.0250	ND	0.0253	mg/l (ppm)	75.0-125	101	20.0	23.2	
Batch: 6070119	Date Prepared: 7/3/96									
Blank	6070119-BLK1				Water					
Silver	7/3/96			ND	mg/l (ppm)	0.0200				
Blank Spike	6070119-BS1				Water					
Silver	7/3/96			0.304	mg/l (ppm)	70.0-130				
Duplicate	6070119-DUP1	B606504-01			Water					
Silver	7/3/96		ND	ND	mg/l (ppm)			20.0		2
Matrix Spike	6070119-MS1	B606504-01			Water					
Silver	7/3/96	0.250	ND	0.254	mg/l (ppm)	75.0-125	102			
Matrix Spike Dup	6070119-MSD1	B606504-01			Water					
Silver	7/3/96	0.250	ND	0.253	mg/l (ppm)	75.0-125	101	20.0	0.985	
Batch: 6070123	Date Prepared: 7/2/96									
Blank	6070123-BLK1				Water					
Mercury	7/3/96			ND	mg/l (ppm)	0.00100				

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Laura Dutton

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Dalton, Olmstead and Fuglevand
11711 Northcreek Pkwy S, Ste # D101
Bothell, WA 98011

Project: Park 95
Project Number: SAB-004
Project Manager: Mathew Dalton

Sampled: 6/27/96
Received: 6/28/96
Reported: 7/3/96

Dissolved Metals by EPA 6010/7000 Series Methods Quality Control

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Blank Spike	6070123-BS1				Water					
Mercury	7/3/96	0.00500		0.00515	mg/l (ppm)	70.0-130	103			
Duplicate	6070123-DUP1		B606504-01		Water					
Mercury	7/3/96		ND	ND	mg/l (ppm)			20.0		
Matrix Spike	6070123-MS1		B606504-01		Water					
Mercury	7/3/96	0.00500	ND	0.00524	mg/l (ppm)	80.0-120	105			
Matrix Spike Dup	6070123-MSD1		B606504-01		Water					
Mercury	7/3/96	0.00500	ND	0.00529	mg/l (ppm)	80.0-120	106	20.0	0.948	
Batch: 6070138	Date Prepared: 7/3/96									
Blank	6070138-BLK1				Water					
Arsenic	7/3/96			ND	mg/l (ppm)	0.00400				
Blank Spike	6070138-BS1				Water					
Arsenic	7/3/96	0.0500		0.0534	mg/l (ppm)	70.0-130	107			
Duplicate	6070138-DUP1		B606504-01		Water					
Arsenic	7/3/96		ND	ND	mg/l (ppm)			20.0		
Matrix Spike	6070138-MS1		B606504-01		Water					
Arsenic	7/3/96	0.0500	ND	0.0471	mg/l (ppm)	75.0-125	94.2			
Matrix Spike Dup	6070138-MSD1		B606504-01		Water					
Arsenic	7/3/96	0.0500	ND	0.0480	mg/l (ppm)	75.0-125	96.0	20.0	1.89	

Laura Dutton



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Dalton, Olmstead and Fuglevand 11711 Northcreek Pkwy S, Ste # D101 Bothell, WA 98011	Project: Park 95 Project Number: SAB-004 Project Manager: Mathew Dalton	Sampled: 6/27/96 Received: 6/28/96 Reported: 7/3/96
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Notes

#	Note
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- 1 The spike recovery for this QC sample is outside of NCA established control limits.
- 2 RPD values are not reported for concentrations less than ten times the reporting limit.

North Creek Analytical, Inc.

Laura L Dutton, Project Manager

Dalton, Olmsted & Fuglevand, Inc

Environmental Consultants

Contract Laboratory: *NCA*

CHAIN OF CUSTODY REPORT

CLIENT: Dalton, Olmstead & Fuglevand ADDRESS: 19017 120th Avenue N.E., Suite 107 Bothell, Washington 98011-9508 PHONE: (206) 486-7905 FAX: (206) 486-7651				REPORT TO: <u>Matt Dalton, Terry Olmstead,</u> <u>Paul Fuglevand</u>				SAME DAY RUSH (+150%)																																																																																																																																																																																																			
				BILLING TO: P.O. NUMBER: QUOTE #: <i>Ag. 50. Mg.</i>				1 BUSINESS DAY RUSH (+100%) 2 BUSINESS DAY RUSH (+80%) 3 BUSINESS DAY RUSH (+60%) <i>X</i> 5 BUSINESS DAY RUSH (+40%) 10 BUS. DAY STANDARD (LIST) 5 BUS. DAY HYDROCARBON (LIST)																																																																																																																																																																																																			
PROJECT NAME: <i>PARK 90/95</i> PROJECT NUMBER: <i>SAB-009</i> SAMPLED BY: <i>OG COOPER</i>				Analysis Request																																																																																																																																																																																																							
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>SAMPLE IDENTIFICATION: (NUMBER OR DESCRIPTION)</th> <th>SAMPLING DATE / TIME</th> <th>MATRIX (W,S,O)</th> <th># OF CONT.</th> <th colspan="10" rowspan="2" style="text-align: center; vertical-align: middle;"> <i>Total As-Built Cdr. 100 Hg. Se Discovered As-Built Cdr. 100 Hg. Se</i> </th> <th>COMMENTS & PRESERVATIVES USED</th> <th>LABORATORY SAMPLE NUMBER</th> </tr> </thead> <tbody> <tr> <td>1. MW-1</td> <td>6/27 1100</td> <td>W</td> <td>2</td> <td>X</td> <td>X</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td rowspan="5" style="vertical-align: top;"> <i>Isolated samples Filtered in field</i> <i>need results by Wednesday Afternoon (earliest) July 3.</i> </td> <td>B606504-01</td> </tr> <tr> <td>2. MW-2</td> <td>↓ 1305</td> <td>↓</td> <td>1</td> <td></td> <td>X</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td>-02</td> </tr> <tr> <td>3. MW-3</td> <td>↓ 1300</td> <td>↓</td> <td>2</td> <td>X</td> <td>X</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td>-03</td> </tr> <tr> <td>4. MW-4</td> <td>↓ 1415</td> <td>↓</td> <td>2</td> <td>X</td> <td>X</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td>-04</td> </tr> <tr> <td>5. DUPL</td> <td>↓ 1310</td> <td>↓</td> <td>2</td> <td>X</td> <td>X</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td>-05</td> </tr> <tr> <td>6.</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td> <td>-06</td> </tr> <tr> <td>7.</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td> <td></td> </tr> <tr> <td>8.</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td> <td></td> </tr> <tr> <td>9.</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td> <td></td> </tr> <tr> <td>10.</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td> <td></td> </tr> </tbody> </table>				SAMPLE IDENTIFICATION: (NUMBER OR DESCRIPTION)	SAMPLING DATE / TIME	MATRIX (W,S,O)	# OF CONT.	<i>Total As-Built Cdr. 100 Hg. Se Discovered As-Built Cdr. 100 Hg. Se</i>										COMMENTS & PRESERVATIVES USED	LABORATORY SAMPLE NUMBER	1. MW-1	6/27 1100	W	2	X	X											<i>Isolated samples Filtered in field</i> <i>need results by Wednesday Afternoon (earliest) July 3.</i>	B606504-01	2. MW-2	↓ 1305	↓	1		X											-02	3. MW-3	↓ 1300	↓	2	X	X											-03	4. MW-4	↓ 1415	↓	2	X	X											-04	5. DUPL	↓ 1310	↓	2	X	X											-05	6.																	-06	7.																		8.																		9.																		10.																		RELINQUISHED BY: <i>Dalton</i> DATE: <i>6/27/96</i> FIRM: <i>OG</i> TIME: <i>1645</i> RELINQUISHED BY: <i>M. Olmstead</i> DATE: <i>6/28/96</i> FIRM: <i>DOF</i> TIME: <i>9:15 AM</i>				RECEIVED BY: <i>Michael</i> DATE: <i>6/27/96</i> FIRM: <i>DOF</i> TIME: <i>1645</i> RECEIVED BY: <i>Dana</i> DATE: <i>6/28/96</i> FIRM: <i>NCA-B</i> TIME: <i>0915 AM</i>			
SAMPLE IDENTIFICATION: (NUMBER OR DESCRIPTION)	SAMPLING DATE / TIME	MATRIX (W,S,O)	# OF CONT.	<i>Total As-Built Cdr. 100 Hg. Se Discovered As-Built Cdr. 100 Hg. Se</i>														COMMENTS & PRESERVATIVES USED	LABORATORY SAMPLE NUMBER																																																																																																																																																																																								
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2. MW-2	↓ 1305	↓	1		X											-02																																																																																																																																																																																											
3. MW-3	↓ 1300	↓	2	X	X											-03																																																																																																																																																																																											
4. MW-4	↓ 1415	↓	2	X	X											-04																																																																																																																																																																																											
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SAMPLE RECEIPT INFORMATION: CONTAINER CONDITION?: GOOD VIOLATED COOL (4° C)? YES NO CUSTODY SEALS? GOOD VIOLATED NOT USED HAZARDOUS SAMPLES?: NO YES; DESCRIBE ON BACK				PAGE 1 OF 1																																																																																																																																																																																																							

TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES NORTHWEST, INC.

**7110 38th Drive SE
Lacey, Washington 98503**

**Mobile Environmental Laboratories
Environmental Sampling Services**

**Telephone: 360-459-4670
Fax: 360-459-3432**

July 1, 1996

Matt Dalton
Dalton Olmsted & Fuglevand, Inc.
11711 North Creek Parkway S., Suite 101
Bothell, WA 98011

Dear Mr. Dalton:

Please find enclosed the data report for analyses conducted off-site June 28, 1996, for soil and water samples from the Park 90/5 Project, Project No. SAB-004, in Seattle, Washington. The soils and waters were analyzed for Diesel and Oil by WTPH-D/D Extended.

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

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

Sincerely,



Michael A. Korosec
President

QA/QC FOR ANALYTICAL METHODS

GENERAL

The TEG Northwest Laboratory quality assurance and quality control (QA/QC) procedures are conducted following the guidelines and objectives which meet or exceed certification/-accreditation requirements of California DOHS, Washington DOE, and Oregon DEQ. The Quality Control Program is a consistent set of procedures which assures data quality through the use of appropriate blanks, replicate analyses, surrogate spikes, and matrix spikes, and with the use of reference standards that meet or exceed EPA standards.

When analyses are taking place on-site with the mobile lab, the need for Field Blanks or Travel/Trip Blanks is eliminated. If there is going to be a delay before sample preparation for analysis, the sample is stored at 4° C.

ANALYTICAL METHODS

TEG Northwest Labs use analytical methodologies which are in conformity with U. S. Environmental Protection Agency (EPA), Washington DOE, and Oregon DEQ methodologies. When necessary and appropriate due to the nature or composition of the sample, TEG may use variations of the methods which are consistent with recognized standards or variations used by the industry and government laboratories.

TPH-Gasoline, TPH-Diesel

(Gasoline and/or Diesel, Modified EPA 8015, WTPH-G and WTPH-D)

A blank and a calibration standard are run at the beginning of the day. The standard must be within 15% of the continuing calibration curve value. The standard is rerun at the end of the day. All samples are prepared with a surrogate spike, and the recovery must be between 65% and 135%. A duplicate sample is run at a rate of 1 per 10 samples (or a matrix spike sample is prepared and analyzed). At least 1 method blank is run per 10 samples analyzed.

TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES NORTHWEST INC.

PARK 90/5 PROJECT
 Seattle, Washington
 Dalton, Olmsted & Fuglevand, Inc.
 Project No. SAB-004

Diesel and Oil in Soil by WTPH-D/D-Extended

Sample Number	Date	Recovery %	Diesel mg/kg	Heavy Oil mg/kg
Meth. Blank	06/28/96	94	nd	nd
MW-1 S-4	06/28/96	101	nd	nd
MW-2 S-4	06/28/96	92	nd	nd
MW-3 S-4	06/28/96	95	nd	nd
MW-4 S-4	06/28/96	99	nd	nd
MDL			20	40

"nd" Indicates not detected at the listed detection limit.

"int" Indicates that interference peaks prevent determination.

TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES NORTHWEST INC.

PARK 90/5 PROJECT

Seattle, Washington

Dalton, Olmsted & Fuglevand, Inc.

Project No. SAB-004

Diesel and Oil in Water by WTPH-D/D-Extended

Sample Number	Date	Recovery %	Diesel ug/l	Heavy Oil ug/l
Meth. Blank	06/28/96	95	nd	nd
MW-1	06/28/96	95	nd	nd
MW-2	06/28/96	97	nd	nd
MW-3	06/28/96	93	nd	nd
MW-4	06/28/96	92	nd	nd
Dupl	06/28/96	104	nd	nd
MDL			200	400

"nd" Indicates not detected at the listed detection Limit.

"int" Indicates that interference peaks prevent determination.

Dalton, Olmsted & Fuglevand, Inc

Environmental Consultants

Contract Laboratory: TEG

CHAIN OF CUSTODY REPORT

CLIENT: Dalton, Olmstead & Fuglevand					REPORT TO: <u>Matt Dalton, Terry Olmstead,</u> Paul Fuglevand					SAME DAY RUSH (+150%) ☒																			
ADDRESS: 19017 120th Avenue N.E., Suite 107 Bothell, Washington 98011-9508					BILLING TO:					1 BUSINESS DAY RUSH (+100%)																			
PHONE: (206) 486-7905 FAX: (206) 486-7651					P.O. NUMBER:					2 BUSINESS DAY RUSH (+80%)																			
PROJECT NAME: <u>PARU 90/5</u>					QUOTE #:					3 BUSINESS DAY RUSH (+60%)																			
PROJECT NUMBER: <u>SAB 004</u>					Analysis Request WIPPH-DX					5 BUSINESS DAY RUSH (+40%)																			
SAMPLED BY: <u>DB LOOFEN</u>										10 BUS. DAY STANDARD (LIST)																			
SAMPLE IDENTIFICATION: (NUMBER OR DESCRIPTION)					SAMPLING DATE / TIME					MATRIX (W,S,O)					# OF CONT.					COMMENTS & PRESERVATIVES USED					LABORATORY SAMPLE NUMBER				
1. MW-1 S-4					6/26 0850					SOIL					1					X									
2. MW-2 S-4					1050					↓					↓					X									
3. MW-3 S-4					1325					↓					↓					X									
4. MW-4 S-4					1650					↓					↓					X									
5. MW-1					1100					WATER					1 L					X									
6. MW-2					1515					↓					↓					X									
7. MW-3					1300					↓					↓					X									
8. MW-4					1415					↓					↓					X									
9. DUPL					1310					↓					↓					X									
10.																													
RELINQUISHED BY: <u>[Signature]</u>					DATE: <u>6/28/96</u>					RECEIVED BY: <u>[Signature]</u>					DATE: <u>6-28-96</u>														
FIRM: <u>TEG</u>					TIME: <u>0735</u>					FIRM: <u>TEG</u>					TIME: <u>0735</u>														
RELINQUISHED BY:					DATE:					RECEIVED BY:					DATE:														
FIRM:					TIME:					FIRM:					TIME:														
SAMPLE RECEIPT INFORMATION:					CONTAINER CONDITION?: GOOD VIOLATED					COOL (4° C)? YES NO																			
CUSTODY SEALS? GOOD VIOLATED NOT USED					HAZARDOUS SAMPLES?: NO YES; DESCRIBE ON BACK					PAGE 1					OF 1														

**CONFIRMATION AND INFORMATION
SOIL SAMPLE DATA SHEETS**

TRANSGLOBAL ENVIRONMENTAL GEOSCIENCES NORTHWEST, INC.

**7110 38th Drive SE
Lacey, Washington 98503**

**Mobile Environmental Laboratories
Environmental Sampling Services**

**Telephone: 360-459-4670
Fax: 360-459-3432**

June 18, 1996

Matt Dalton
Dalton Olmsted & Fuglevand, Inc.
11711 North Creek Parkway S., Suite 101
Bothell, WA 98011

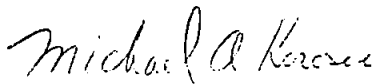
Dear Mr. Dalton:

Please find enclosed the data report for analyses conducted on-site June 11 through 15, 1996, for soil samples from the Park 90/5 Project site in Seattle, Washington. The soil samples were analyzed for Diesel and Oil by WTPH-D/D Extended.

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

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

Sincerely,



Michael A. Korosec
President

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GENERAL

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When analyses are taking place on-site with the mobile lab, the need for Field Blanks or Travel/Trip Blanks is eliminated. If there is going to be a delay before sample preparation for analysis, the sample is stored at 4° C.

ANALYTICAL METHODS

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TPH-Gasoline, TPH-Diesel

(Gasoline and/or Diesel, Modified EPA 8015, WTPH-G and WTPH-D)

A blank and a calibration standard are run at the beginning of the day. The standard must be within 15% of the continuing calibration curve value. The standard is rerun at the end of the day. All samples are prepared with a surrogate spike, and the recovery must be between 65% and 135%. A duplicate sample is run at a rate of 1 per 10 samples (or a matrix spike sample is prepared and analyzed). At least 1 method blank is run per 10 samples analyzed.

PARK 90/5 PROJECT
 Seattle, Washington
 Dalton, Olmsted and Fuglevand, Inc.

Diesel and Oil in Soil by WTPH-D/D-Extended

Sample Number	Date	Recovery %	Diesel mg/kg	Heavy Oil mg/kg
Meth. Blank	06/11/96	95	nd	nd
P5-E1	06/11/96	98	nd	527
P5-E1 Dup	06/11/96	99	nd	471
P5-N1	06/11/96	106	nd	1333
P5-S1	06/11/96	99	nd	238
P5-B1	06/11/96	102	178	1950
P5-N2	06/11/96	85	nd	473
P5-B2	06/11/96	106	437	929
P5-E2	06/11/96	98	29	1040
P5-W1	06/11/96	110	52	537
MDL			20	40

"nd" Indicates not detected at the listed detection limit.

"int" Indicates that interference peaks prevent determination.

PARK 90/5 PROJECT
Seattle, Washington
Dalton, Olmsted and Fuglevand, Inc.

Diesel and Oil in Soil by WTPH-D/D-Extended

Sample Number	Date	Recovery %	Diesel mg/kg	Heavy Oil mg/kg
Meth. Blank	06/12/96	92	nd	nd
P5-W2	06/12/96	94	82	327
P5-E3	06/12/96	88	nd	186
P4-N1	06/12/96	96	nd	nd
P4-S1	06/12/96	101	nd	192
P4-W1	06/12/96	94	nd	120
P4-E1	06/12/96	101	nd	152
P4-B1	06/12/96	94	nd	636
P4-B2	06/12/96	98	68	3510
P4-B3	06/12/96	100	nd	813
P4-B3 Dup	06/12/96	94	nd	737
P2-N1	06/12/96	96	nd	nd
P2-W1	06/12/96	109	689	nd
167833	06/12/96	91	nd	nd
167833 Dup	06/12/96	89	nd	nd
MDL			20	40

"nd" Indicates not detected at the listed detection limit.

"int" Indicates that interference peaks prevent determination.

PARK 90/5 PROJECT
 Seattle, Washington
 Dalton, Olmsted and Fuglevand, Inc.

Diesel and Oil in Soil by WTPH-D/D-Extended

Sample Number	Date	Recovery %	Diesel mg/kg	Heavy Oil mg/kg
Meth. Blank	06/13/96	93	nd	nd
P2-E1	06/13/96	92	nd	nd
P2-B1	06/13/96	int	11600	nd
P2-S1	06/13/96	90	409	nd
P2-S1 Dup	06/13/96	95	485	nd
P2-B2	06/13/96	93	248	nd
P2-SE	06/13/96	96	149	nd
P2-E2	06/13/96	85	8600	nd
P2-S2	06/13/96	89	14900	nd
P2-E3	06/13/96	96	21	nd
P2-E3 Dup	06/13/96	95	19	nd
P2-N2	06/13/96	93	2300	nd
P2-SE2	06/13/96	98	5690	nd
P2-NE1	06/13/96	106	2840	nd
MDL			20	40

"nd" Indicates not detected at the listed detection limit.

"int" Indicates that interference peaks prevent determination.

PARK 90/5 PROJECT
 Seattle, Washington
 Dalton, Olmsted and Fuglevand, Inc.

Diesel and Oil in Soil by WTPH-D/D-Extended

Sample Number	Date	Recovery %	Diesel mg/kg	Heavy Oil mg/kg
Meth. Blank	06/14/96	95	nd	nd
P2-SW1	06/14/96	104	1420	nd
P2-SE3	06/14/96	96	7460	nd
P2-SE3 Dup	06/14/96	98	8260	nd
P2-B3	06/14/96	104	nd	nd
P2-B3 Dup	06/14/96	94	nd	nd
P2-S3	06/14/96	100	nd	nd
P2-SE4	06/14/96	101	806	nd

MDL			20	40
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"nd" Indicates not detected at the listed detection limit.

"int" Indicates that interference peaks prevent determination.

PARK 90/5 PROJECT
 Seattle, Washington
 Dalton, Olmsted and Fuglevand, Inc.

Diesel and Oil in Soil by WTPH-D/D-Extended

Sample Number	Date	Recovery %	Diesel mg/kg	Heavy Oil mg/kg
Meth. Blank	06/15/96	92	nd	nd
P2-E4	06/15/96	95	nd	nd
P2-E4 Dup	06/15/96	91	nd	nd
P2-B4	06/15/96	97	86	nd
P2-B4 Dup	06/15/96	90	101	nd
P2-E5	06/15/96	105	133	nd
P2-E6	06/15/96	103	58	nd
MDL			20	40

"nd" Indicates not detected at the listed detection limit.

"int" Indicates that interference peaks prevent determination.

CHAIN-OF-CUSTODY RECORD

[illegible]

[illegible]



CLIENT: DALTON OLMSTEAD and FUGLEVAND
ADDRESS: _____
PHONE _____ FAX: _____
CLIENT PROJECT #: _____ PROJECT MANAGER: _____

DATE: 13 June 1996 PAGE 1 OF 1
PROJECT NAME: Park 90/5
LOCATION: _____
COLLECTOR: _____ DATE OF COLLECTION _____

[illegible]

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
	6/13/96 1410		6-13-96 1610
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS

CHAIN OF CUSTODY SEALS Y/N/NA

SEALS INTACT? Y/N/NA

RECEIVED GOOD COND./COLD

NOTES:

LABORATORY NOTES:

SAMPLE DISPOSAL INSTRUCTIONS

☐ TEG DISPOSAL @ \$2.00 each ☐ Return ☐ Pickup

CHAIN-OF-CUSTODY RECORD

[illegible]



TRANSGLOBAL
ENVIRONMENTAL
GEOSCIENCES

CHAIN-OF-CUSTODY RECORD

CLIENT: Dalton Olmsted & Englevand
11711 North Creek Pky S. #101
ADDRESS: Bothell WA 98011
PHONE: 206 486-7905 FAX: 206 487-7651
CLIENT PROJECT #: SAB-004 PROJECT MANAGER: MATT DALTON

DATE: 6-15-96 PAGE 1 OF 1
PROJECT NAME: Park 90/s
LOCATION: Seattle, WA
COLLECTOR: _____ DATE OF COLLECTION: _____

Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES														FIELD NOTES	Total Number of Containers	Laboratory Number
					VOA 801/8010	VOA 802/8020	VOA 824/8240	Semi Vol 825/8270	TPH 418.1	TPH 8015 (gasoline)	TPH 8015 (diesel)	PAH 610/8100	EST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TOTAL LEAD	PH	ASBESTOS			
P2-B4	9-10	0905	50% GRAB	402 Glass						X											
P2-E5		1100	"	"						X											
P2-E6		1100	"	"						X											

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
<u>Matt Dalton</u>	<u>6/15/96 12:30</u>	<u>Sub. List</u>	<u>6/15/96 12:30</u>
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

SAMPLE DISPOSAL INSTRUCTIONS
☐ TEG DISPOSAL @ \$2.70 each ☒ Return ☐ Pickup