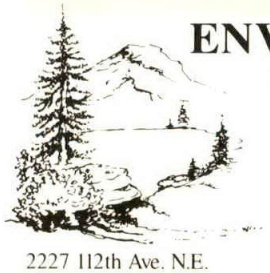
PRELIMINARY ENVIRONMENTAL STUDY

6305 East Marginal Way South
Seattle, Washington

FRANK AND RUTH LENCI TRUST



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January 8, 1993 JN 2187

Frank and Ruth Lenci Trust
Hill Raaum Pietromonaco
P.O. Box 700
Mercer Island, Washington 98040

Attention: John Pietromonaco

Subject: Preliminary Environmental Study
6305 East Marginal Way South
Seattle, Washington

Gentlemen:

Environmental Associates, Inc. has completed a preliminary environmental study of the property at 6305 East Marginal Way South in an effort to assess the potential for the presence of dangerous, hazardous, or toxic materials in subsurface soil and groundwater. This report presents a summary of our field exploration methods along with findings of the study and conclusions.

The results of this effort suggest that approximately the upper three feet of soils on the southern portion of the site are contaminated with heavy oil (> C24) and certain metals (cadmium and lead). The petroleum and metals contamination levels diminished significantly or were nondetectable at depths greater than approximately three feet.

Based upon the results of analysis of a groundwater sample obtained from an existing on-site monitoring well, it appears that the surficial contamination described in the previous paragraph has not affected groundwater quality at the site.

Several alternative conceptual approaches to site remediation are discussed in the recommendations section of this report. Decision making regarding selection of a particular method or combination of methods, or methods outside of the framework of our discussions, clearly rests with the client. In our opinion, based upon our preliminary findings, it appears that the site stabilization method described in the recommendations section may represent the best balance between protection of the environment and future cost/benefit considerations for the project.

As stated elsewhere in the report, we recommend that a copy of the findings of this report be forwarded to the Washington Department of Ecology for their review and comments prior to finalization of plans for future treatments.

We appreciate the opportunity to be of service to you on this project and trust that the information presented here will be of value in your planning efforts. If you have any questions or if we may be of further service, please do not hesitate to contact us.

Respectfully submitted,
ENVIRONMENTAL ASSOCIATES, INC.

Don W. Spencer, M.Sc., P.G., CEI
President

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PROJECT DESCRIPTION

The Vicinity Map, Plate 1 appended to this report, illustrates the general location of the project. The site is a vacant, triangular shaped parcel located at 6305 East Marginal Way South, Seattle, Washington. The site, which is located at the northern end of the First Avenue South Bridge, is bounded on the west by First Avenue South, on the east by East Marginal Way South, and on the south by South Front Street.

Historically, the site has been occupied by a transmission repair shop, an automobile wrecking yard, and possibly other automotive activities since at least 1950, and perhaps earlier. The latest existing structure was recently demolished.

The Site Exploration Plan, Plate 2 appended to this report, illustrates the approximate locations of surface (hand-tool), test-pit (backhoe), and groundwater sampling locations utilized during the course of this study.

SCOPE OF WORK

In a letter to Mr. John Pietromonaco dated March 26, 1991 from Ms. Louise Bardy of the Washington Department of Ecology (WDOE), attention was drawn to the potential presence of contamination in the form of oil seen by WDOE on surface soils and ponded water on the subject site. The letter went on to state that halogenated organic compounds, priority pollutant metals, polychlorinated biphenyls, and non-chlorinated solvents were also suspected to be present on the subject site. No basis for this speculation was provided.

The WDOE letter along with conversations with Mr. Pietromonaco formed the basis for the following scope of work:

* Sterile hand tools were used to obtain shallow (1 to 2 foot) composite samples from three different areas on the subject site. Each composite in turn was comprised of soils sampled at three random localities.

* Laboratory analyses were performed on the composite samples for the following parameters:

    1) Hydrocarbon Identification
    2) TPH 418.1
    3) Priority Pollutant Metals (Ag,As,Ba,Cd,Cr,Hg,Pb,Se)
    4) Polychlorinated Biphenyls.

* Backhoe exploration and sampling was conducted to assess subsurface conditions below depths accessible to hand implements (laboratory analysis to depend upon results of shallow soil sampling).

* A graphic log of each test pit was prepared by our field geologist.

* Sampling of groundwater.

* Preparation of this summary report.

METHODOLOGY

On October 26, November 3, and December 4, 1992 an environmental geologist from Environmental Associates, Inc. provided the following services at the subject site:

Surface Soils Sampling

Using sterile hand implements, nine shallow (1 to 2 foot) holes were excavated at random locations throughout the subject site. The nine samples were then composited using three separate samples per composite sample. The samples were composited so as to characterize the northern, the southwestern, and the southeastern areas of the property (see Plate 2, Site Exploration Plan).

Samples for laboratory analysis were selected at depths ranging from 3 to 6 feet based on their physical appearance, odor, and position relative to the "worst case" surface samples taken and analyzed at an earlier date.

Samples were placed in labeled, sterile glassware furnished by the project laboratory. Samples were then stored in an iced-chest at or below 4 degrees centigrade and were transferred to the laboratory in this condition in an effort to preserve sample integrity. EPA-recommended sample management protocol including maintenance of chain-of-custody documentation was followed at each step of the project.

The three composite samples were than analyzed for the following parameters:

* Hydrocarbon Identification (gas chromatography)
* Total Petroleum Hydrocarbons (EPA Method 418.1) TPH
* Priority Pollutant Metals (Ag,As,Ba,Cd,Cr,Hg,Pb,Se)
* Polychlorinated Biphenyls (EPA Method 8080)

Test Pit Logging

Test pits were excavated using a backhoe at nine different locations on the subject site. The excavating depth limitation of the backhoe was approximately 12 feet. An attempt was made to locate the test pits to obtain reasonably wise coverage throughout the site. The approximate locations of the test pits are depicted in the Site Exploration Plan, Plate 2 appended herewith.

During excavation, a field log was made by the field geologist for each test pit. Information recorded versus corresponding depth on each log included soil type (Unified Soil Classification System), color, texture, moisture characteristics, estimated relative density, plasticity, seepage zones, and other observable conditions.

Groundwater Sampling

An existing groundwater monitoring well labeled "MW-15" was discovered on the mid-eastern edge of the property approximately at the location shown on Plate 2. Despite our research and contact with WDOE, no information was obtained as to who might have constructed the well, or what analyses might have been run on groundwater samples taken from the well in the past. The well was therefore sampled by Environmental Associates, Inc. in an attempt to assess groundwater quality on the subject site.

Prior to sampling, a hand bailer was used to purge the well by removing a minimum of three well volumes of water. This procedure was intended to assure that samples obtained from the well would be representative of ambient groundwater conditions in the surrounding water-bearing strata.

Following developmental purge bailing, a sterilized PTFE (teflon) bailer was used to extract a groundwater samples from the well. Samples were poured into clean, preconditioned, labeled glassware (VOA viles with teflon septa, amber glass jars with teflon lids, and a plastic bottle) furnished by the project laboratory. Samples were stored in an iced chest on site and transported to the project laboratory in this condition in an effort to preserve sample integrity. EPA sample management protocol including maintenance of chain-of-custody records was observed at all stages of the project.

RESULTS

NCAR - Surface Conditions

As noted earlier in this report, surface soils conditions at the site were initially examined by sampling nine shallow hand excavations (< 2 ft.). Soil samples from these localities were composited using three individual samples to constitute each composite sample.

Laboratory analysis of the shallow composite samples revealed the presence of hydrocarbons in the heavy oil (> C24) range with highest concentrations (810 ppm) in the southwestern part of the property. Analysis of the samples for EPA priority pollutant metals also revealed concentrations to be highest in areas at the southern end of the property. The "worst case" sample (370 ppm total lead) was also analyzed by Toxicity Characteristic Leaching Procedure (TCLP) and the results (0.70 ppm TCLP Lead) suggest that the total lead present is not leaching downward into deeper soils. Concentrations of polychlorinated biphenyls (PCBs) in soil samples throughout the site were found to be nondetectable or below Model Toxics Control Act (MTCA) minimum cleanup limits.

Subsurface Conditions

As noted earlier in the report, subsurface conditions at the subject site were examined by excavating nine test pits in the locations noted on Plate 2.

Soils underlying the site are generally comprised of 2 to 4 feet of fill material (gray, brown, and black silty sand containing gravel, scrap metal, bottles, wood, and sawdust) overlying brown to gray stratified sand and silty sands with some occasional gravels. These soils are, in turn, overlying a stiff, tan to bluish-gray silt of low plasticity, with an estimated relative moisture content ranging from moist to wet.

The silt layer apparently serves to "perch" shallow groundwater to the extent that seepages were noted at the contact of the silt layer and the overlying stratified sands. This "perched" groundwater occurs as precipitation percolates downward through overlying sands and gravels and is restricted in its downward movement by the lower relative permeability of the fine-textured sediments (silts and possibly clays).

Soil samples were collected at various discrete depths in each test pit and submitted for analysis depending on their physical qualities (appearance, odor, etc.) and proximity to the "worst" near-surface grab samples obtained and analyzed earlier in the study.

Results of testing of these deeper samples suggest that the concentrations of heavy oil decline considerably at depths of between three to four feet (see TABLE A - Results of Laboratory Testing). These concentrations were found to be below the MTCA minimum cleanup levels. Analysis of soil for total concentrations of EPA priority pollutant metals also revealed levels either nondetectable or below MTCA minimum cleanup levels.

Groundwater

Analysis of groundwater revealed that gasoline, diesel, and motor oil hydrocarbons, as well as EPA priority pollutant metals, were nondetectable.

CONCLUSIONS

Contaminated soils exist at shallow (0 to 3 feet) depth on the subject property. This contamination includes petroleum (heavy oil) and EPA priority pollutant metals (lead and cadmium). Concentrations of these contaminants are found to be within acceptable MTCA minimum cleanup standards or are nondetectable at depths greater than three feet. Total lead present in the upper two feet of soils on the site has been found to be nonleachable, and shown to be non existent in locations sampled at depths greater than three feet.

Groundwater on the subject property appears to be unaffected by contaminants found in surface samples, as samples taken from an existing monitoring well on the subject property and analyzed for surficial contaminant parameters were found to contain no detectable levels of petroleum hydrocarbons (gasoline, diesel, or motor oil) or EPA priority pollutant metals.

RECOMMENDATIONS

General

While certain sections of the MTCA generally preclude official WDOE oversight on projects not being remediated under provisions of a consent decree or agreed order, it has been our experience on numerous projects that inclusion of the regulatory agency in the communication loop early in the process of formulation of decisions regarding selection and implementation of an "independent cleanup action" can improve the end result. On that basis, we initially recommend that this report be forwarded to the Northwest Regional Office of the Washington Department of Ecology and/or to their

representative Ms. Louise Bardy. Depending upon your interests and needs, this action can later be followed by scheduling of an "informal" meeting with Ms. Bardy or others in the agency in the event that a plan for future action can be drafted and brought to such a meeting for informal discussion.

Alternative Approaches to Site Remediation

Alternative approaches to site remediation are controlled by several factors including soil type, contamination type and distribution, desired schedules, budgetary limitations, regulatory acceptance, etc. The following paragraphs provide four possible alternative approaches for discussion in ascending order relative to cost.

No Action

This alternative is initially the least costly and may appear preferred as far as time constraints are concerned. It is conceivable that the site characterization summarized in this report may be sufficient to satisfy WDOE or other regulatory agencies that no additional work or remediation is warranted. However, under the "No Action" alternative, contamination does remain on site and could result in a lower property value and/or possible exposure to regulatory action in the future.

Site Stabilization

For the purposes of this report, site stabilization may be defined as implementation of tasks and/or practices necessary to preclude significant future interaction between the known contaminants and the environment. The results of this preliminary study, and in particular the limited vertical extent of the oil and the metals, suggest that conditions at the site are relatively "stable" in the current condition.

Future site stabilization efforts would focus on; (1) elimination of future potential for mobilization of contaminants by percolation and infiltration of precipitation, and; (2) minimizing the potential for future human contact with these materials. These two objectives could conceivably be accomplished by:

* Mixing of a relatively low percentage of lime with the upper two to three feet of the soil stratum identified as containing elevated total concentrations of certain metals would further immobilize the metals through chemical bonding and some reduction of effective soil porosity. The lime treatment would likely have little effect on the residual oil.

* Capping of surface areas of the site by asphalt pavement, buildings, etc., which could occur as part of possible future development would provide a major reduction in the potential for infiltration of precipitation and runoff as mobilizing agents for both oil and metals in soil, and would preclude human interaction with these materials.

Positive Aspects:

Positive aspects of site stabilization as described above would include:

* Approach is responsive to goal of continued protection of the environment, and may be viewed in that light by regulatory agencies who may review this project. In terms of the environment, it offers a substantial improvement over the "no action" alternative.

* Relatively low cost as compared to other methods such as removal or expensive process treatments.

* Work could easily be incorporated as a part of future development and construction activities.

Negative Aspects:

* While site stabilization, in our opinion, offers a balanced approach between environmental protection, cost, and integration with future development of the property, the elevated concentrations of oils and/or metals would remain on-site. This fact could prove to be a stumbling block if the project is reviewed with institutional rigidity by lending institutions or regulators.

<u>Bioremediation Of Oil-Affected Soils</u>

The practical application of microorganisms including alcaligenes and pseudomonas in the reduction of petroleum residues in soils has been widely used throughout the United States and has gained considerable recognition in other countries. For this project, offering a simple explanation, the process would involve:

* Excavation of petroleum-affected soils placing them in a temporary bermed on-site treatment pad under 10 to 20 mil polyethylene liner. The liner floor would be contoured to direct percolation toward a sump equipped with a pump to effect a "closed loop" contained within the treatment area. Optimum design involves soil placement in thickness not exceeding 18 to 24 inches.

* Inoculation of the soil with appropriate bacteria and nutrients.

* Periodic sampling and lab testing to document decline in residual petroleum concentrations. Bacteria catabolize (die and self-consume) at the end of the process.

* Terminate treatment and use soil on or off-site at such time as residual petroleum levels are reduced to within standards of the Model Toxics Control Act (MTCA), Chapter 173-340 WAC.

Positive Aspects:

* Approach is responsive to goal of continued protection of the environment, and may be viewed in that light by regulatory agencies who may review this project. In terms of the environment, it offers a substantial improvement over the "no action" alternative.

* Treatment would effectively eliminate the oil portion of the residual contamination on the property as a possible "bone of contention" in future financing or regulatory review.

Negative Aspects:

* The elevated concentrations of metals would remain on-site. As discussed under other treatment scenarios, this could conceivably put off certain lending institutions or regulators. This short coming could conceivably be side-stepped to some degree by following bio-remediation with the lime stabilization discussed earlier.

* Given the climate of the Pacific Northwest, diligent application of the bioremediation approach could take one or two seasons to reduce residual hydrocarbon concentrations to below MTCA threshold values. Said another way, from a development standpoint, time becomes an open-ended variable.

* Costs for bioremediation would be higher than for the "no action" scenario or for the site stabilization approach. Exclusive of set-up, excavation, monitoring, etc., bacterial inoculation costs are estimated at $30 to $45 per cubic yard.

Soil Excavation/Removal

The "brute force" approach of soil removal and off-site disposal has evolved in response to several factors including lack of practical flexibility and utility in the existing regulatory framework, and the type of development planning which frequently does not include sufficient time to iron out (i.e. regulatory liaison, implementation of technologies such as bioremediation, etc.) environmental problems by alternative methods if such problems are encountered. From the standpoint of opinion, we would not advocate adoption of this alternative until the utility and applicability of one or more of the other alternatives had been thoroughly explored with the client and the Washington Department of Ecology.

For purposes of discussion, this remediation alternative includes permitting, lab testing, excavation and disposal at an appropriate landfill, import of clean suitable fill, and an abundance of regulatory liaison and reporting.

Positive Aspects:

* Approach renders a site formerly contaminated as totally clean. This has appeal to financial institutions who are characteristically reluctant to offer financing on a contaminated site. A similar positive perception is often shared by prospective purchasers.

* Highest probability to eliminate future agency (WDOE/EPA) concern.

Negative Aspects:

* Highest cost for all remediation scenarios. Based on our recent work in the Seattle area, a very small site can easily cost $100,000 to $150,000.

* Under the concept of joint and several liability provided under CERCLA, future liability for exported contamination conceivably remains with the originator.

LIMITATIONS

This report has been prepared for the exclusive use of the Frank and Ruth Lenci Trust along with Hill Raaum Pietromonaco and their representatives for specific application to this site. Our work for this project was conducted 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 13, 1992. No other warranty, expressed or implied, is made.

If new information is developed in future site work which may include excavations, borings, studies, analyses, etc., Environmental Associates, Inc., must be retained to reevaluate the conclusions of this report and to provide amendments as required.

We appreciate the opportunity to be of service on this interesting project and trust that the information presented here will be useful to your planning and management efforts. If you have any questions or if we may be of further service, please do not hesitate to contact us.

Respectfully submitted,
ENVIRONMENTAL ASSOCIATES, INC.

James R. Ruef
Environmental Geologist

Don W. Spencer, M.Sc., P.G., CEI
President - Environmental Services

EPA-Certified Asbestos Inspector/Management Planner
I.D. # AM 48151

Registered Site Assessor/Licensed UST Supervisor
Washington Department of Ecology (Lic. W000010)

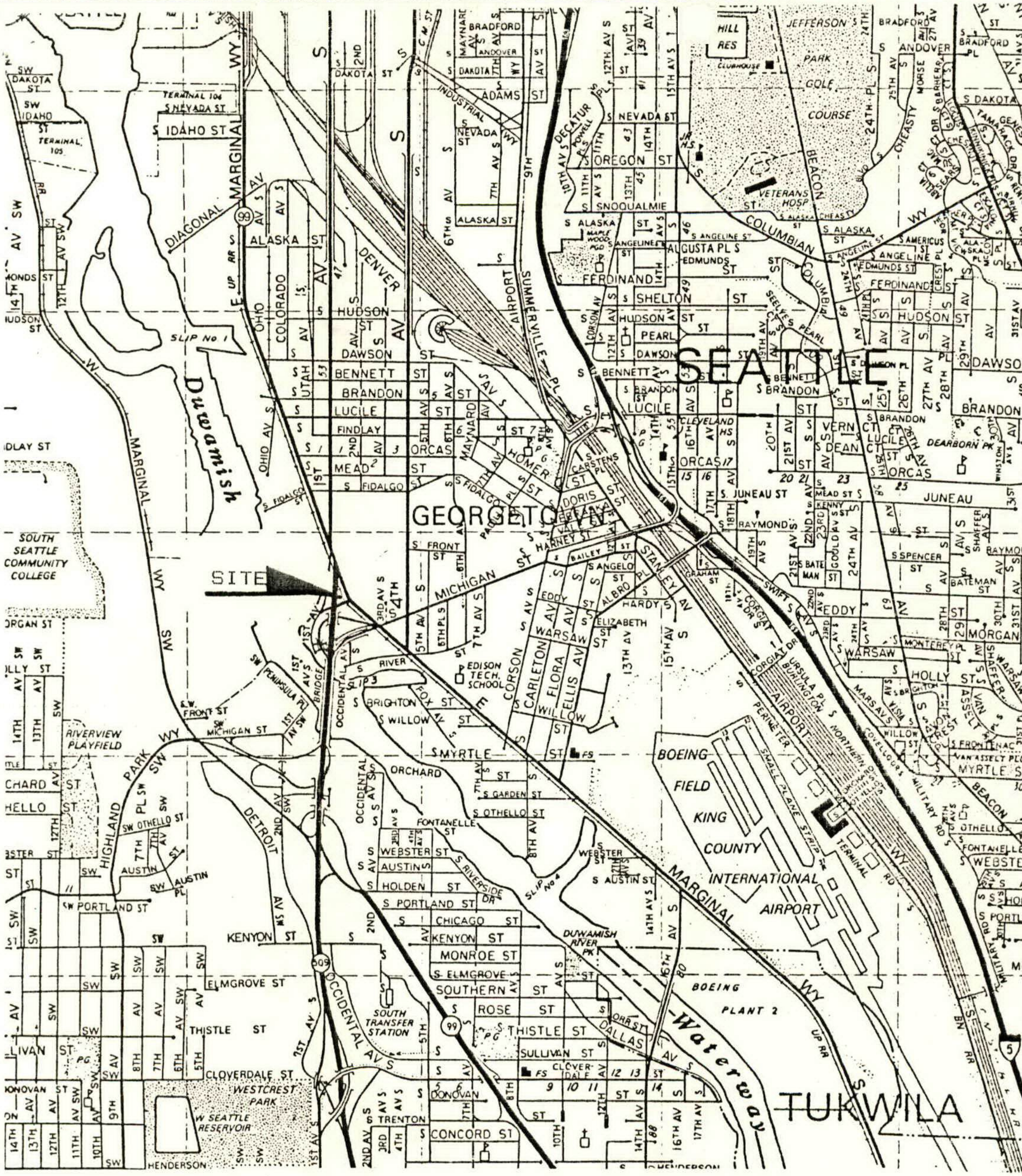
License: W000010 (Washington)
License: 11464 (Oregon)
License: 876 (California)

TABLE A - Results of Laboratory Testing
6305 East Marginal Way South
Seattle, Washington

SAMPLE NUMBER	LOCATION	HCID (ppm)	418.1 (ppm)	PCB's (ppm)	Ag	As	Ba	Cd	Cr	Hg	Pb	Se
					(total metals in ppm unless noted otherwise)							
Surficial Soil Sampling												
2187-1	surf. composite #1	heavy oil	94	<0.40	<2.7	12	<110	1.6	15	<0.11	71	23
2187-2	surf. composite #2	heavy oil	810	<0.40	<2.8	13	<110	2.7	18	0.19	230	18
2187-3	surf. composite #3	heavy oil	450	0.60	7.6	17	210	3.7	21	0.11	370	23
2187-3	surf. comp. #3	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.70 (TCLP)	NA
Test-Pit Soil Sampling												
TP1-1	test-pit 1 @ 3 feet	NA	46	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP2-2	test-pit 2 @ 4 feet	NA	NA	NA	<5.1	<13	<100	<1.3	21	<0.05	<26	75
TP5-2	test-pit 5 @ 4 feet	NA	150	NA	NA	NA	NA	NA	NA	NA	NA	NA
Groundwater Sampling												
MW-15	existing monitor. well	<0.04 gas <0.4 diesel <2 motor oil	<0.2	NA	<0.05	<0.005	<0.05	<0.005	<0.05	<0.001	<0.005	<0.05
MTCA Cleanup	Soil		200	1.0		20.0		2.0	100.0	1.0	250.0	
Guidelines	Water		1.0	0.0001		0.005		0.005	0.05	0.002	0.005	

NOTES:

(ppm) denotes parts per million
(TCLP) denotes Toxicity Characteristic Leaching Procedure
Cleanup Guidelines are published in the Model Toxics Control Act (MTCA), Chapter 173-340 WAC.



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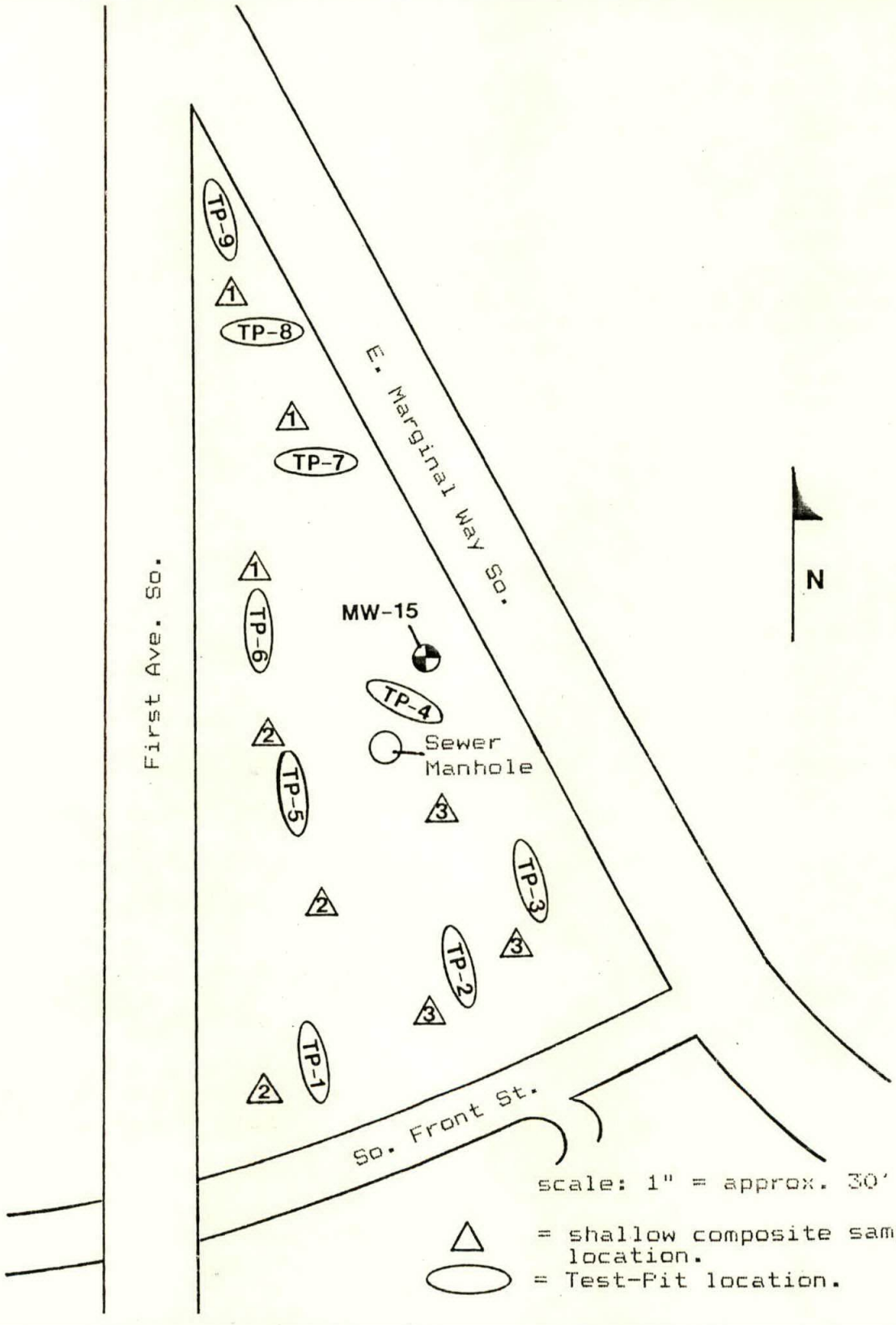
VICINITY MAP

Vacant Parcel of Property
6305 East Marginal Way South
Seattle, Washington

Job No:	Date:		Plate
2187	DEC 92		1



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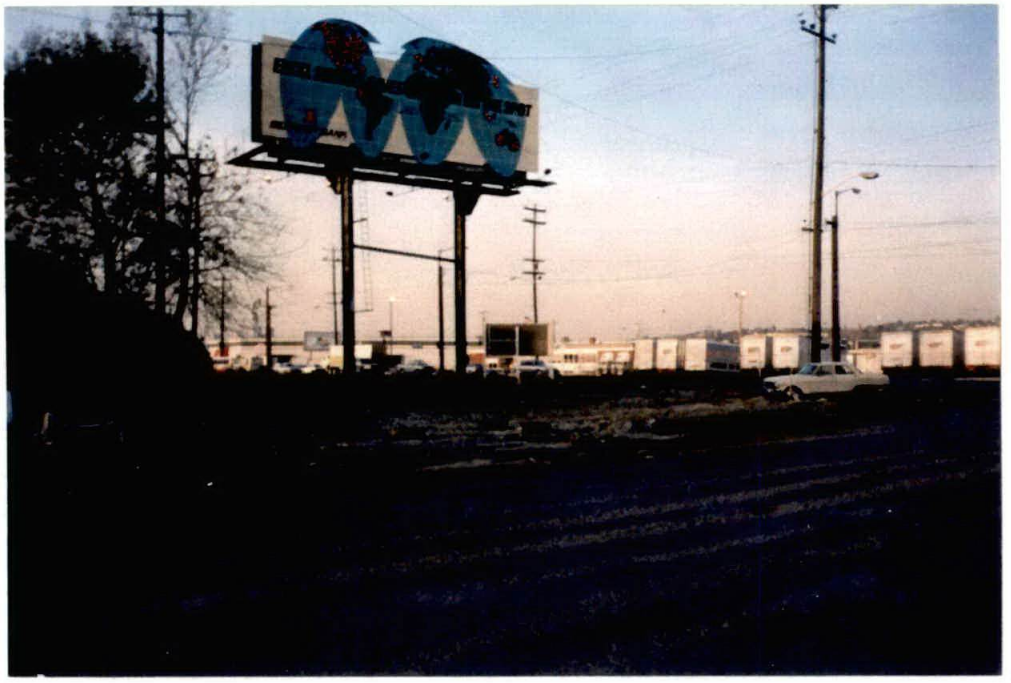
SITE EXPLORATION PLAN
Vacant Parcel of Property
6305 East Marginal Way South
Seattle, Washington

Job No:	Date:		Plate
2187	DEC 92		2



View north across So. Front St.

Completion of Test-Pit #5; note sawdust which can be found in fill material at the site.

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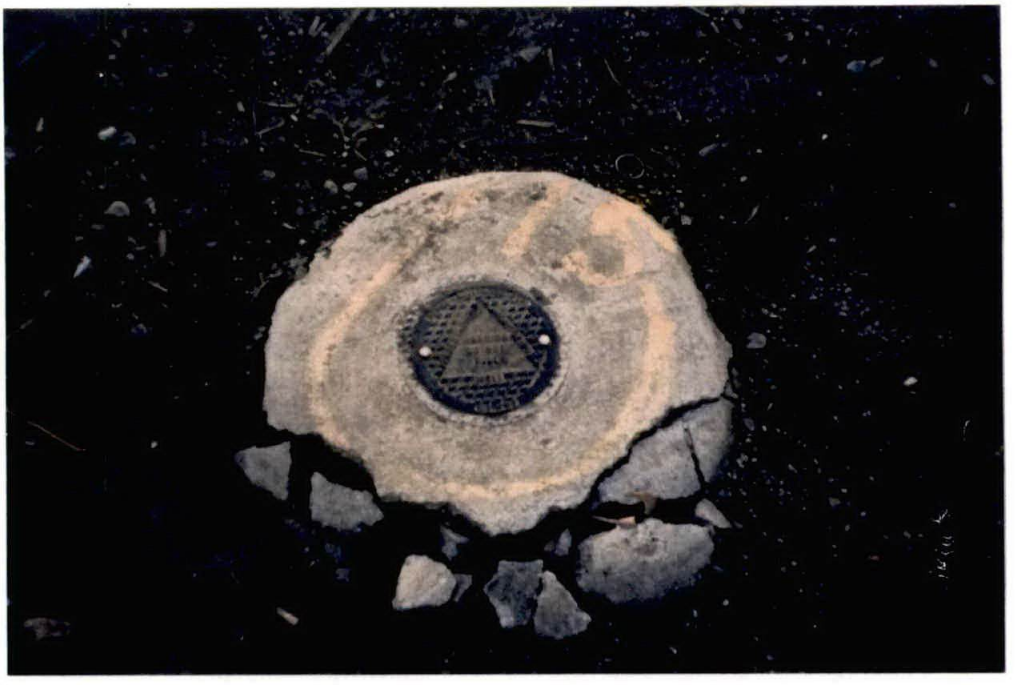
SITE PHOTOS

Job No:	Date:		Plate
2187	DEC 92		3

View south of subject property.



Existing groundwater monitoring well (MW-15) along E. Marginal Way South.

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SITE PHOTOS

Job No:	Date:		Plate
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