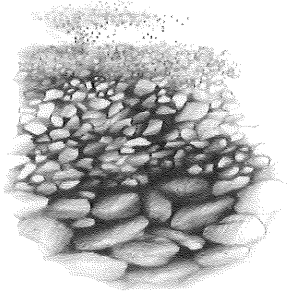


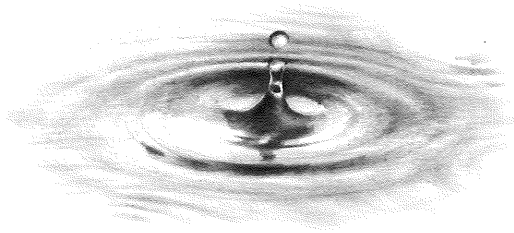
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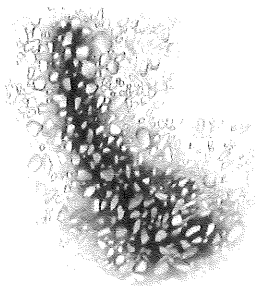
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Geotechnical Engineering



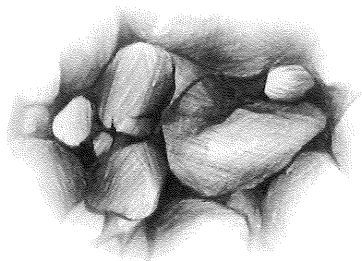
Water Resources



Environmental Assessments and
Remediation



Sustainable Development Services



Geologic Assessments

Associated Earth Sciences, Inc.
Celebrating 25 Years of Service

Independent Remedial Action Report

LAKEVIEW BUILDING

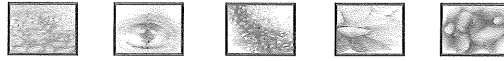
Seattle, Washington

Prepared for

Foushée

Project No. KE070183A
July 7, 2008

Associated Earth Sciences, Inc.



Celebrating Over 25 Years of Service

July 7, 2008
Project No. KE070183A

Foushée
3260 118th Avenue SE
Bellevue, Washington 98005

Attention: Mr. Mike Fey

Subject: Independent Remedial Action Report
Lakeview Building
Seattle, Washington

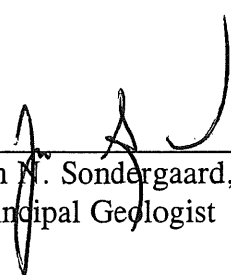
Dear Mr. Fey:

We are pleased to present the enclosed copies of the above-referenced report. This letter summarizes the results of the environmental work performed by Associated Earth Science, Inc. (AESI) and others during design and construction of the Lakeview Building.

Environmental and geotechnical studies began in 1988 and continued until the beginning of construction in 2007. AESI observed construction-related excavation activities at the Lakeview Building between May and August 2007. The documents summarized in this report represent only a portion of those prepared during design and construction of the project. Only those documents pertaining to environmental aspects of the project in AESI's possession at the time of preparation of this report have been included.

We appreciate the opportunity to be of service to you on this project. Should you have any questions regarding this letter or other environmental aspects of the project, please call us at your earliest convenience.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington



Jon N. Sondergaard, P.G., P.E.G.
Principal Geologist

JNS/dr - KE070183A6 - Projects\20070183\KE\WP

Kirkland ▪ Everett ▪ Tacoma
425-827-7701 425-259-0522 253-722-2992
www.aesgeo.com

INDEPENDENT REMEDIAL ACTION REPORT

LAKEVIEW BUILDING

Seattle, Washington

Prepared for:

Foushée

3260 118th Avenue SE
Bellevue, Washington 98005

Prepared by:

Associated Earth Sciences, Inc.

911 5th Avenue, Suite 100
Kirkland, Washington 98033
425-827-7701
Fax: 425-827-5424

July 7, 2008

Project No. KE070183A

I. REMOVAL AND DISPOSAL OF CONTAMINATED SOIL

Associated Earth Sciences, Inc. (AESI) is pleased to provide this report documenting the removal and disposal of contaminated soil encountered during the construction of the Lakeview Building project. We understand this document is needed in support of a LEED Certification for the Lakeview project. This report has been prepared for the exclusive use of Foushée and their agents, for specific application to this project. Within the limitations of scope, schedule, and budget, our services have been performed in accordance with generally accepted environmental assessment practices in effect in this area at the time our report was prepared. No other warranty, express or implied, is made.

1.0 PREVIOUS REPORTS

1.1 Reports by Others

AESI reviewed the following pertinent documents prepared by others for the Lakeview building site and adjacent related buildings in preparation of this report:

1. *Preliminary Geotechnical Engineering Study, Proposed Quadrant Lake Union Center, Seattle, Washington*, prepared by Geotech Consultants, Inc., their project number JN88318, dated September 20, 1988.
2. *Preliminary Environmental Study of Parcels A, B, and C, Burlington Northern Right-of-Way, Quadrant Lake Union Waterfront Center, Seattle, Washington*, prepared by Geotech Consultants, Inc., their project number JN-9008 Rev. 1, dated April 18, 1989.
3. *Geotechnical Engineering Study, Adobe Systems at the Quadrant Lake Union Center, 700 North Northlake Way, Seattle, Washington*, prepared by Geotech Consultants, Inc., their project number JN 96176, dated July 3, 1996.
4. *Geotechnical Engineering Considerations, Proposed Building 3 of East Development, Quadrant Lake Union Center, Seattle, Washington*, prepared by Geotech Consultants, Inc., their project number JN96176-3, dated November 25, 1997.
5. *Groundwater Analytical results from December 26, 2000, sampling Event, Proposed Lakeview Building, Quadrant Lake Union Center*, prepared by IT Corporation, their project number 793645(02), dated January 30, 2001.

These five reports are summarized below and contained in Appendix A.

The "Preliminary Geotechnical Engineering Study" by Geotech Consultants, Inc., dated September 20, 1988 investigated the subsurface conditions for the entire 14-acre Quadrant

Lake Union Center property in the 400 to 900 blocks of North 34th Street. The area of their investigation included the Lakeview site, located at the east end of the area of their investigation. Eight test borings were drilled across the entire property in late August and early September 1988. Borings B-1 through B-5 were located in the west half of the Lake Union center property, while boring B-7 was the closest exploration located near the southwest corner of the Lakeview Building property. Borings B-6 and B-8 were located to the west and south of the site, respectively. Six soil samples were tested by Am Test, Inc. of Redmond, Washington, during the course of the project. The samples were tested for oil and grease, priority pollutant metals, and/or pentachlorophenol. Geotech Consultants concluded that "no significant amounts of any of these contaminants were found."

The preliminary environmental study prepared by Geotech Consultants, Inc. dated April 18, 1989 was a preliminary assessment of the potential for contamination along the Burlington Northern Right-of-Way that extended across the entire 14-acre Quadrant Lake Union Center property prior to construction of the new buildings. The scope of the study included a visual reconnaissance of the site, review of aerial photograph from the period 1936 through 1988, sampling of near surface soils from selected locations along the railroad right-of-way using hand excavation implements, and laboratory analysis for petroleum hydrocarbons, polychlorinated biophenyls (PCBs), organic halides, and chlorinated herbicides, including (2, 4-D), (2, 4, 5-TP), (2, 4, 5-T), and dicamba. Geotech Consultants, Inc. considered these to be the most likely contaminants to be present. Twelve soil samples were collected during their investigation. Only samples 8 and 9 are in the general area of the Lakeview Building site, according to the sampling locality description included in the laboratory analysis summary table located at the end of their report. The only testing performed on these samples was for petroleum hydrocarbons. The testing yielded petroleum hydrocarbon concentrations ranging from 183 to 111 ppm (parts per million), but they report that the results are affected by the presence of coal fragments. Only two of the 12 samples collected across the 12-acre property were tested for the other analytes.

The "Geotechnical Engineering Study" by Geotech Consultants, Inc., dated July 3, 1996 investigated the subsurface conditions for the Adobe Building. The site plan and their description of the project in 1996 indicates that the area of the investigation was bounded by Fremont Avenue on the west, the Aurora Bridge on the east, the ship canal on the south, and North 34th Street on the north. The investigation was performed to further define the depth to suitable foundation bearing soils and utilized three borings performed in 1988. Five additional borings were performed within the area of the investigation but only B-1 and B-5 were located within the area of the Lakeview Building. B-1 was located in the extreme southeast corner of the site, while B-5 was located within the railroad right-of-way adjacent to the base of the existing retaining wall, in the northeast corner of the site. The report references the 1989 preliminary environmental study and does not indicate that additional contamination was encountered in any of their new borings, including borings B-1 and B-5 on the Lakeview Building site.

The "Geotechnical Engineering Study" by Geotech Consultants, Inc., dated November 25, 1997 presents geotechnical engineering considerations for "Building 3," which is the Lakeview Building site. The study was performed to address specific issues related to the installation of recommended augercast piles. The study used borings B-1 and B-5 from the 1996 investigation and included two additional borings (B-1A and B-2A) drilled in September 1997 and three test pits (TP-1, TP-2, and TP-3) excavated in September 1997. The borings were drilled in the southern third of the site, while the test pits were excavated within the northern half of the site. The letter does not indicate that additional contamination was encountered in any of the new explorations.

The January 30, 2001 letter, by IT Corporation, presents results from sampling of ground water from dewatering wells W-2 and W-5, located along the southern and eastern edges of the Lakeview Building footprint, respectively. The purpose of the study was "to further evaluate the presence of pentachlorophenol (PCP) in the ground water at the site." The letter summarizes sampling events conducted on November 28, and December 11, 20, and 26, 2000. The letter concluded that PCP was intermittently present in the ground water at the site at concentrations that slightly exceed cleanup levels (MCTA Method B and MCL) based on the use of the ground water for drinking water purposes. The letter notes that because the ground water at the site is not currently used for drinking water purposes, nor is it reasonably likely to be used in the future, the detected concentrations of PCP do not appear to present a threat to human health. The letter also concludes that the PCP levels present in the ground water do not pose a threat to the environment, should it migrate to the ship canal.

1.2 AESI Reports

AESI prepared the following pertinent documents for the Lakeview Building site during the course of the project:

1. *Subsurface Exploration, and Geotechnical Engineering Report, Quadrant Lake Union Center, Lakeview Building, University Place, Washington*, project number KE00162G, dated May 10, 2000.
2. *Supplemental Exploration Pits, Lakeview Building, 801 North 34th Street Seattle, Washington*, prepared for Quadrant Corporation, project number KE00162G, dated August 16, 2000.
3. *Lakeview Building Dewatering Profiles, 801 North 34th Street, Seattle, Washington*, prepared for Quadrant Corporation, project number KE00162G, dated February 21, 2001.
4. *Environmental Closure Letter, Lakeview Building, Seattle, Washington*, prepared for Foushée, project number KE070183A, dated September 7, 2007.

All four of AESI's reports are summarized below and are contained in Appendix A. The analytical data from the September 2007 Environmental Closure letter are included in Appendix B.

AESI performed a geotechnical engineering study for the Lakeview Building site in April and May, 2000. The results of that study are contained in AESI's report, dated May 10, 2000. The study included drilling three exploration borings to address the subsurface conditions at the site and provide geotechnical engineering recommendations for construction of the Lakeview Building. The study utilized previous subsurface explorations performed by Geotech Consultants (report dated November 25, 1997). Two of AESI's exploration borings (EB-2 and EB-3) were performed in the north half of the site, while the third (EB-1) was located in the southeast quadrant of the site within the building footprint. None of AESI's explorations encountered evidence of contamination at the elevations sampled.

AESI performed supplemental exploration pits for the Lakeview Building in early August, 2000. The explorations were performed to further characterize the existing fill that would be encountered during construction of the building. A total of seven exploration pits (EP-101 through EP-107) were excavated throughout the site. Exploration pits EP-101, EP-102, EP-103, EP-106, and EP-107 were located in the north-central portion of the site, while EP-104 was located in the southwest corner of the site and EP-105 was located in the southeast corner of the site. Samples of the fill were collected, consistent with local standards of practice. Composite samples were collected where no definite indications of contamination were present. Discreet samples were collected at depths in the exploration pits where hydrocarbon-like odors were noted. The samples were transferred to IT Corporation. AESI did not have the results of any testing that may have been performed on those samples at the time of preparation of this report. However, only exploration pits EP-105 and EP-107 noted petroleum odors in soils at depths of 14 feet, and 4 to 8 feet bgs (below the existing ground surface). These exploration pits are located in the southeast quadrant of the building footprint.

AESI prepared a letter to Quadrant, dated February 21, 2001, addressing dewatering at the site during construction. Five dewatering wells were installed by Hos Bros. Construction along the south and east property lines in the southeast quadrant of the site. AESI did not continuously observe the installation of the wells, but did observe the procedures used and the finished wells. Three piezometers were also installed in the southeast quadrant of the site to monitor ground-water-level response to pumping. The approximate locations of the dewatering wells and piezometers are shown on the location map contained in the letter. AESI was on-site continuously to observe the soil conditions and installation of the piezometers. AESI did not perform any sampling or analysis related to potential contamination. No evidence of contamination is noted in the soil descriptions contained in the piezometer logs in the letter.

AESI prepared an environmental closure letter for Foushée at the conclusion of excavation activities related to construction of the foundation for the Lakeview building. The letter summarized the results of AESI's environmental observations, sampling, and testing performed

during mass excavation, augercast pile installation, and other construction-related excavation activities at the Lakeview Building between May 7, 2007 and August 23, 2007. The observations and conclusions of this letter are restated in following sections of this report.

2.0 PROJECT DESCRIPTION

The project consisted of construction of a new office building on the Quadrant Lake Union Center site. The footprint of the building covers about 46,300 square feet. The new Lakeview building is situated east of the existing Plaza Building, and north of the existing Adobe Waterfront Building. The new building includes three levels of parking below, and three levels of office space above, with the floor slab of the lowest parking level at approximately elevation 10 feet. The new building is similar in construction materials and style to the existing adjacent buildings, including reinforced concrete parking levels. The upper levels consist of steel framework, post-tensioned, concrete floors and masonry exterior. The adjacent buildings were constructed with pile foundation support, as was the Lakeview building.

The site is located at the northeast corner of the Quadrant Lake Union Center, and is bordered by North 34th Street to the north, by the Plaza building to the west, by the Adobe Waterfront building to the south, and by the Aurora Bridge, commercial buildings, and a marina to the east. Prior to construction, the project area was occupied by a landscaped lawn and parking area at the ground surface, with considerable thickness of existing fill in some areas. A substantial landscape mound constructed of fill was located in the southern half of the building footprint. Portions of Parking Levels A, B, and C have already been constructed beneath the Plaza Building and existing landscaping, and the new parking level construction joins and is continuous with the parking levels at adjacent buildings.

3.0 SOIL SAMPLING AND ANALYSES

Detectable concentrations of petroleum hydrocarbons were documented in much of the soil removed for the basement excavation. Although concentrations were below Model Toxics Control Act (MTCA) cleanup levels in most areas, all soils with odor or other observable indications of petroleum contamination were disposed of at the Rinker facility, located in Everett, Washington.

All soils from the basement excavation were exported from the site by J.R. Hayes & Sons (Hayes). Soils determined to be clean were transported to the Hayes' pit in Maple Valley, Washington. Petroleum-hydrocarbon-containing soils were transported by Hayes to Rinker. AESI's work at the site included:

- Observation of test pits excavated at the site.

- Observation of soil and ground water conditions during excavation activities, including installation of augercast piles. AESI monitored the soils and ground water for observable indications of contamination, such as odor, sheen, and staining.
- Collection of representative environmental grab samples of the soils. The samples were transported daily under chain-of-custody to a local environmental testing laboratory (Friedman & Bruya, Inc.) for testing and storage.

Approximate locations of environmental samples and test pits are shown on Sheet 1. In general, the soil samples were collected near potential point sources identified in previous site documents, around previously unknown potential point sources discovered during excavation, and from the old fill that was ubiquitous across the site. Testing of one ground water sample at the site indicated chemical concentrations in ground water were below cleanup standards for the tested analytes. A summary of the laboratory test data (Table 1) is attached to this report. Laboratory test certificates are presented in Appendix B.

3.1 Old Fill and Piles

Prior to construction of the Lakeview Building, the thickness of the old fill below the subject property ranged from less than 10 feet on the north side of the site adjacent to the North 34th Street retaining wall to approximately 40 feet along the south property line adjacent to North Northlake Way. The old fill generally consisted of sand, silt, and gravel intermixed with clay, concrete rubble, cobbles, sawdust and wood (including logs), and other debris.

As part of the planned building construction, the old fill was completely removed over a portion of the excavation in order to install the underground parking facility. The bottom of the excavation for the building was terminated at an elevation of approximately 9 feet amsl (above mean sea level). The approximate contact between the native soils and the fill soils exposed at the bottom of the excavation is shown on Sheet 1. The fill soils were excavated in stages, around known contamination hot spots and suspected contaminated soils, as analytical data for soil samples of the excavation became available. All contaminated soils from known (previously tested) hot spots, soils with greater than 200 ppm TPH, as determined from testing of samples during excavation, and suspected contaminated soils immediately adjacent to these areas above the bottom of the parking garage were removed from the excavation and transported off-site to Rinker Materials in Everett, Washington, for treatment and disposal.

In the northern portion of the bottom of the foundation excavation, where dense native glacial soils were observed, we observed no evidence (odor, staining, sheen) of impacted soils during construction. In the southern two-thirds of the bottom of the foundation excavation, where older fill soils were observed, some small areas of impacted soils were left in place. Creosote piles were observed at the southwest corner of the building and in the central third of the building, near the fill/native contact. Many of these piles were removed. Some creosote piles were left in place when it was not possible to pull them out of the foundation subgrade soils.

Some creosote-contaminated soils can be expected within approximately 6 inches of the pile surface at the locations of the piles.

Soil test data indicate that metals concentrations and the majority of the hydrocarbon (diesel and motor oil) concentrations in soils were below MTCA Method A cleanup levels throughout the majority of the site at the bottom of the foundation excavation. The only observed area where elevated hydrocarbon concentrations above the MTCA Method A cleanup level were left in place in soils beneath the building was in the extreme southeast corner of the site, in the vicinity of test pit TP-205. Concentrations of diesel and motor oil in soil samples below the building subgrade are shown on Sheet 1. Based on these results and field observations, the approximate limits of contamination left in place below the building are presented on Sheet 1. The soils in these areas commonly exhibit a petroleum sheen, staining, and odor. We also observed occasional piles in these areas.

3.3 Augercast Pile Installation

AESI was on-site continuously during installation of the augercast piles to observe the soils for indications of contaminants and document the installation of the piles. The soil conditions observed during installation of the augercast piles is in general agreement with the soil conditions documented in previous site studies. If evidence of contaminant impact (odor, sheen, discoloration, etc.) was observed in the soil cuttings during drilling, the soils were segregated and transported off-site to Rinker Materials in Everett, Washington, for treatment and disposal.

3.6 Native Soils

Excavation activities by the general contractor, Foushée, and their subcontractors to construct the new building have removed all of the old fill from the northern third of the building footprint. The native soils typically consisted of stiff to hard silt, and dense to very dense, sand and gravel. Only one small area of native soils in the east end of the building footprint, very near the contact with the overlying fill, shows evidence of contamination associated with treated piles observed in the area. No evidence of contamination was observed throughout the remainder of the native soils in this area of the building.

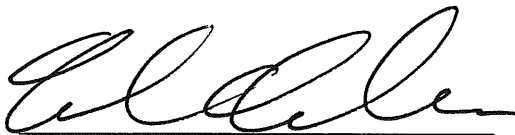
4.0 CONCLUSION

Construction of the new Lakeview Building has resulted in the removal of soils containing petroleum hydrocarbon, chromium, and arsenic concentrations above the MTCA Method A or Method B cleanup criteria for these contaminants. All of these soils were transported off-site by City Transfer to Rinker Materials in Everett, Washington, for treatment and disposal. Some soils containing above-MTCA-cleanup concentrations of petroleum and chromium remain in the subgrade soils below the lower level concrete parking slab in the south half of the

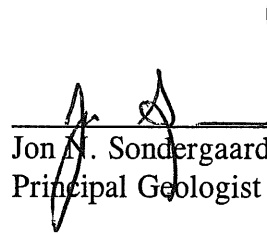
site. In AESI's opinion, these soils present a low risk to the development, considering they represent only a small percentage of the total area of the subgrade below the lower level parking slab, combined with the thickness of the concrete slab and the forced air ventilation that has been installed in the parking area. We understand the slab sub-drains installed below the lower parking level slab have been tied in to the existing parking structure drainage for the parking garage to the south. In our opinion, the property has been remediated to the requirements of the MTCA, and no further remedial action or monitoring is required.

We have enjoyed working with you on this project. If you should have any questions, or require further assistance, please do not hesitate to call.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington



Frank S. Mocker, P.G., P.E.G.
Senior Staff Geologist



Jon N. Sondergaard, P.G., P.E.G.
Principal Geologist

Attachments: Sheet 1: Environmental Sample Location Map
Table 1: Summary of Laboratory Test Results
Appendix A: Reports by AESI and Others
Appendix B: Laboratory Analytical Results

Sampling Point	Media	Elevation (feet amsl ²)	Date Sampled	Diesel	Motor Oil	Analytical Test Results (ppm ^{1,3})										R ^{6/7}
						Chromium	Arsenic	Selenium	Silver	Cadmium	Barium	Lead	Mercury	Penta-chloro-phenol		
ES 31	Soil	13	5/15/2007	79	150	11	2.56	<1	<1	<1	51.6	30.3	<0.2	<1	R	
ES 34	Soil	15 to 20	5/15/2007	<50	<125	11.7	1.96	<1	<1	<1	31.3	6.81	<0.2	<0.1	R	
ES 35	Soil	14 to 20	5/15/2007	<50	<125	18.4	3.06	<1	<1	<1	49.5	12.5	<0.2	<0.1	R	
ES 36	Soil	13	5/15/2007	93x	410	17	5.11	<1	<1	<1	68.1	33.7	<0.2	<1	R	
ES 38	Soil	9	5/15/2007	320x	1,200	21.1	9.99	<1	<1	<1	123	236	<0.2	<0.1	I	
ES 48	Soil	8.25	5/16/2007	63,000	46,000										I	
ES 49	Soil	8.25 to 8.5	5/16/2007	<50	<125										I	
ES 52	Soil	8.33	5/17/2007	300	170	12.3	4.58	<1	<1	<1	63.1	46.7	<0.2	<1	I	
ES 53	Soil	8.5	5/17/2007	<50	<125	11.4	2.23	<1	<1	<1	59.1	13.2	<0.2	<0.1	I	
ES 54	Soil	9.5	5/17/2007	440	280	9.76	3.33	<1	<1	<1	70.7	63.4	<0.2	<1	R	
ES 57	Soil	Stockpile	5/18/2007	<50	<125										R	
ES 58	Soil	Stockpile	5/18/2007	<50	<125										R	
ES 59	Soil	Stockpile	5/18/2007	<50	<125										R	
ES 60	Soil	17	5/21/2007	<50	490	13	3.3	<1	<1	<1	63.1	17.3	<0.2	<1	R	
ES 61	Soil	12	5/21/2007	130	390	6.96	7.91	<1	<1	<1	163	118	<0.2	<1	R	
ES 62	Soil	14	5/21/2007	<50	<125	7.63	<1	<1	<1	<1	16.2	1.28	<0.2	<0.1	R	
ES 63	Soil	10.5	5/21/2007	380	420	14.3	4.92	<1	<1	<1	58.1	23.9	<0.2	<1	R	
ES 64	Soil	14	5/21/2007	<50	<125	9.07	1.02	<1	<1	<1	21.7	3.77	<0.2	<0.1	R	
ES 65	Soil	15 to 20	5/21/2007	<50	<125	9.61	1.85	<1	<1	<1	21	2.4	<0.2	<0.1	R	
W4 (MW S-1)	Water		5/2/2007	<50	<250	<1	<1	<1	<1	<1	63.8	<1	<0.2	<2	R	
Cleanup Levels (MTCA Method A or B)				2,000	2,000	2,000 ⁹	20	400	400	2	5,600	250	2	8.33		

NOTES: ¹ ppm Parts per million

² amsl Above mean sea level

³ x The pattern of peaks present is not indicative of diesel. The result is due to overlap from the motor oil range.

⁴ j The result is below normal reporting limits. The value reported is an estimate.

⁵ N/A Not applicable

⁶ R Tested soils were removed and exported from the site.

⁷ I Tested soils remain in place below the building floor slab.

⁸ Results for water sample MW-5-1 in micrograms per liter ($\mu\text{g/l}$) equal to parts per billion (ppb).

⁹ Based on chromium III cleanup standard.

APPENDIX A

Reports by AESI and Others

GEOTECH CONSULTANTS, INC.

13256 N.E. 20th St. (Northup Way), Suite 16
Bellevue, WA 98005
(206) 747-5618
FAX 747-8561

September 20, 1988

JN 88318

The Quadrant Corporation
P.O. Box 130
Bellevue, Washington 98009

Attention: Barbara Chilcote

Subject: Preliminary Geotechnical Engineering Study
Proposed Quadrant Lake Union Center
Seattle, Washington

Gentlemen:

We are pleased to present this preliminary geotechnical engineering report for the proposed Quadrant Lake Union Center to be constructed in the 400 to 900 blocks of North 34th Street in Seattle, Washington. The purpose of our work was to explore site conditions and provide earthwork and foundation design criteria for planning purposes.

The subsurface conditions of the proposed building site were explored with eight test borings. We found the site to be underlain by dense to very dense silty sands generally at depths of thirty to forty feet. Loose silts and sands, and occasionally soft peat, overlies the dense soils. Structural loads should be transferred to the dense underlying soils using augercast piers or driven piling. Laboratory tests on several soil samples showed no significant contamination.

The attached report contains a more detailed discussion of the study and recommendations. If there are any questions, or if we can be of further service, please contact us.

Respectfully submitted,

GEOTECH CONSULTANTS, INC.

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



PRELIMINARY GEOTECHNICAL ENGINEERING STUDY

QUADRANT LAKE UNION CENTER
SEATTLE, WASHINGTON

RECEIVED

APR 3 1996

This report represents the results of our preliminary geotechnical engineering study of the site of the proposed Quadrant Lake Union Center in Seattle. The site is located in the 400 to 900 blocks of North 34th Street in the Fremont district of Seattle. The general location of the site is illustrated on the Vicinity Map, Plate 1. Based on our discussions with Quadrant, we anticipate that the development will include office and multi-use buildings. The buildings along the waterfront will be two to three stories in height and the buildings further back from the waterfront may be up to six stories in height. One conceptual plan shows a total of nineteen buildings in the development, including the new Burke Building and two existing buildings which would remain.

SITE CONDITIONS

SURFACE

The existing building locations and the site configuration is illustrated on Plate 2. The property south of North 34th Street is roughly triangular in shape and covers approximately fourteen acres. The portion of the planned center which we studied lies between North 34th Street and the Lake Washington Ship Canal, and between Phinney Avenue North and Aurora Avenue North. The Fremont Bridge divides the property into an eastern and western half, while the Aurora Bridge crosses high above the property along the eastern edge of the site. The property is bounded on the north by a retaining wall that supports North 34th Street. The wall rises from zero feet in height at the west end of the site to a maximum height of twenty-seven and one-half feet at the Fremont Bridge. The wall then drops to a height of thirteen feet at the eastern property line. Topographically, the site is relatively flat, except along the bank of the canal. Twelve buildings (A through L) presently occupy the site along with parking garages and storage areas under the Fremont Bridge. Buildings G through K are of wood-frame construction, with the remaining buildings being of brick and/or concrete construction. Evidence of distress caused by differential settlement is visible on the elevation of Buildings B and M. Those areas on the site not covered by buildings are generally paved with asphalt.

SUBSURFACE

The subsurface conditions were explored by eight borings at the approximate locations shown on Plate 2. The borings were drilled on August 31 and September 1 and 2, 1988, using a truck-mounted hollow stem auger drill. Samples were taken at five (5) foot intervals using a standard penetration sampler. This two-inch outside diameter split spoon sampler is driven into the soil with a one hundred forty (140) pound hammer falling thirty (30) inches. The number of blows required to advance the sampler a given distance is an indication of the soil density or consistency. A geotechnical engineer from our staff observed the drilling process, logged the test borings, and obtained representative samples of the soils encountered. The Test Boring Logs are attached to this report as Plates 3 through 10.

The uppermost soil unit is fill consisting of loose silt and sand. The fill thickness varies from three feet near the western edge of the property to thirty feet or more in the eastern portion. Underlying the fill, we encountered medium dense silty sand and silt to a depth of thirty to forty feet. In several borings we encountered a five to ten-foot thick layer within this unit that was dense, however, it is underlain by loose soils. A layer of peat, approximately three feet thick, was also found in this soil unit at a depth of thirty-one feet in the eastern portion of the site. Dense to very dense glacial till consisting of silty, gravelly sand underlies the entire site at depths generally beginning at thirty-five to forty feet and extending to a maximum explored depth of forty-four feet.

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.

GROUNDWATER

Groundwater levels at the site will be controlled by the level of the Lake Washington Ship Canal. Groundwater seepage was observed at a depth of 2.5 to 17.5 feet in the test borings. The water levels reflect the locations of seepage through the side of the boring walls at the time of the drilling. Longer term water level monitoring was not conducted. It is expected that light seepage could occur at elevations above the canal level in permeable zones recharged from the hillside to the north of the site.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

We explored the subsurface soil conditions of the site with eight test borings. Dense to very dense glacial till soils consisting of silty, gravelly sand was encountered generally at depths of thirty-five to forty feet, overlain by loose silty sand and silt. Near the surface, beneath the asphalt which covers most of the site, we encountered concrete slabs in five of the test boring sites. In our opinion, the underlying dense native soils may be relied upon to support moderate to heavy loads. Structural loads may be transferred to this underlying bearing horizon using either augercast concrete piers or treated timber piles. Inasmuch as the piers, or piles, will be end-bearing they will not be affected by seismic liquifaction of the loose, saturated upper soils. We point out, however, that driving piles in a highly developed area, such as the Fremont District, is often looked upon with disfavor by local residents. Damage, real or imagined, is often attributed to pile-driving operations. Minimum pier or pile lengths of thirty-five to forty-five feet, based on existing grade, may be anticipated.

For the heavier buildings, we recommend using augercast piers rather than timber piles because of their greater load-bearing capacity. The use of augercast piers would be subject to review by DCLU if the pier length exceeds thirty times the diameter since the Uniform Building Code (UBC) does not specifically address augercast piers. We also recommend that the lowest level of any of the proposed buildings be at least slightly higher than the highest level of the canal, although some groundwater seepage can be expected at any level of excavation in this area.

AM Test, Inc. of Redmond tested six soil samples for contamination from oil and grease, priority pollutant metals, and/or pentachlorophenol (wood preservative). No significant amounts of any of these contaminants were found. Results of the tests are attached to this report.

AUGERCAST CONCRETE PIERS

Augercast piers should be installed with continuous flight, hollow stem auger equipment. Concrete grout must be pumped continuously through the auger as the auger is withdrawn. The rate of withdrawal should not exceed nine (9) feet per minute.

The grout pressure at the grout pump should be in the range of 150 to 250 psi, depending on the length of feeder hose used. The pump should be equipped with a calibrated stroke counter so that grout volumes may be calculated. For a sixteen (16) inch diameter pier with five (5) feet of penetration into the very dense sand strata, an allowable capacity of thirty (30) tons may be assumed. The pier capacity can be increased by three (3) tons per additional foot of embedment to a maximum capacity of seventy-five (75) tons per pier. For wind or seismic loads the allowable load can be increased by one-third. We can provide design criteria for different pier diameters if greater capacities are required. Based on limited test boring information, we estimate a minimum pier length of about thirty-five (35) to forty-five (45) feet will be required.

We estimate that total settlement of single piers will be on the order of one-half inch. Most of this settlement should occur during the construction phase as the dead loads are applied. The remaining post-construction settlement would be realized as the live-loads are applied. We estimate differential settlements over any portion of the structures should be less than about one-quarter inch. No reduction of pier capacity for group action will be necessary if the piers are spaced a minimum of three pier diameters apart (centerline to centerline).

Lateral pier capacity is generally governed by deflections at the top of the pier which depend on the pier stiffness with respect to the surrounding soil near the upper portion of the pier, the length of the pier, and the degree of fixity at the pier cap. We suggest for design purposes that a lateral pier capacity value of two tons should be used. Greater lateral load values may be possible, depending on the reinforcing in the pier. Passive earth pressure on the grade beams will also provide some lateral resistance. Passive earth pressures on the grade beams can be assumed to be equal to that exerted by a fluid having a density of three hundred pounds per cubic foot (pcf). The piers should be reinforced their entire length.

As the completed pier below ground cannot be observed, judgement and experience must be used as the basis for determining the acceptability of a pier. Therefore, we recommend that the installation of all piers be observed by a qualified geotechnical engineer who can fully evaluate the contractor's operation, collect and interpret installation data, verify bearing stratum elevations, and who would understand the implications of variations from normal procedures with respect

to the design criteria. We suggest the contractor's equipment and procedures be reviewed by Geotech Consultants prior to the start of construction.

DRIVEN TIMBER PILES

The proposed structures may be supported on sound pressure-treated Class B piles driven into the underlying very dense silty sandy soils. The piles should conform to the specifications as outlined in the Uniform Building Code Standard 25-14 for end bearing piles. Timber piles should have a minimum butt diameter of twelve inches and a minimum tip diameter of eight inches. Driven piles should be placed no closer than three pile diameters, center line to center line. Alternatively, steel piles can be used to support heavier loads per pile. Specific criteria for high capacity pipe piles can be developed once the load capacity requirements are known. We recommend, however, that augercast piers be used if high capacities are needed.

For wood piles an allowable bearing capacity of thirty tons can be used. The piles should be driven to refusal. Refusal is defined as thirty blows per foot for the last one foot of driving, when driven with a hammer having a rated energy of fifteen thousand (15000) foot-pounds. The minimum penetration is ten feet below grade. The piles should be marked in one foot increments to facilitate the recording of blow counts during the driving process. The pile number should be clearly marked on the location stake. We recommend that the piles be driven with a steam, air or diesel hammer with fixed leads.

Based on the test boring information, we expect that wood pile lengths will vary between thirty-five and forty-five feet below existing grade. Because soil conditions can be variable, we recommend that at least four test piles per building be driven, before ordering of production piles, to obtain a more accurate estimate of pile lengths and to determine driving characteristics. The piles and hammer used should be the same type as to be used in production driving. Geotech Consultants personnel should observe the installation of both the test piles and production piles on a full-time basis.

We anticipate timber piles which are driven to refusal, will have total or differential settlements on the order of one-quarter inch.

Lateral loads due to wind or seismic forces may be restricted by the piles and by passive pressure on the grade beams. We anticipate piles will have a lateral capacity of one

ton per pile. Additional lateral loads can be resisted by battered piles, friction between the slab and the subgrade, and passive earth pressures on the grade beams. Piles may be battered at an angle of 1:5 (horizontal to vertical) without reduction of vertical load capacity. A coefficient of friction of 0.35 may be used between the floating concrete slab and subgrade. Passive earth pressures on the grade beams can be assumed to be equal to that exerted by a fluid having a density of three hundred (300) pounds per cubic foot (pcf).

SLAB-ON-GRADE FLOORS

Inasmuch as piers (or piles) will be used for structural support of the buildings, a decision must be made on whether or not to transfer floor loads to the pier system. Construction of a grade slab floor over the existing fill involves some degree of risk. If floor loads are to be low and some irregular settlement and cracking can be tolerated, the slabs can be supported on the existing fill soils. One precaution which could be employed would consist of proof-rolling of the building area with a loaded dump truck. Any soft areas encountered would then be excavated and replaced with select imported material.

We recommend that concrete slabs be placed over at least one foot of granular structural fill. Isolation joints should be provided where the slabs intersect columns and walls. Control and expansion joints should also be used to control cracking from expansion and contraction. Saw cuts or preformed strip joints used to control shrinkage cracking should extend through the upper one-fourth of the slab. The spacing of control or expansion joints is a function of the amount of steel placed in the slab. Reducing the water/cement ratio of the concrete and curing of the concrete by preventing evaporation of free water until cement hydration occurs will also reduce shrinkage cracking.

A 6-mil polyethylene plastic vapor barrier should be used under floors likely to receive an impermeable floor finish or where passage of water vapor through the floor is undesirable. Based on American Concrete Institute recommendations, we suggest placing a two to three-inch layer of sand over the vapor barrier to protect the vapor barrier and to allow some moisture loss through the bottom of the slab to reduce warping in the curing process. Sand should be used to aid in the fine grading process of the subgrade to provide uniform support under the slab.

PERMANENT 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) pounds per cubic foot (pcf). If walls are to be restrained at the top from free movement, a uniform force of one hundred (100) pounds per square foot (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 three hundred (300) pcf and a coefficient of friction of 0.40. 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 granular soils containing no organics. The wall backfill 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 drainage product such as Miradrain or Enkadrain may be used. The purpose of this is to assure that the design criteria for the retaining wall is not exceeded because of a build-up of hydrostatic pressure behind the wall.

SITE DRAINAGE

We recommend the use of footing drains at the base of all footings and earth retaining walls. Roof and surface water drains must be kept separate from the foundation drain system. The footing drains should be surrounded by at least six inches of one-inch-minus washed rock. The rock should be wrapped with non-woven geotextile filter fabric (Mirafi 140N, Supac 4NP, or similar materials). At the highest point, the perforated pipe invert should be at least as low as the bottom of the footing and/or crawl space and it should be sloped for drainage. A typical footing drain detail is attached to this report as Plate 14.

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 grading in areas adjacent to buildings should be sloped at least two percent away from the building, except where the area adjacent to the building is paved.

Some groundwater seepage is possible, and, if 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.

EXCAVATIONS AND SLOPES

We are unaware of any planned excavated slopes other than for utility trenches. In no case should excavation slopes be steeper or greater than the limits specified in local, state, and national government safety regulations. Temporary cuts up to a height of four feet may be made vertical. For slopes having a height greater than four (4) feet, the cut should have an inclination no steeper than 1:1 (horizontal:vertical) from the top of the slope. It should be noted that the sands will cave suddenly and without warning. Utility contractors should be especially aware of this potential danger.

All permanent cut slopes into native dense soils should be inclined no steeper than 2:1 (horizontal:vertical). Fill slopes also should not exceed 2:1 (horizontal:vertical). Water should not be allowed to flow uncontrolled over the top of any slope. Also, 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.

PAVEMENT AREAS

All parking and roadway areas may be supported on native soils or existing fills provided these soils can be compacted to 95 percent density and are stable at the time of construction. Structural fill and/or fabric may be needed to stabilize soft, wet or unstable areas. However, we recommend using Supac 5NP, manufactured by Phillips Petroleum Company, or a non-woven fabric with equivalent strength and permeability characteristics, and at least one foot of Class A gravel structural fill under the pavement section. The subgrade should be evaluated by Geotech Consultants, Inc. after the site is stripped and cut to grade. 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. All subgrade areas must also be in a stable, non-yielding condition prior to paving. The pavement section for lightly loaded traffic and parking areas should consist of two (2) inches of asphalt concrete (AC) over four (4) inches of crushed rock base (CRB) or three (3) inches of asphalt treated base (ATB). We recommend that heavily loaded areas be provided with three (3) inches of AC over six (6) inches of CRB or four (4) inches of ATB. The heavily loaded areas are those areas such as main driveways and areas with truck traffic, especially where trucks are turning. These guidelines are based on our experience in the area and on what has been successful in similar situations. We can provide recommendations based on expected traffic loads and R value tests, if requested. Some maintenance and repair of limited areas can be expected. To provide for a design without the need for any repair would be uneconomical.

SITE PREPARATION AND GENERAL EARTHWORK

We recommend that existing building foundations, floor slabs and pavement be removed from the proposed building areas. Structural fill under floor slabs and foundations should be placed in horizontal lifts and compacted to a density equal to or greater than 95 percent of the maximum dry density in accordance with ASTM Test Designation D-1557-78 (Modified Proctor). The fill materials should be placed at or near the optimum moisture content. Fill under pavements and walks and behind retaining walls should also be placed in horizontal lifts and compacted to 90 percent of the maximum density except for the top twelve (12) inches which should be compacted to 95 percent of maximum density. The allowable thickness of the fill lift will depend on the material type, compaction equipment and the number of passes made by the equipment. In no case should the lifts exceed twelve (12) inches in loose thickness. Geotech Consultants, Inc. should observe site conditions prior to fill placement. On-site soils will generally be unsuitable for use as structural fill or backfill.

Ideally, structural fill which is to be placed in wet weather should consist of a granular soil having no more than 5 percent material passing the No. 200 sieve. The percentage of particles passing the 200 sieve should be measured on that portion of the soil passing the three-quarter inch sieve.

LIMITATIONS

Geological factors such as stratigraphic discontinuities that occur between test borings and soil exposures, or variations in groundwater conditions are not predictable with a limited exploration program or conventional engineering analysis. Such non-quantifiable risks must be borne by the owners.

This preliminary report has been prepared for specific application to this project and for the exclusive use of The Quadrant Corporation and their representatives. 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 within the scope of our services and within budget and time constraints. No warranty is expressed or implied. The scope of our services does not include services related to construction safety precautions and our recommendations are not intended to direct the contractor's methods, techniques, sequences or procedures, except as specifically described in our report for consideration in design. We recommend that this report, in its entirety, be included in the project contract documents for the information of the contractor.

ADDITIONAL SERVICES

It is recommended, when more complete site plans are available, that Geotech Consultants, Inc. review these plans. Additional test borings may be required to develop specific criteria for the building foundation. The additional exploration required will depend on building locations and foundation loads.

It is also recommended that Geotech Consultants, Inc. be retained to provide geotechnical consultation, testing, and observation services during construction. This is to confirm that subsurface conditions are consistent with those indicated by our exploration, to evaluate whether earthwork and foundation construction activities comply with the intent of contract plans and specifications, and to provide recommendations for design changes in the event subsurface conditions differ from those anticipated prior to the start of construction. We recommend

The Quadrant Corporation
September 20, 1988

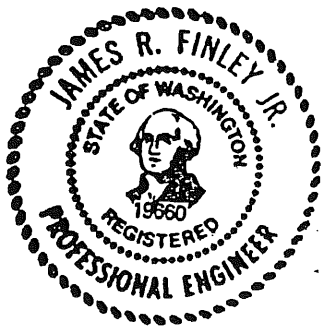
JN 88318
Page 11

that a representative of our firm be present during placement of structural fill to observe the process and to conduct density tests in the fill.

The following plates are attached and complete this report:

Plate 1	Vicinity Map
Plate 2	Test Boring Location Plan
Plates 3 - 10	Test Boring Logs
Plates 11 - 13	Grain Size Analysis
Plate 14	Footing Drain Detail
Attachment	AM Test Analysis Report

Respectfully submitted,
GEOTECH CONSULTANTS, INC.

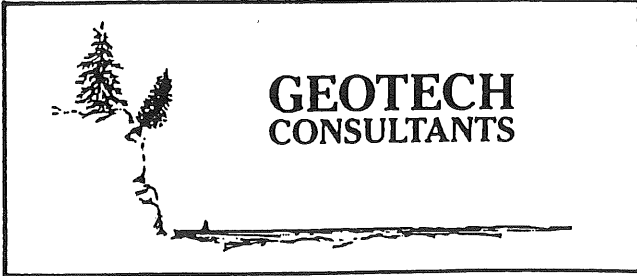
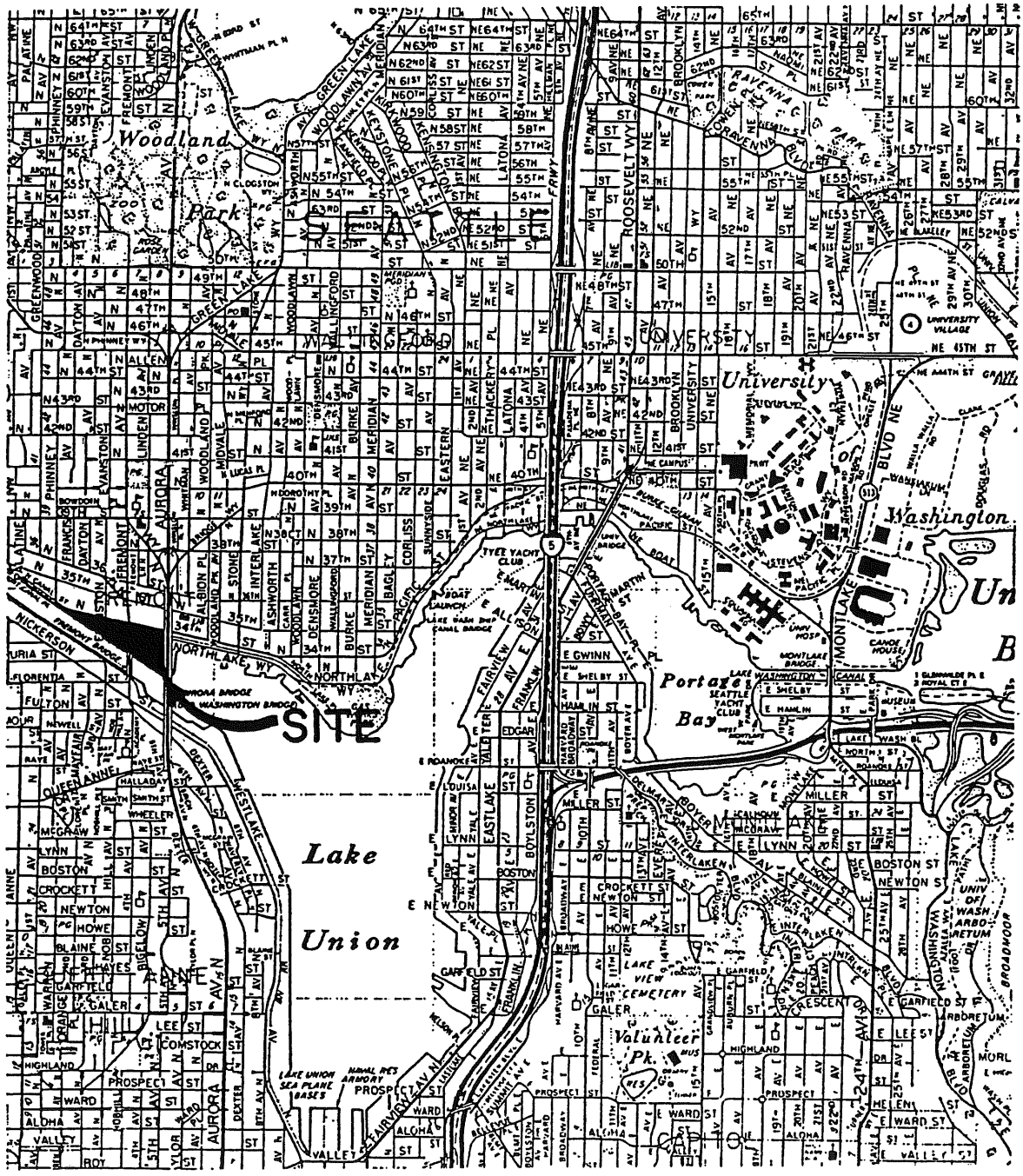


Dennis B. Green
Dennis B. Green
Geotechnical Engineer

James R. Finley, Jr.
James R. Finley, Jr. P.E.
Principal

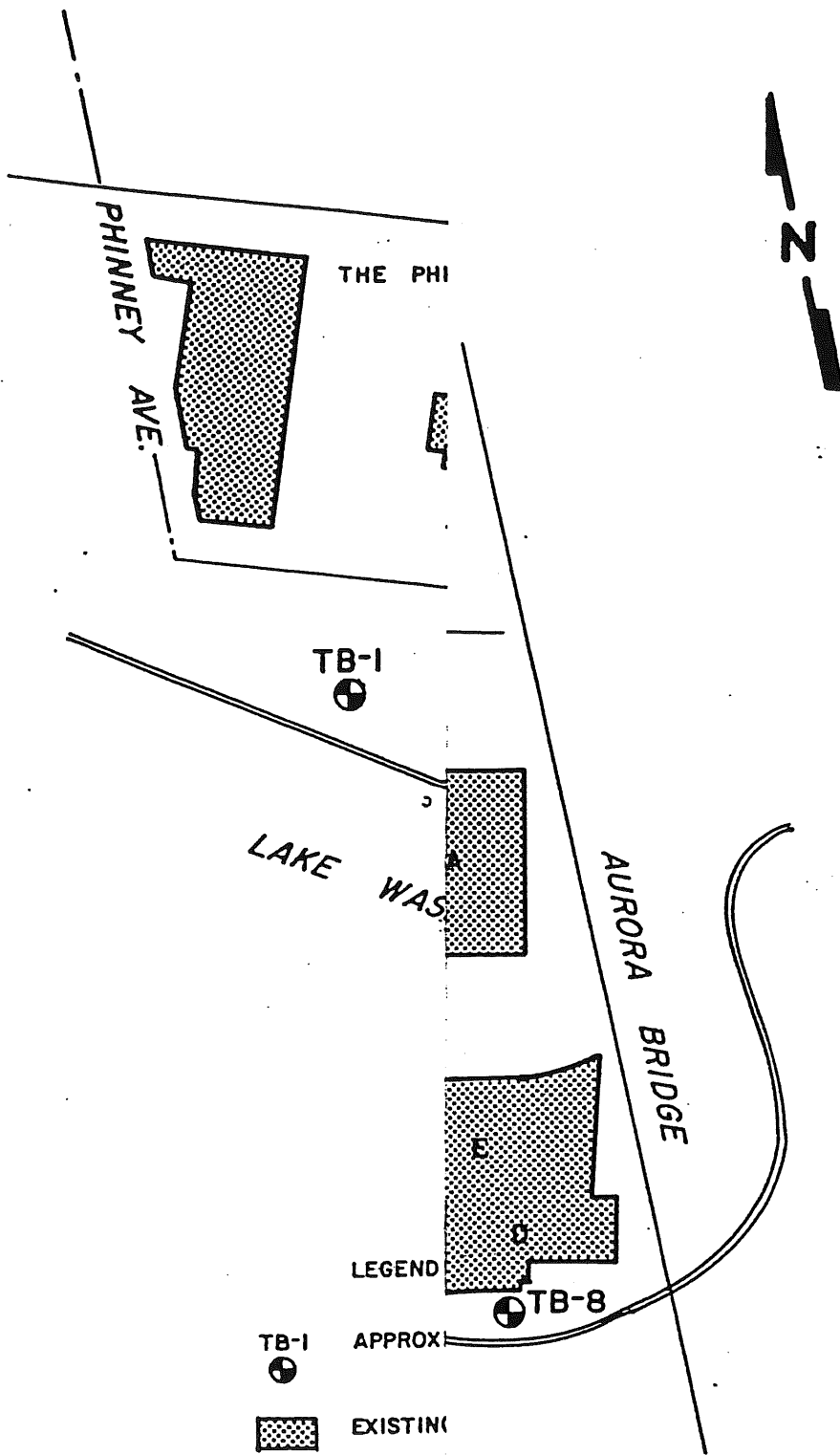
Attachments

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VICINITY MAP
QUADRANT LAKE UNION CENTER
SEATTLE, WASHINGTON

Job No.:	Date:	Plate:
88318	SEPT. 1988	1

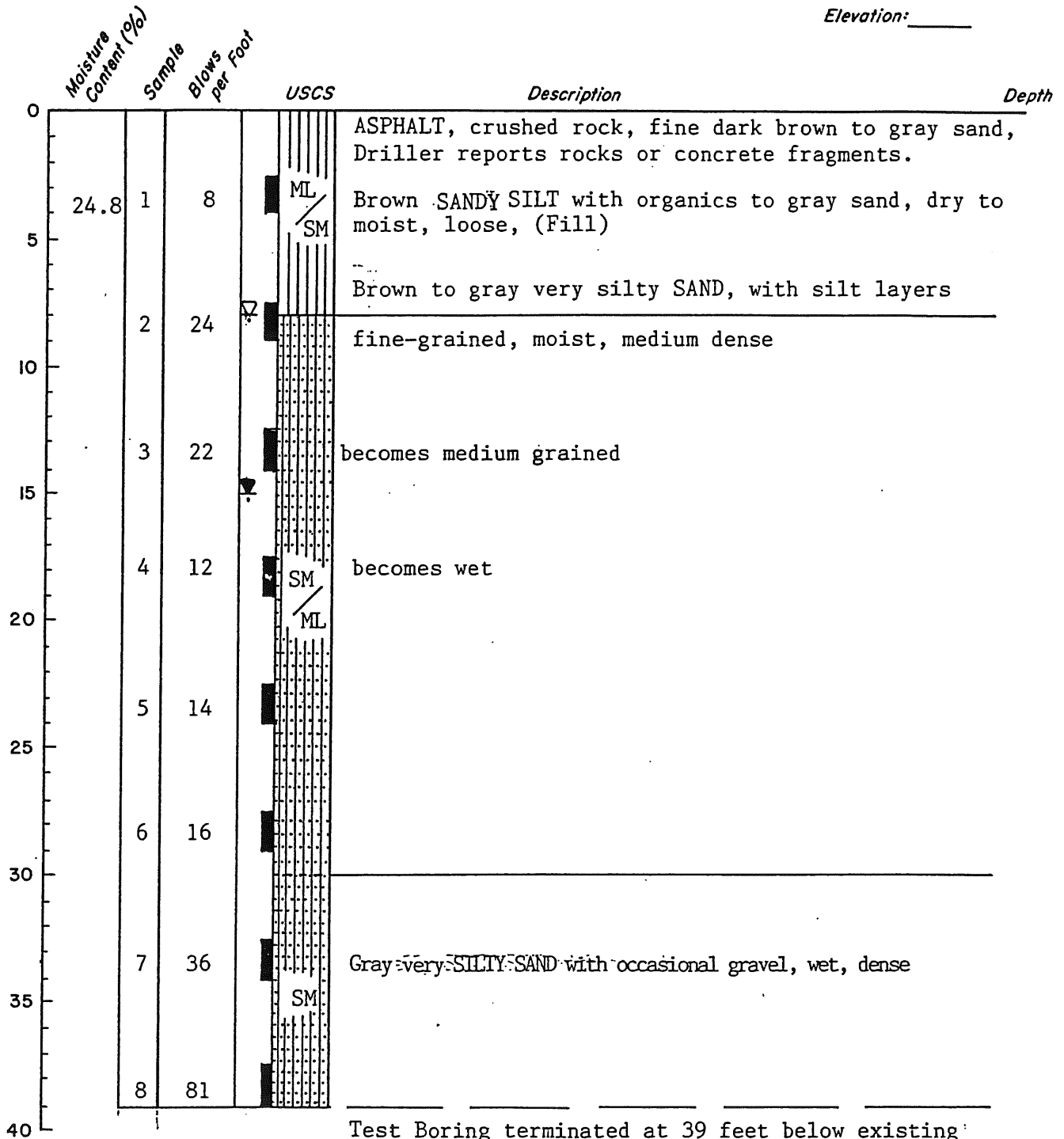


TEST BORING LOCATION PLAN
 QUADRANT LAKE UNION CENTER
 SEATTLE, WASHINGTON

Job No. 88318	Date SEPT., 1988	Scale NO SCALE	Plate 2
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BORING 1

Elevation: _____



Test Boring terminated at 39 feet below existing grade. Groundwater seepage at 15 feet while drilling.



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TEST BORING LOG
QUADRANT LAKE UNION CENTER
SEATTLE, WASHINGTON

Job No.:
88318

Date:
SEPT. 1988

Logged By:
DBG

Plate:
3

BORING 2

Elevation: _____

	Moisture Content (%)	Sample	Blows Per Foot	USCS	Description	Depth
0					ASPHALT	
5		1	5	SM ML	Brown/Black SAND/SILT with charred wood, dry, loose, (Fill)	
10	7.7	2	62	SM	Brown SILTY SAND with silt layers, medium grained, wet, dense	
15		3	10	SM	Gray GRAVELLY SANDY SILT, wet, medium dense	
20		4	50	ML SM	becomes dense	
25		5	52	SM	Gray very SILTY very GRAVELLY SAND, wet to saturated, dense	
30		6	14			
35		7	57	SM	Gray SILTY GRAVELLY SAND, fine to medium grained, wet, very dense, (Glacial Till)	
40		8	50			

Test Boring terminated at 39 feet below existing grade. Groundwater seepage encountered at 6½ feet while drilling.



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TEST BORING LOG
 QUADRANT LAKE UNION CENTER
 SEATTLE, WASHINGTON

Job No.:	Date:	Logged By:	Plate:
88318	SEPT. 1988	DEG	4

BORING 3

Elevation: _____

Moisture Content (%)	Sample	Blows per Foot	USCS	Description	Depth
			OL	ASPHALT OVER CONCRETE	0
	1	11		Dark brown organics SILT & SAND, moist, loose	0 - 1
				Greenish-gray very SILTY SAND, fine to medium grained, moist, loose to medium dense	1 - 5
17.2	2	15	SM	becomes gray-tan and wet	5 - 10
				Gray SILTY SAND, medium to fine grained, saturated, medium dense, with gray SILT layers	10 - 15
	3	20			15 - 20
			SM ML		20 - 25
	4	32			25 - 30
				becomes GRAVELLY	30 - 35
	5	13			35 - 40
	6	50		Gray very SILTY GRAVELLY SAND, wet, very dense	40 - 45
					45 - 50
	7	50	SM		50 - 55
					55 - 60
	8	50			60 - 65

Test Boring terminated at 39 feet below existing grade. Groundwater seepage encountered at 13 feet while drilling.



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TEST BORING LOG
 QUADRANT LAKE UNION CENTER
 SEATTLE, WASHINGTON

Job No.:
88318

Date:
SEPT. 1988

Logged By:
DBG

Plate:
5

BORING 4

Elevation: _____

Moisture Content (%)	Sample	Blows per Foot	USCS	Description	Depth
				ASPHALT	0
10.8	1	20	SM	Tan SILTY SAND, medium grained, moist, medium dense, (Fill)	1
	2	11		Dark gray slightly SANDY SILT to SILTY SAND, wet, soft	7
	3	13		becomes medium dense	13
	4	51		becomes dense	20
	5	37	SM ML		27
	6	17		becomes medium dense	33
	7	17			37
	8	50	SM	Dark Gray very SILTY GRAVELLY SAND, wet, very dense	40

Test Boring terminated at 39 feet below existing grade. Groundwater seepage encountered at 7 feet while drilling.



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TEST BORING LOG
 QUADRANT LAKE UNION CENTER
 SEATTLE, WASHINGTON

Job No.: 88318	Date: SEPT. 1988	Logged By: DBG	Plate: 6
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BORING 5

Elevation: _____

	Moisture Content (%)	Sample	Blows Per Foot	USCS	Description	Depth
0				SM ML	ASPHALT & CONCRETE Mottled SAND & SILT with thin layer of organics, moist, loose, (Fill)	
1			15		Gray very SILTY SAND, moist, loose	
5					becomes wet and medium dense	
2			18			
10						
3			53	SM	Tan SILTY SAND, fine to medium grained, wet, dense	
15						
4			44		becomes saturated	
20						
5			16		Gray very SILTY SAND, fine grained with silt layers, saturated, loose to medium dense	
25						
6			25	SM ML		
30						
7			23			
35						
8			50	SM	Gray SILTY slightly GRAVELLY SAND, wet, very dense	
40						

Test Boring terminated at 39 feet below existing grade. Groundwater seepage encountered at 17½ feet while drilling.



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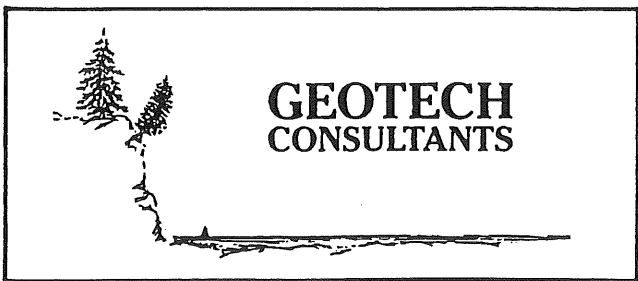
TEST BORING LOG
QUADRANT LAKE UNION CENTER
SEATTLE, WASHINGTON

Job No.: 88318	Date: SEPT. 1988	Logged By: DBG	Plate: 7
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BORING 6

Elevation: _____

	Moisture Content (%)	Sample	Blows per Foot	USCS	Description	Depth
0					ASPHALT over CONCRETE	
5		1	23	[Symbol]	WOOD entire sample, has odor probably treated pile	
10		2	5	[Symbol] SM	WOOD with some gravel	
15		3	11	[Symbol]	Gray SILTY SAND with some gravel, fine to medium grained, saturated, loose to medium dense	
20	13.7	4	46	[Symbol] SM	Gray SILTY SAND with silt layers, medium grained, saturated, dense	
25		5	62 71	[Symbol]		
Test Boring terminated at 25 feet below existing grade. NO groundwater seepage encountered during drilling.						
30						
35						



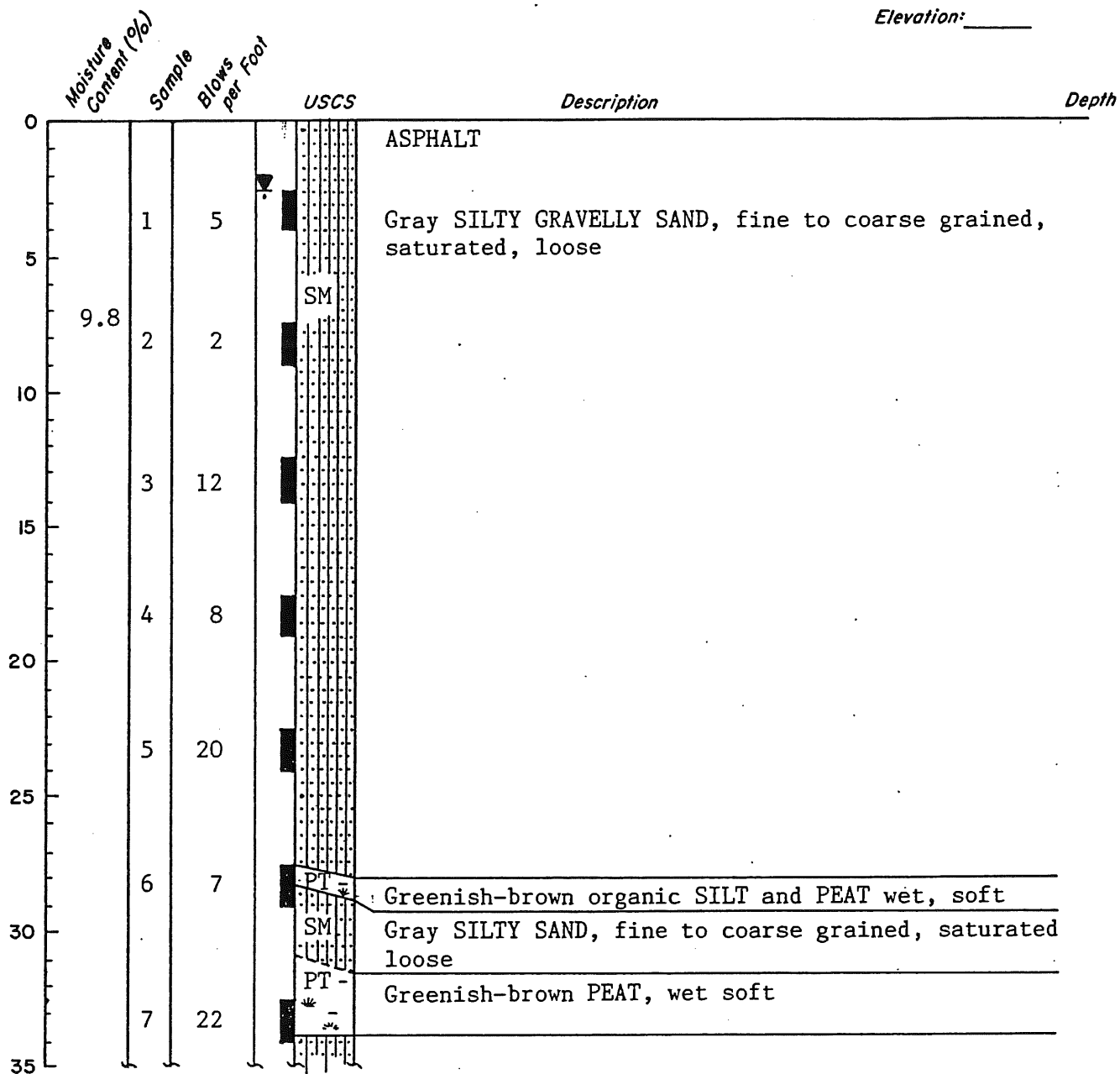
TEST BORING LOG

QUADRANT LAKE UNION CENTER
SEATTLE, WASHINGTON

Job No.:	Date:	Logged By:	Plate:
88318	SEPT. 1988	DBG	8

BORING 7

Elevation: _____



**GEOTECH
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TEST BORING LOG
 QUADRANT LAKE UNION CENTER
 SEATTLE, WASHINGTON

Job No.: 88318	Date: SEPT. 1988	Logged By: DBG	Plate: 9
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BORING 7 (cont.)

Elevation: _____

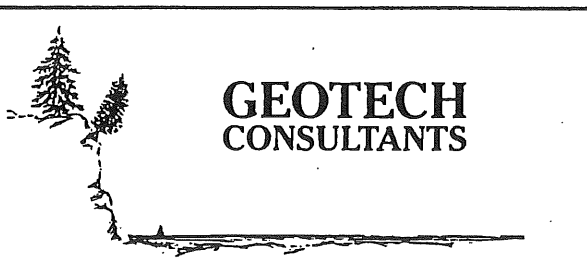
Moisture Content (%)	Sample	Blows per Foot	USCS	Description	Depth
	8	41	SM	Gray very SILTY SAND, medium grained, saturated dense	
	9	50			

Test Boring terminated at 43 feet below existing grade. Groundwater seepage encountered at 2½ feet while drilling.

35

40

45



TEST BORING LOG
 QUADRANT LAKE UNION CENTER
 SEATTLE, WASHINGTON

Job No.: 88318	Date: SEPT. 1988	Logged By: DBG	Plate: 9 cont.
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BORING 8

Elevation: _____

	Moisture Content (%)	Sample	Blows Per Foot	USCS	Description	Depth
0					ASPHALT	
1		13			Tan-brown SILT & SAND with brick and gravel, moist, loose, (Fill)	
5						
2		5				
10						
23.7		3	16			
15						
4		18		ML SM	Pounded on Brick	
20						
5		11				
25						
6		6			metal fragment	
30						
7		21		PT*	Brown organic SILT and PEAT, wet, loose	
35						



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TEST BORING LOG
 QUADRANT LAKE UNION CENTER
 SEATTLE, WASHINGTON

Job No.: 88318	Date: SEPT. 1988	Logged By: DBG	Plate: 10
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BORING 8 (cont.)

Elevation: _____

Moisture Content (%)	Sample	Blows per Foot	USCS	Description	Depth
	8	31	SM	Gray SILTY SAND with possible brick fragments, fine to medium grained, saturated, medium dense	
	9	50/5	SM	Dark Gray very SILTY SAND, fine grained, wet very dense	
<p>Test Boring terminated at 44 feet below existing grade. Groundwater seepage encountered at 6 feet while drilling.</p>					

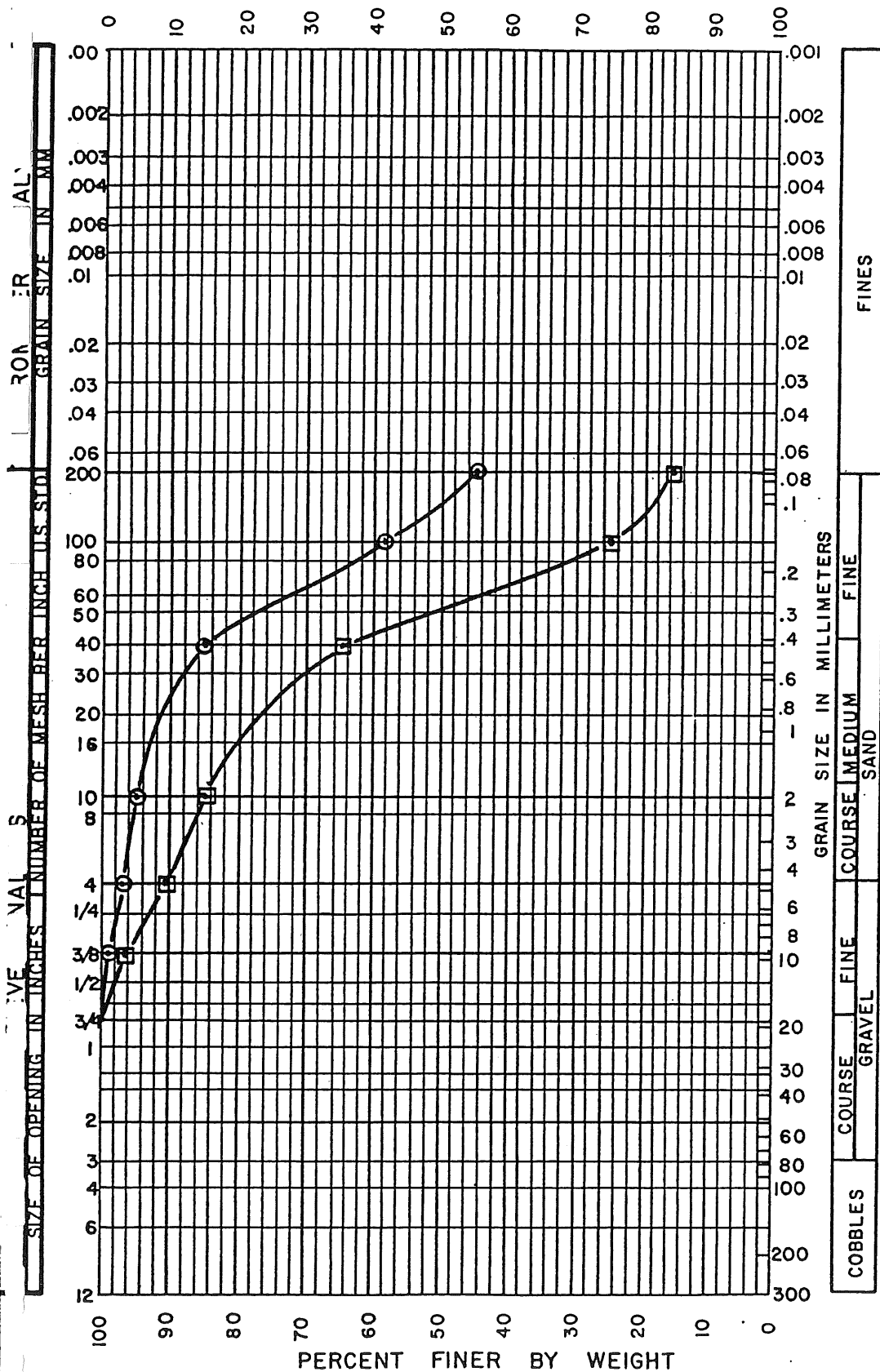


**GEOTECH
CONSULTANTS**

TEST BORING LOG
 QUADRANT LAKE UNION CENTER
 SEATTLE, WASHINGTON

Job No. 88318	Date SEPT. 1988	Logged By DBG	Plate 10 cont.
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PERCENT COARSER BY WEIGHT



BORING/TEST PIT	DEPTH	ELEV.	SAMPLE MOISTURE	SYMBOL	KEY	SOIL CLASSIFICATION
B-1	2'-4'		1	24.8%	SM	○—○ Silty Sand
B-2	7'-9'		2	7.7%	SM	□—□ Silty Sand



**GEOTECH
CONSULTANTS**

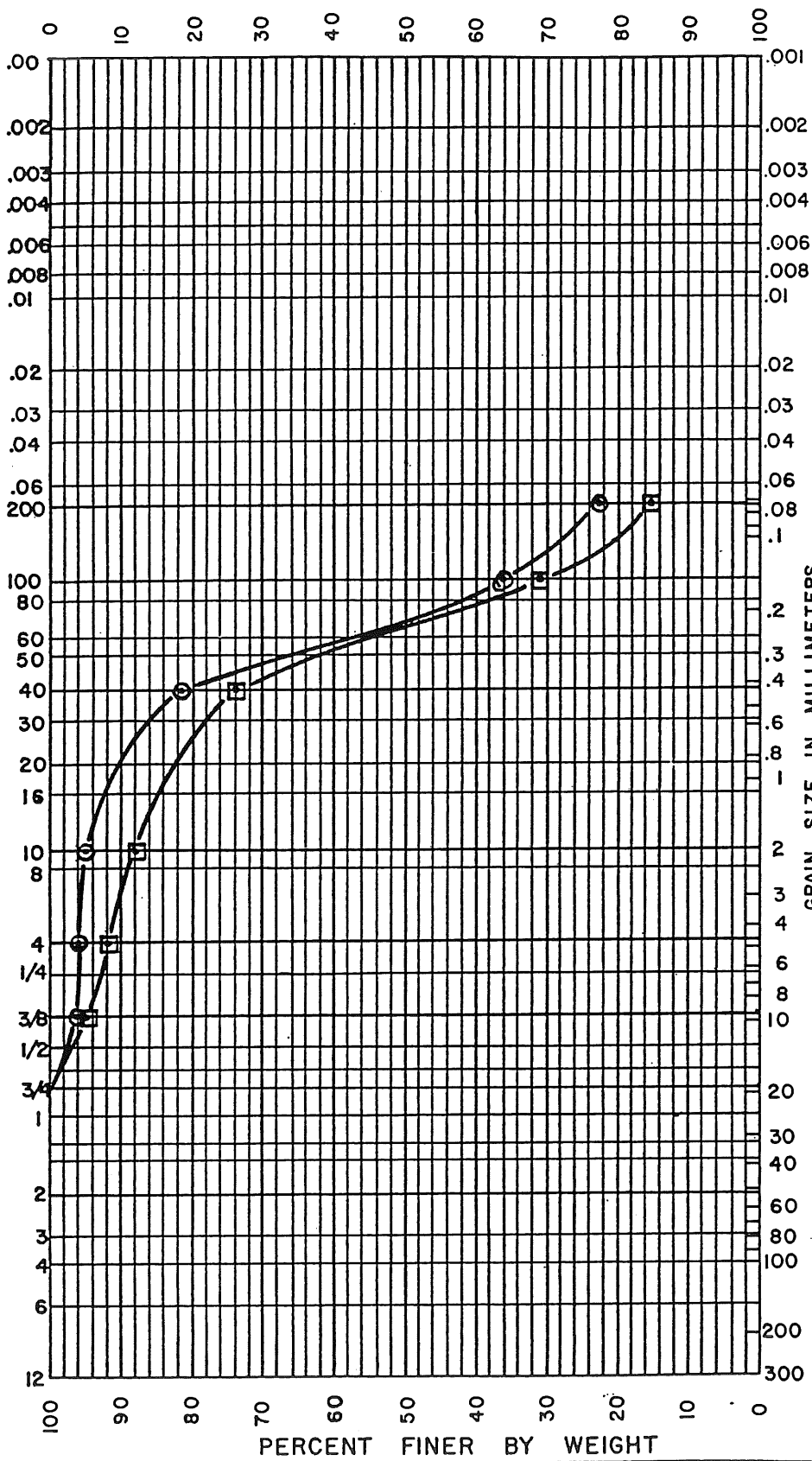
GRAIN SIZE ANALYSIS
QUADRANT LAKE UNION CENTER
SEATTLE, WASHINGTON

JN: 88318

PLATE: 111

SIEVE ANALYSIS
 SIZE OF OPENING IN INCHES
 NUMBER OF MESH PER INCH U.S. STD.
 HYDROMETER ANALYSIS
 GRAIN SIZE IN MM

PERCENT. COARSER BY WEIGHT



COBBLES
 COURSE GRAVEL
 FINE GRAVEL
 COURSE MEDIUM SAND
 FINE SAND
 FINES

BORING/TEST PIT	DEPTH	ELEV.	SAMPLE MOISTURE	SYMBOL	KEY	SOIL CLASSIFICATION
B-3	72-9'		2	SM	○	Silty Sand
B-4	22-4'		1	SM	□	Silty Sand
B-5						

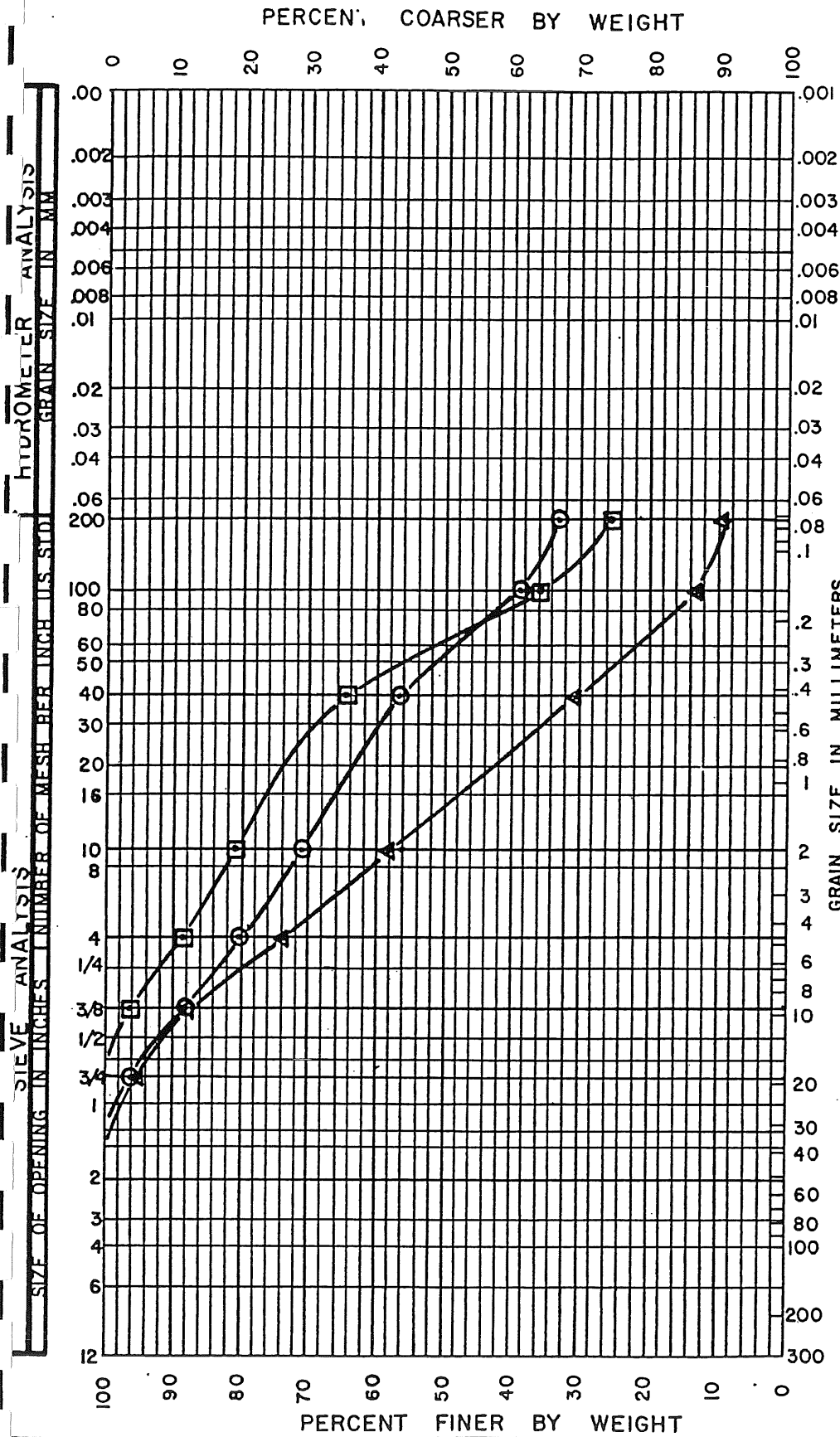


**GEOTECH
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GRAIN SIZE ANALYSIS
 QUADRANT LAKE UNION CENTER
 SEATTLE, WASHINGTON

JN: 88318

PLATE: 12

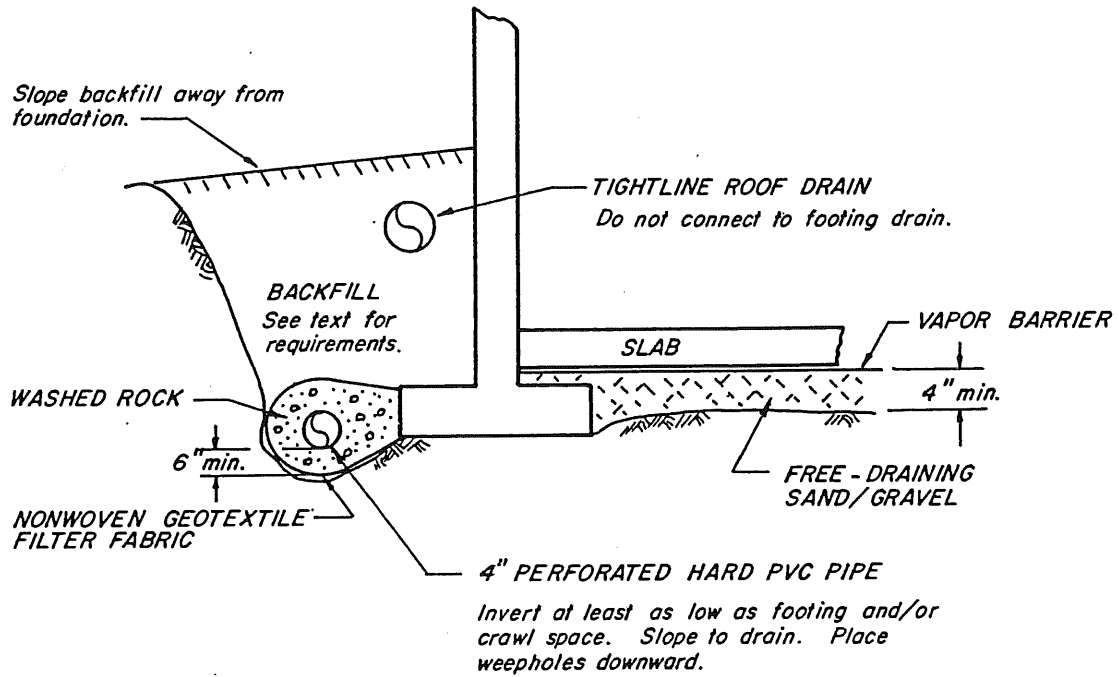


**GEOTECH
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GRAIN SIZE ANALYSIS
QUADRANT LAKE UNION CENTER
SEATTLE, WASHINGTON

JN: 8818

PLATE: 13



**GEOTECH
CONSULTANTS**

**FOOTING DRAIN DETAIL
QUADRANT LAKE UNION CENTER
SEATTLE, WASHINGTON**

Job No.:
88318

Date:
SPT. 1988

Scale:
N.T.S.

Plate:
14

QUADRANT LAKE UNION CENTER
ANALYSIS REPORT

<u>Laboratory Sample No.</u>	<u>Client Identification</u>	<u>Oil & Grease (uglg)</u>
817829	B-3 #1	<5.0
817830	B-3 #3	---
817831	B-4 #1	<5.0
817832	B-4 #2	31.3
817833	B-7 #1	<5.0
817834	B-8 #2	---

QUADRANT LAKE UNION CENTER
CHEMICAL ANALYSIS RESULTS

METAL	B-3 #1	B-4 #1	B-7 #1	B-8 #
ARSENIC	5.9	4.9 4.8	4.4	4.3
SILVER	<0.98	<0.85	<0.98 <0.96	<0.89
ANTIMONY	<2.0	<1.7	<1.9 <1.9	<1.8
BUYLLIUM	<0.69	<0.60	<0.69 <0.67	<0.62
CADMIUM	<0.20	<0.17	<0.19 <0.19	<0.18
CHROMIUM	38	24	31 33	23
COPPER	65	3.9	13 12	15
LEAD	3.1	2.5	5.9 6.7	44
NICKEL	35	20	27 25	25
MERCURY	<0.011	<0.011	0.027	0.012 0.008
SELINIUM	<0.60 <0.60	<0.52	<0.58	<0.61
THALLIUM	<0.098	<0.087	<0.097	<0.091
ZINC	21	13	56 58	96
TOTAL SOLIDS (%)	89.8	81.9	85.5	87.5 88.3

GEOTECH CONSULTANTS

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April 18, 1989

JN-9008
Rev. 1

Quadrant Commercial Division
Quadrant Plaza, Suite 500
Northeast 8th at 112th
Bellevue, Washington 98009

Attention: Barbara Chilcote, Development Manager

Subject: Preliminary Environmental Study of Parcels A, B, and C,
Burlington Northern Right-of-Way,
Quadrant Lake Union Waterfront Center,
Seattle, Washington.

Dear Ms. Chilcote:

In response to your recent request, and in accordance with the terms of our proposal to Quadrant dated March 3, 1989, the Environmental Services Division of Geotech Consultants, Inc., has completed preliminary environmental studies of the referenced parcels. This report presents a summary of our field exploration and laboratory methods along with results.

PROJECT DESCRIPTION/SCOPE OF WORK

The subject parcels are located immediately south of N. 34th Street, and extend in an east-west direction from the vicinity of Phinney Avenue N. on the west to Stone Way N. in the east. At the time of our study, the parcels were occupied by railway tracks, ties, and gravel bedding typical of railroad spur lines.

As noted in the reference proposal, the overall objective for this study was to provide a preliminary assessment with respect to the potential for the presence of contamination of soils or other materials along the railroad right-of-way.



METHODOLOGY

Our approach to the project included execution of the following tasks:

- (1) Visual reconnaissance of conditions along the entire length of the section of right-of-way being acquired was performed by an environmental scientist from our firm. Using maps furnished by Quadrant for reference, documentation regarding the location of spills, soil discoloration, vegetative stress, or other conditions which might suggest the presence of contamination was developed.
- (2) Geotech Consultants, Inc., environmental staff acquired and reviewed aerial imagery from the period 1936 through 1988 in an effort to discern railroad operating practices which could expose a particular area of the right-of-way to greater potential for contamination.
- (3) Geotech staff sampled near-surface soils from selected localities in the railroad right-of-way. In selecting sampling localities, an effort was made to assess areas of obvious soil staining as "worst case" examples, and to evaluate seemingly unaffected areas for the purpose of assessing "background" conditions.
- (4) Soil samples were obtained from various localities using hand excavation implements and were immediately placed in laboratory-sterilized glassware with teflon sealed lids. Samples were stored in an iced chest at the site and taken to the lab in this condition to preserve sample integrity. Each sample container was clearly labeled as to sampling location, unique identifying sample number, the name of the individual geologist/engineer doing the sampling, and the date and time.

Sampling locations were documented on the maps furnished by Quadrant, with locations fixed by reel tape measurements from known landmarks along the right-of-way. EPA recommended protocols for sample management including maintenance of chain of custody documentation were observed at each stage of the project.

(5) Following preliminary review of aerial imagery, and based on observations made during the route reconnaissance, the decision was made to evaluate soils for petroleum hydrocarbons, polychlorinated biphenyls (PCB's), organic halides (screen), and chlorinated herbicides including [2,4-D], [2,4,5-TP], [2,4,5-T], and dicamba. These compounds were considered as the most likely contaminants to be present based on observations and review of historical use or activity on the right-of-way.

Analysis for the contaminants noted in the preceding paragraph was accomplished using the following methods:

- * Total petroleum hydrocarbons, EPA Method 418.1.
- * Chlorinated Herbicides in soil, EPA Method 8150.
- * PCB's in soil, EPA Method 8080.
- * Total Organic Halides (TOH), EPA Method 8010.

RESULTS OF STUDY

General Observations - Surficial Conditions

Soils observed within the railway bedding and right-of-way generally consist of sandy-gravel overlying dark sandy soil containing coal fragments. The upper gravel "ballast" ranges from approximately one (1) to three (3) inches in thickness, and is generally discontinuous throughout the length of the right-of-way. The coal-bearing layer is approximately four (4) inches in thickness, and may be found at most locations along the railway. Beneath the coal-bearing layer is brown silty to sandy gravel which is the "native" soil in this area.

Table A appended to this report provides a convenient descriptive index to conditions found along the right of way during our reconnaissance and sampling effort. Each sampling locality number correlates with locations noted on the Sample Location Plan, Plate 1, appended to this report.

A brief review of the descriptions provided in Table A should be sufficient for the reader to conclude that several relatively small areas of obvious soil contamination by "oil" were visible at the time of the reconnaissance, and that an abundance of coal

fragments were present in the right-of-way area and railway bedding.

Results of Laboratory Analysis

Petroleum Hydrocarbons

As noted in the appropriate column of Table A appended to this report, hydrocarbon analysis of soils obtained from stained areas along the railroad right-of-way detected concentrations ranging from 128 parts per million (ppm) in sample number 6 to 11,700 ppm in sample number three. The significance of these results rests in part with guidelines for clean-up of petroleum spills outlined in a Washington Department of Ecology (WDOE) guideline document entitled "Policies and Procedures for Underground Storage Tank Removal", dated August 1, 1988. In the cited document, a target maximum concentration for clean-up of "oil" in soils is set at 200 ppm. Applying this guideline to the data presented in Table A, it is clear that many of the small surficial spills at the site would require clean-up under existing WDOE guidelines.

Polychlorinated Biphenyls (PCB's)

As noted in Table A, of the two samples analyzed for PCB's (samples 3 and 11), PCB's were only identified in sample 3 at a concentration of 4,000 parts per billion (ppb). Under definitions provided in applicable sections of the Dangerous Waste Regulations of the State of Washington, specifically Chapter 173-303-071 (k) WAC, materials containing less than one to two parts per million (i.e. 1,000 to 2,000 parts per billion) would be excluded from designation as dangerous waste. Unfortunately, as the material analyzed in the sample obtained at sampling locality 3 on this project contained 4,000 ppb, it technically qualifies as dangerous waste under the cited regulations, et seq. As explained in greater detail in the conclusions section of the report, the PCB problem appears to be relatively small in scope.

Herbicides

As noted in Table A, for the two samples analyzed for herbicides (samples 2 and 10), concentrations ranged from 50 ppb for 2,4,5-TP in sample number 2 to 310 ppb 2,4-D in the same sample. With respect to 2,4,5 T, the maximum concentration detected in the sample set was 250 ppb in sample number 2.

Under section 090 (8) of the Dangerous Waste Regulations, Chapter 173-303 WAC, maximum allowable concentrations for herbicides prior to designation of a material as "dangerous waste" are 10 parts per million (read this as 10,000 ppb for comparison to the results of this study) for 2,4-D. For 2,4,5-TP(silvex), the maximum allowable concentration is 1 part per million (1,000 ppb). Comparing the results presented in Table A to the regulations, it appears that the maximum concentration of 2,4,5-TP(silvex) detected in our samples of site soils was only 13 percent of the maximum allowable. Similarly, the highest concentration of 2,4-D detected in our samples of site soils was only 3 percent of the maximum allowable under the cited regulation.

Total Organic Halides

No organic halides were detected in a screening of site soils for these compounds using gas chromatography at a system detection limit of 75 parts per billion.

CONCLUSIONS/RECOMMENDATIONS

Based on the information developed as a result of this preliminary study, it would appear that with the exception of a few isolated small scale accumulations of oil, the subject parcels are free from hazardous or toxic 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.), The Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA: 42 USC, 9601, et seq.), and the recently enacted Washington State Senate Bill 6085 (known formally as the "State Superfund Act"), and that such substances have not been generated, stored, or disposed of on the subject parcels.

As noted in earlier sections of the report, PCB's were detected in the oil-stained materials in sample number 3 in concentrations exceeding the maximum allowable concentrations under existing regulations. Based solely on field observations, a preliminary estimate of the maximum volume of material which could require removal at the sample number 3 location is approximately seven

(7) cubic feet or roughly 52 gallons. A preliminary estimate for trucking and disposal fees excluding site excavation, special protection for staff, and supplemental analysis is approximately \$700. This figure is not to be used in any manner except for purposes of discussion, and may be revised.

While it is unlikely that this occurrence presents an immediate threat to public health or environmental resources, further interaction with the materials through such activities as clean-up, disposal, or construction would necessitate implementation of personal protective precautions for staff, and proper clean up and disposal procedures.

The Dangerous Waste Regulations, Chapter 173-303 WAC provide excellent guidance with respect to management of the PCB-containing materials. Briefly, the required management steps and applicable regulations include the following:

- (1) Complete WDOE notification Form 2 to obtain waste generator number. WAC 173-303-060.
- (2) Arrange for disposal of PCB material at an approved Treatment, Storage, and Disposal (TSD) facility possessing proper EPA permits authorized under 40 CFR Part 271. WAC-173-303-141.
- (3) Package the material in acceptable overpack drums or other storage devices as advised by the TSD facility. During all phases of excavation and packaging, personal protection equipment shall be worn by workers. For the sake of brevity here, we will be pleased to provide details for this activity at the time the clean up work is contemplated.
- (4) Prior to offering the material for shipping to TSD, complete an appropriate manifest prepared in accordance with instructions as described in the uniform manifest Appendix of 40 CFR, Part 262. (See WAC-173-303-180)
- (5) Following clean-up, obtain and analyze a supplemental sample for PCB's to provide confirming documentation with respect to the adequacy of the clean-up.

The Environmental Services Division of Geotech Consultants, Inc., maintains a staff of highly qualified and experienced staff, and

is fully prepared to assist the Quadrant Corporation in managing various aspects of the remediation activity as outlined in the preceding paragraphs.

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 March 3, 1989. This report is for the exclusive use of the Quadrant 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., Geotech Consultants, Inc., should be allowed to reevaluate the conclusions of this report and to provide amendments as required.

We appreciate the opportunity to provide environmental consulting services on this interesting project and we trust that the information presented here will be of value as you move forward in your development efforts. If you have any questions or if we may be of service, please do not hesitate to contact us.

Respectfully submitted,
GEOTECH CONSULTANTS, INC.

John F. Cole

John F. Cole
Senior Environmental Geologist

Don W. Spencer

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

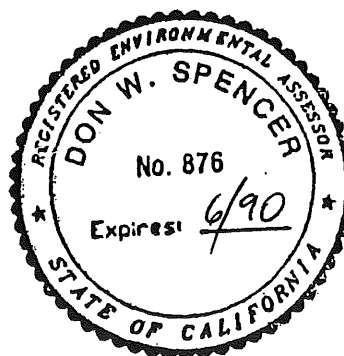


TABLE A - RESULTS OF LABORATORY ANALYSIS AND DESCRIPTION OF SAMPLING LOCALITIES

1) Drant Lake Union Waterfront Center - Railroad Right of Way Parcels

2) Tech Consultants, Inc., Don W. Spencer, M.Sc.

SAMPLING LOCATION	Petroleum Hydrocarb. (PPM)	PCB's (PPB)	Herbicides in Soil				Description of Sampling Locality
			2,4-D (PPB)	2,4,5-TP (PPB)	2,4,5-T (PPB)	Dicamba (PPB)	
1	224	NA	NA	NA	NA	NA Centerline of RR, 100 ft. E. of Phinney. Dk. brown soil.	
2	NA	NA	310	50	250	ND 5 feet N. of track, 250 ft. E. of Phinney. No plant growth.	
3	11700	4000	NA	NA	NA	NA Oil spill approximately 6 ft. diameter X 3 in. deep at switch.	
4	NA	NA	NA	NA	NA	NA Same as above.	
5	2420	NA	NA	NA	NA	NA N. of track @ Kuichak boats; oil stain around forms.	
6	128	NA	NA	NA	NA	NA 40 ft. west of #5. Oil stained gravel area 10 ft. X 10 ft.	
7	*613	NA	NA	NA	NA	NA Under Fremont bridge at switch. Dark soil with coal fragments.	
8	*182	NA	NA	NA	NA	NA Dark soil with coal frags. between Aurora and Fremont bridges.	
9	*111	NA	NA	NA	NA	NA Just W. of Aurora bridge; dark soil with coal.	
10	NA	NA	210	130	190	ND Between tracks 250 ft. E of Aurora bridge; dark soil.	
11	11400	ND	NA	NA	NA	NA 5 ft. dia., 3 in. deep oil spill at switch.	
12	10500	NA	NA	NA	NA	NA Centerline of RR.	

NOTES:

- 1) NA denotes no analysis performed.
- 2) ND denotes no detection of compound of interest within detection limits.
- 3) Asterisk (*) denotes result affected by presence of coal.
- 4) PPM denotes concentration in parts per million.
- 5) PPB denotes concentration in parts per billion (ug/kg).
- 6) Test for Total Organic Halides on samples 3, 5, 11, and 12 revealed no TOH above detection limit of 75 ppb.

GEOTECH CONSULTANTS, INC.

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Bellevue, WA 98005
(206) 747-5618
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July 3, 1996

JN 96176

The Quadrant Corporation
P.O. Box 130
Bellevue, Washington 98009

Attention: Barbara Chilcote

Subject: **Geotechnical Engineering Study**
Adobe Systems at the Quadrant Lake Union Center
700 North Northlake Way
Seattle, Washington

Dear Ms. Chilcote:

We are pleased to present this geotechnical engineering report for the Adobe Systems development to be constructed at the Quadrant Lake Union Center in Seattle, Washington. The scope of our work consisted of exploring site surface and subsurface conditions, and then developing this report to provide recommendations for general earthwork and geotechnical engineering design criteria.

The subsurface conditions of the proposed building site were explored with eight test borings that revealed competent, dense to very dense, native soil at depths ranging from near the ground surface on the site's northern portion to about 35 feet elsewhere. However, it appears that a large majority of the competent soil on the site is under old fill. We recommend that the Adobe complex be supported on augercast concrete piers embedded 10 to 20 feet into the competent soil. The lowest slab of the parking garage is proposed to be at an elevation of 10 feet, and underslab drainage will be needed, because the measured groundwater levels are near the proposed slab elevation. In addition, because the soil at the parking garage level is silty and will likely be wet at the time of construction, we recommend placing a mat of large, coarse material on the excavation subgrade level to provide drainage and a working pad.

A large retaining wall defines the northern edge on the development, and the elevated roadway of the Fremont Bridge is above the property's western side. Unless shoring is provided, the excavation for the new development should be no closer than an imaginary 1.5:1 (Horizontal: Vertical) envelope below the footings of the wall and bridge.



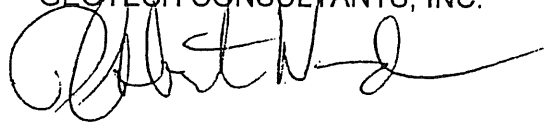
The Quadrant Corporation
July 3, 1996

JN 96176
Cover Letter/Page 2

The attached report contains a discussion of the study and our recommendations. Please contact us, if there are any questions regarding this report or if we can be of further assistance during the design and construction phases of this project.

Respectfully submitted,

GEOTECH CONSULTANTS, INC.

A handwritten signature in black ink, appearing to read "D. Robert Ward", written over the company name.

D. Robert Ward, P.E.
Senior Engineer

DRW:jcv

cc: NBBJ Architects - John Savo
Coughlin Porter Lundeen - James Coughlin and Stephen Porter

GEOTECHNICAL ENGINEERING STUDY
Adobe Systems at the Quadrant Lake Union Center
700 North Northlake Way
Seattle, Washington

This report presents the findings and recommendations of our geotechnical engineering study for the site of the proposed Adobe Systems development in Seattle. The Vicinity Map, Plate 1, illustrates the general location of the site.

We were provided with a site plan that illustrates all existing building and structure locations and provides spot elevations throughout the site. Bush, Roed, and Hitchings prepared this plan, which is dated April of 1990. We were also supplied with some schematic architectural drawings completed by NBBJ Architects on June 3, 1996. Furthermore, the project structural engineer provided us with existing plans for three existing structures: the adjacent Aurora Bridge, the northern elevated approach of the Fremont Bridge, and the retaining wall on the northern edge of the development. Based on these plans, we anticipate that the proposed development will have one large basement garage that will cover much of the site footprint. Cuts of approximately 3 to 8 feet are needed to reach the slab elevation of 10 feet. Above the basement parking garage, the development will have two three- to four-level buildings that are separated by the street that currently runs east-west through the site. A ramp with access to North 34th Street will extend along the eastern side of the development.

SITE CONDITIONS

Surface

The development site is the eastern portion of the Quadrant Lake Union Center, which is located in the southern end of the Fremont area of Seattle. The site is somewhat four-sided. Fremont Avenue North is on the western border, and the Aurora Bridge (also the right-of-way for Aurora Avenue) is to the east. The Lake Washington Ship Canal borders the southern property line. A 20- to 25-foot-high retaining wall, which was apparently constructed in the early 1900s, retains North 34th Street at the northern edge of the property. The existing plans for the wall indicate that its footing extends about 4 feet inside the wall onto the subject property. As noted on the 1910 plans, the northern elevated approach to the Fremont Bridge on the property's western side is supported on conventional footings that are buried about 7 feet below the ground. The Aurora Bridge has large footings that are pile-supported and apparently buried below an elevation of 5 feet. The Aurora Avenue right-of-way is a paved parking lot with an elevation very similar to the subject property's elevation. According to the site plan, the canal to the south had water levels at 7.4 feet and 9.06 feet on September 25, 1988 and June 9, 1987, respectively.

The property is nearly completely covered with three buildings and their surrounding pavement. The only undeveloped area is along the northern edge of the property, where a previous, 30-foot-wide railroad right-of-way exists. This previous railroad area, which is covered with gravel, is generally flat with an elevation of about 18 to 19 feet. The buildings are located on the northwestern corner, the northeastern portion, and the southern portion. The finish floor elevations of the buildings range from about 14 to 18 feet with numerous loading docks at the buildings' perimeters. A major paved driving lane, which is an extension of Northlake Way, extends between

the northeastern and southern buildings. Northlake Way enters the property from the east, exits the property's west through a cut-out in the northern approach of the Fremont Bridge, and then extends into the western portion of the Quadrant Lake Union Center. The driving lane is the approximate low area on the site with an elevation of 13 to 15 feet. The paved area on the property's southern edge near the canal is generally slightly higher than the driving lane.

Subsurface

We explored the subsurface conditions by drilling eight test borings at the approximate locations shown on the Site Exploration Plan, Plate 2. This field exploration program was based upon the proposed construction and required design criteria, the site access, the subsurface conditions revealed during drilling, and the scope of work outlined in our proposal. For a preliminary environmental study dated April 18, 1989, our firm observed the excavation of a continuous trench in the previous railroad right-of-way along the northern edge of the property.

Our firm initially drilled three test borings on the subject property in September of 1988 using a truck-mounted, hollow-stem auger drill. These borings were for our September 20, 1988 geotechnical engineering study of the Quadrant Lake Union Center. Recently, we observed the drilling of five additional test borings using similar equipment. Soil samples were taken at 5-foot intervals with a standard penetration sampler. This split-spoon sampler, which has a 2-inch outside diameter, is driven into the soil with a 140-pound hammer falling 30 inches. The number of blows required to advance the sampler a given distance is an indication of the soil density or consistency. A geotechnical engineer from our staff observed the drilling process, logged the test borings, and obtained representative samples of the soil encountered. The Test Boring Logs are attached as Plates 3 through 10.

All of the test borings, except for Test Boring 5 on the northern edge of the site, revealed approximately 5 to 30 feet of loose, silty fill that generally contained a significant amount of wood debris. In Test Boring 5 and in the continuous trench excavated in the previous railroad right-of-way, we encountered only minor amounts of fill at the ground surface. Below the fill, the soil generally consists of medium-dense sand that becomes dense to very dense. In the bottoms of the test borings, this sand is generally underlain by very dense, silty sand or silt. We have indicated the depth at which dense, native soil was revealed in each test boring on the Site Exploration Plan.

The final logs represent our interpretations of the field logs and laboratory tests. The stratification lines on the logs represent the approximate boundaries between soil types at the exploration locations. The actual transition between soil types may be gradual, and subsurface conditions can vary between exploration locations. The logs provide specific subsurface information only at the locations tested. Where a transition in soil type occurred between samples in the borings, the depth of the transition was interpreted. The relative densities and moisture descriptions indicated on the test boring logs are interpretive descriptions based on the conditions observed during drilling.

Groundwater

Groundwater seepage was observed at depths of about 10 to 15 feet during drilling. Our test borings were left open for only a short time period. The seepage levels on the logs represent the location of transient water seepage and may not indicate the static groundwater level.

We installed a piezometer in Test Borings 4 and 5 to monitor the static groundwater level. On June 25, 1996, we measured the water level in both borings to be approximately 8.5 feet. The static groundwater level on the site's southern side (Test Boring 4) is therefore at an approximate elevation of 8 feet, while the static groundwater level on the northern side (Test Boring 5) is at an approximate elevation of 11 feet.

Groundwater levels vary seasonally with rainfall and other factors. We anticipate that groundwater at this site will be found at levels near the water level of the canal, which apparently varies from an elevation of 7 to 9 feet. The groundwater level should rise slightly in elevation to the north of the canal.

CONCLUSIONS AND RECOMMENDATIONS

General

The subsurface conditions on the development site were explored with eight test borings that revealed dense to very dense, competent, native soil at depths ranging from near the surface to 35 feet. Either loose fill or native soil is over the competent soil. Because a large majority of the site has the competent soil at least 10 feet below the proposed building grade, we recommend that all building loads be supported on augercast concrete piers. Dense, native soil will likely be exposed at the foundation level on the northern edge of the building. This soil could support building loads on conventional footings, but it is not prudent to support a building of this size and magnitude on two separate foundation systems due to the potential for differential settlement.

As noted above, a majority at the slab subgrade level will be loose fill once the building excavation is completed. About 3 to 6 feet of existing fill will be removed to reach the proposed excavation level. The final slab loads should be similar to the weight of the removed soil, and the slab should not induce any additional pressure on the fill at the slab subgrade level. Because of this, the slab could be "floated" on the fill, provided the subbase material directly beneath the slab consists of at least 12 inches of coarse, granular fill. The fill should also meet the drainage requirements noted later in this section. Some settlement of the existing fill is possible due to its inconsistency and occasional debris content. The potential for slab cracking could be minimized by reinforcing the slab with #4 rebar placed at 18-inch centers. This reinforcement pattern has been used on similar Geotech projects and appears to be adequate. If no potential for cracking can be tolerated, the slab should be supported on piers where the fill exists. Where the slab subgrade consists of competent, native soil, such as along the northern portion of the building, typical slab construction is suitable. However, if the slab's northern portion is supported on the existing fill, we recommend placing a construction joint at the competent soil and fill interface. Additional reinforcing should also be installed at this interface because of the possibility of some differential settlement between the two areas.

Underslab drainage is needed for this project, because groundwater levels were measured at approximately 8 feet and 11 feet on the site's southern and northern sides, respectively. The level of the canal is currently about 8 feet, and we understand that it rises to approximately 9 feet, meaning groundwater levels could be even slightly higher at other times of the year. We recommend installing 4-inch, Schedule 40, perforated PVC pipe (Seattle DCLU requirement) at 20-foot centers running in the north-south direction beneath the entire slab. Because the high water mark of the canal is about 9 feet, the invert of the pipes should be very near this level. These pipes should connect to a 6-inch tightline pipe that discharges to either the canal or the storm drain. Canal discharge would be preferable, as we understand that the storm drain system has an elevation above 10 feet. If canal discharge is chosen, a gate valve should be placed at the discharge point so water from the canal does not flow into the pipes. The underslab pipes should be embedded in a minimum 12-inch layer of free-draining, clean, granular material to provide a drainage medium for the groundwater to flow to the pipes. We believe that 1- to 2-inch crushed rock would be optimal for this drainage medium, but other drainage materials could also be used.

To provide a working mat within the excavation, we recommend that the contractor be prepared to place at least 6 inches of large, granular, free-draining material over the excavation subgrade. This material should not be used as the future drainage medium, because it will likely become contaminated during construction. Depending on the condition of the subgrade soil, it may be necessary to (1) place a geotextile filter fabric at the base of the excavation prior to placing the working mat or (2) increase the thickness of the mat. It is highly likely that groundwater will be encountered in the excavation, and the contractor should be prepared to pump this groundwater from the excavation during the construction process.

The existing plans of the large northern retaining wall indicate that its footing extends about 3 feet below the existing ground and about 4 feet onto the subject property. Based on our explorations in this area, we believe that the footing bears on competent, native soil. However, because of the large height of the wall and because high pressures are likely occurring near the edge of the footing, we recommend that no excavation for the Adobe development intrude into the area bounded by an imaginary 1.5:1 (Horizontal:Vertical) envelope that extends below the outside edge of the footing. If the excavation needs to be closer to the footing, shoring should first be constructed to provide lateral stability for the footing. The structural engineer has requested that we estimate the coefficient of friction and the bearing capacity beneath the existing footing; we estimate the coefficient of friction to be 0.45 and the bearing capacity to be 3,000 pounds per square foot.

The 1910 plans of the northern approach to the Fremont Bridge indicate that it is supported on conventional, individual column footings that are buried approximately 7 feet below the ground. The project plans indicate that cuts of up to 8 feet are proposed very close to these footings. In accordance with the recommendations made above, the excavation should not intrude into an imaginary 1.5:1 (H:V) envelope. However, because the excavation will be so close to the existing footings, it may be prudent to excavate a test hole adjacent to one or more of the footings to verify their depths prior to construction. The Aurora Bridge plans indicate that the bridge's large footings are supported on piling. Because of this, we do not believe that the bridge footings will be destabilized by the proposed development.

Geotech Consultants, Inc. should be allowed to review the final development plans to verify that the recommendations presented in this report are adequately addressed in the design. Such a plan

review would be additional work beyond the current scope of work for this study, and it may include revisions to our recommendations to accommodate site, development, and geotechnical constraints that become more evident during the review process.

Augercast Concrete Piers

For a 16-inch-diameter, augercast concrete pier, we recommend using an allowable compressive capacity of 35 tons if the pier is embedded at least 10 feet into dense strata. This capacity can be increased 4 tons for each additional foot of embedment with a maximum capacity of 75 tons for 20 feet of embedment. For transient loading, such as wind or seismic loads, the allowable pier capacity may be increased by one-third. We can provide design criteria for different pier diameters and embedment lengths, if greater capacities are required. The minimum center-to-center pier spacing should be three times the pier diameter. Based on our test boring information, we estimate that pier lengths of about 10 to 55 feet will be required to achieve adequate penetration into the bearing soil.

We estimate that the total settlement of single piers installed as described above will be on the order of one-half inch. Most of this settlement should occur during the construction phase as the dead loads are applied. The remaining post-construction settlement would be realized as the live-loads are applied. We estimate that differential settlements over any portion of the structure should be less than about one-quarter inch.

Lateral Pile Capacity

Lateral forces resulting from earthquakes, wind loads, or other sources can be resisted by battered piles or by the passive resistance of the soil that surrounds vertical piles. We anticipate that battered piles will not be used for this project. Therefore, all lateral forces will be resisted by vertical piling.

The lateral load capacity and the amount of pile deflection for a given lateral load are governed primarily by the passive resistance of the near-surface soil and the strength of the pile itself. The use of the following procedures and the design charts that are appended to this report as Plate 11 will allow the estimation of horizontal pile deflections and internal moments at, or below, each pile cap for a given lateral loading condition. We understand that fixed-head conditions will be used for this project.

The following equations, which assume a fixed head, may be used to estimate the lateral pile deflections and moments:

$$X = \frac{A_x P_p T^3}{EI}$$

$$M = A_m P_p T$$

Please refer to Plate 11 for definitions of the above symbols.

For the anticipated soil conditions and pile type, we recommend using a value of 35 pounds per cubic inch (pci) for the coefficient of variation of horizontal subgrade reaction (Kh). This includes reduction factors for group effects and repeated loading (e.g., seismic). The moments calculated using this procedure do not contain a factor of safety. We recommend incorporating a suitable safety factor in the lateral load design.

Augercast Pier Installation

Augercast piers should be installed with continuous flight, hollow-stem auger equipment. Concrete grout must be pumped continuously through the auger as it is withdrawn. Often, the augering action may tend to disturb the soil at the bottom of a drilled hole, possibly resulting in a decreased end-bearing capacity. To minimize the effects of this disturbance, we recommend requiring the pile contractor to rotate the auger while pumping the first few cubic feet of grout, prior to starting auger withdrawal. This will mix any loose cuttings at the bottom of a hole with cement, thus developing the end-bearing capacity.

In order to maintain the surface of the pumped grout above the tip of the auger, we recommend the following:

- (1) Maintain a minimum grout head of 5 feet above the tip of the auger at all times.
- (2) Ensure that the grout pressure at the grout pump is in the range of 150 to 250 pounds per square inch (psi), depending on the length of feeder hose used.
- (3) Equip the grout pump with a calibrated stroke counter so that grout volumes per pier may be calculated.

As the completed below-ground pier below cannot be observed, judgement and experience must be used as the basis for determining the acceptability of a pier. The installation of all piers should be observed by a representative of Geotech Consultants, Inc., who can fully evaluate the contractor's operation, collect and interpret installation data, verify bearing stratum elevations, and understand the implications of variations from normal procedures with respect to the design criteria.

Seismic Considerations

The site is located within Seismic Zone 3, as illustrated on Figure No. 16-2 of the 1994 Uniform Building Code (UBC). In accordance with Table 16-J of the 1994 UBC, the site soil profile is best represented by Profile Type S2. As required by the Critical Areas Ordinance, the design criteria presented in this report consider the effects of a one-in-100-years seismic event. The upper saturated fill has a moderate potential for seismic liquefaction during a moderate to large seismic event. For this reason, we have recommended that the building loads be supported on the dense soil below the fill. This dense soil does not have a potential for liquefaction during a moderate to large seismic event.

Slabs-on-Grade

The building floors may be constructed as slabs-on-grade atop at least 12 inches of granular, free-draining material. (The drainage consideration requires the free-draining material.) The subgrade soil must be in a firm, non-yielding condition at the time of slab construction or underslab fill placement. Any soft areas encountered should be excavated and replaced with select, imported, structural fill. In areas where the passage of moisture through the slab is undesirable, a vapor barrier, such as a 6-mil plastic membrane, should be placed beneath the slab. Additionally, sand should be used in the fine-grading process to reduce damage to the vapor barrier, to provide uniform support under the slab, and to reduce shrinkage cracking by improving the concrete curing process. Other specific slab recommendations are contained in the General section of this report.

Permanent Foundation and Retaining Walls

Retaining walls backfilled on only one side should be designed to resist the lateral earth pressures imposed by the soil they retain. The following recommended design parameters are for walls that restrain level backfill:

<u>Parameter</u>	<u>Design Value</u>
Active Earth Pressure*	40 pcf
Passive Earth Pressure	250 pcf
Soil Unit Weight	130 pcf

Where:

1. pcf is pounds per cubic foot.
2. Active and passive earth pressures are computed using the equivalent fluid densities.

* For a restrained wall that cannot deflect at least 0.002 times its height, a uniform lateral pressure equal to 10 psf times the height of the wall should be added to the above active equivalent fluid pressure.

The values given above are to be used to design permanent foundation and retaining walls only. The passive pressure given is appropriate for the depth of level, structural fill placed in front of a retaining or foundation wall only. We recommend a safety factor of at least 1.5 for overturning and sliding, when using the above values to design the walls.

The design values given above do not include the effects of any hydrostatic pressures behind the walls and assume that no surcharge slopes or loads, such as vehicles, will be placed behind the walls. If these conditions exist, those pressures should be added to the above lateral soil pressures. Also, if sloping backfill is desired behind the walls, we will need to be given the wall

dimensions and the slope of the backfill in order to provide the appropriate design earth pressures. The surcharge due to traffic loads behind a wall can typically be accounted for by adding a uniform pressure equal to 2 feet multiplied by the above active fluid density.

Heavy construction equipment should not be operated behind retaining and foundation walls within a distance equal to the height of a wall, unless the walls are designed for the additional lateral pressures resulting from the equipment. The wall design criteria assume that the backfill will be well-compacted in lifts no thicker than 12 inches. The compaction of backfill near the walls should be accomplished with hand-operated equipment to prevent the walls from being overloaded by the higher soil forces that occur during compaction.

Retaining Wall Backfill

Backfill placed behind retaining or foundation walls should be coarse, free-draining, structural fill containing no organics. This backfill should contain no more than 5 percent silt or clay particles and have no gravel greater than 4 inches in diameter. The percentage of particles passing the No. 4 sieve should be between 25 and 70 percent. For increased protection, drainage composites should be placed along cut slope faces, and the walls should be backfilled with pervious soil.

The purpose of these backfill requirements is to ensure that the design criteria for a retaining wall are not exceeded because of a build-up of hydrostatic pressure behind the wall. The top 12 to 18 inches of the backfill should consist of a relatively impermeable soil or topsoil, or the surface should be paved. The sub-section entitled **General Earthwork and Structural Fill** contains recommendations regarding the placement and compaction of structural fill behind retaining and foundation walls.

Excavations and Slopes

Excavation slopes should not exceed the limits specified in local, state, and national government safety regulations. Temporary cuts to a depth of about 4 feet may be attempted vertically in unsaturated soil, if there are no indications of slope instability. Based upon Washington Administrative Code (WAC) 296, Part N, unsaturated fill at the subject site would be classified as Type C. Therefore, temporary cut slopes greater than 4 feet in height cannot be excavated at an inclination steeper than 1.5:1 (Horizontal:Vertical), extending continuously between the top and the bottom of a cut. The native, unsaturated, dense sand is classified as a Type B soil, and it can be sloped at a 1:1 (H:V) inclination.

These temporary slope inclinations are based on what has been successful at other sites with similar soil conditions. Temporary cuts are those that will remain unsupported for a relatively short duration to allow for the construction of foundations, retaining walls, or utilities. Temporary cut slopes should be protected with plastic sheeting during wet weather. The cut slopes should also be backfilled or retained as soon as possible to reduce the potential for instability. Please note that loose soil can cave suddenly and without warning. Utility contractors should be made especially aware of this potential danger.

All permanent cuts into native soil should be inclined no steeper than 2:1 (H:V). Water should not be allowed to flow uncontrolled over the top of any temporary or permanent slope. Also, all permanently exposed slopes should be seeded with an appropriate species of vegetation to reduce erosion and improve the stability of the surficial layer of soil.

Drainage Considerations

We recommend the use of footing drains at the bases of the exterior grade beams and beneath the slab at 20-foot spacings. These drains should be surrounded by at least 6 inches of 1-inch-minus, washed rock and then wrapped in non-woven, geotextile filter fabric (Mirafi 140N, Supac 4NP, or similar material). At its highest point, each perforated pipe invert should be at least as low as the bottom of the footing, and it should be sloped for drainage. All roof and surface water drains must be kept separate from the foundation drain system. A typical drain detail is attached to this report as Plate 13. For the best long-term performance, perforated PVC pipe is recommended for all subsurface drains. The Seattle DCLU requires the use of Schedule 40 PVC pipe inside building footprints.

Groundwater was observed during our field work. Seepage into the excavation should be drained from the site by directing it through drainage ditches, perforated pipe, or French drains, or by pumping it from sumps interconnected by shallow connector trenches at the bottom of the excavation.

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 foundations, slabs, or pavements are to be constructed. Final site grading in areas adjacent to a building should slope away at least 2 percent, except where the area is paved.

General Earthwork and Structural Fill

All building and pavement areas should be stripped of surface vegetation, topsoil, organic soil, and other deleterious material. It is extremely important that the foundations and slabs for the existing structures are also removed. The stripped or removed materials should not be mixed with any materials to be used as structural fill, but they could be used in non-structural areas, such as landscape beds.

Structural fill is defined as any fill placed under a building, behind permanent retaining or foundation walls, or in other areas where the underlying soil needs to support loads. All structural fill should be placed in horizontal lifts with a moisture content at, or near, the optimum moisture content. The optimum moisture content is that moisture content that results in the greatest compacted dry density. The moisture content of fill is very important and must be closely controlled during the filling and compaction process.

The allowable thickness of the fill lift will depend on the material type selected, the compaction equipment used, and the number of passes made to compact the lift. The loose lift thickness should not exceed 12 inches. We recommend testing the fill as it is placed. If the fill is not

compacted to specifications, it can be recompacted before another lift is placed. This eliminates the need to remove the fill to achieve the required compaction. The following table presents recommended relative compactions for structural fill:

<u>Location of Fill Placement</u>	<u>Minimum Relative Compaction</u>
Beneath slabs or walkways	95%
Behind retaining walls	90%
Beneath pavements	95% for upper 12 inches of subgrade, 90% below that level

Where:

Minimum Relative Compaction is the ratio, expressed in percentages, of the compacted dry density to the maximum dry density, as determined in accordance with ASTM Test Designation D 1557-78 (Modified Proctor).

Ideally, structural fill that will be placed in wet weather should consist of a coarse, granular soil with a silt or clay content of no more than 5 percent. The percentage of particles passing the No. 200 sieve should be measured from that portion of soil passing the three-quarter-inch sieve.

LIMITATIONS

The analyses, conclusions, and recommendations contained in this report are based on site conditions as they existed at the time of our exploration and assume that the soil encountered in the test borings is representative of subsurface conditions on the site. If the subsurface conditions encountered during construction are significantly different from those observed in our explorations, we should be advised at once so that we can review these conditions and reconsider our recommendations where necessary. Unanticipated soil conditions are commonly encountered on construction sites and cannot be fully anticipated by merely taking soil samples in test borings. Subsurface conditions can also vary between exploration locations. Such unexpected conditions frequently require making additional expenditures to attain a properly constructed project. It is recommended that the owner consider providing a contingency fund to accommodate such potential extra costs and risks. This is a standard recommendation for all projects.

This report has been prepared for the exclusive use of the Quadrant Corporation and its representatives for specific application to this project and site. Our recommendations and conclusions are based on observed site materials, and selective laboratory testing and engineering analyses. Our conclusions and recommendations are professional opinions derived in accordance with current standards of practice within the scope of our services and within budget and time constraints. No warranty is expressed or implied. The scope of our services does not include

services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in our report for consideration in design. We recommend including this report, in its entirety, in the project contract documents so the contractor may be aware of our findings.

ADDITIONAL SERVICES

In addition to reviewing the final plans, Geotech Consultants, Inc. should be retained to provide geotechnical consultation, testing, and observation services during construction. This is to confirm that subsurface conditions are consistent with those indicated by our exploration, to evaluate whether earthwork and foundation construction activities comply with the intent of contract plans and specifications, and to provide recommendations for design changes in the event subsurface conditions differ from those anticipated prior to the start of construction. However, our work would not include the supervision or direction of the actual work of the contractor and its employees or agents. Also, job and site safety, and dimensional measurements, will be the responsibility of the contractor.

The following plates are attached to complete this report:

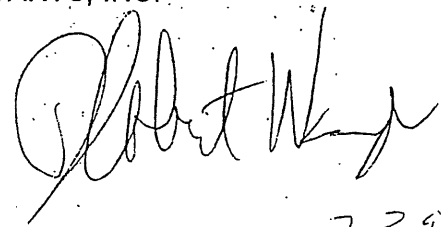
Plate 1	Vicinity Map
Plate 2	Site Exploration Plan
Plates 3 - 10	Test Boring Logs
Plate 11	Lateral Load Capacity Design Criteria
Plate 12	Grain Size Analysis
Plate 13	Footing Drain Detail

We appreciate the opportunity to be of service on this project. If you have any questions, or if we may be of further service, please do not hesitate to contact us.

Respectfully submitted,

GEOTECH CONSULTANTS, INC.

D. Robert Ward, P.E.
Senior Engineer



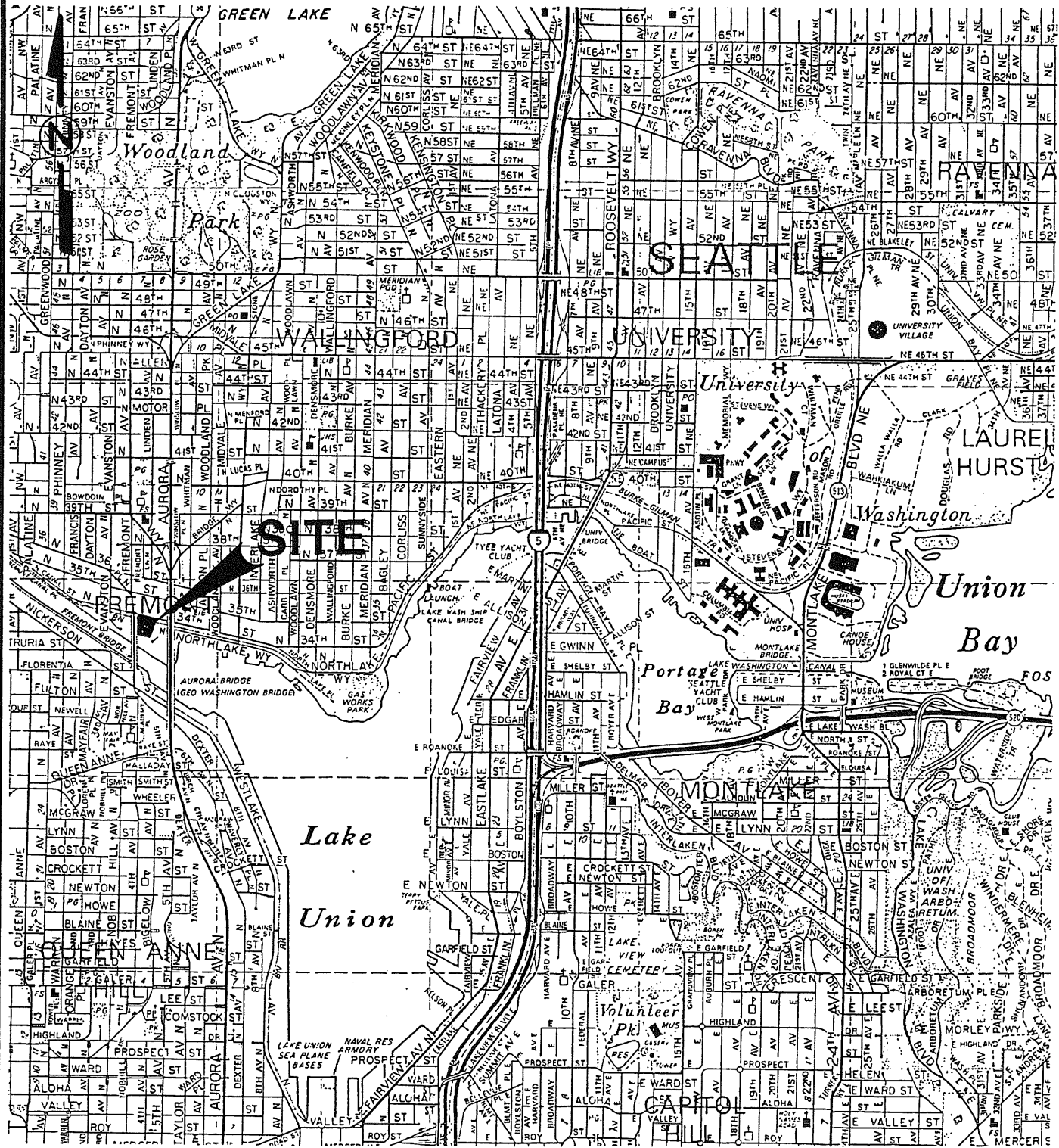
7-3-96



James R. Finley, Jr., P.E.
Principal

10-21-97

DRW/JRF:jcv



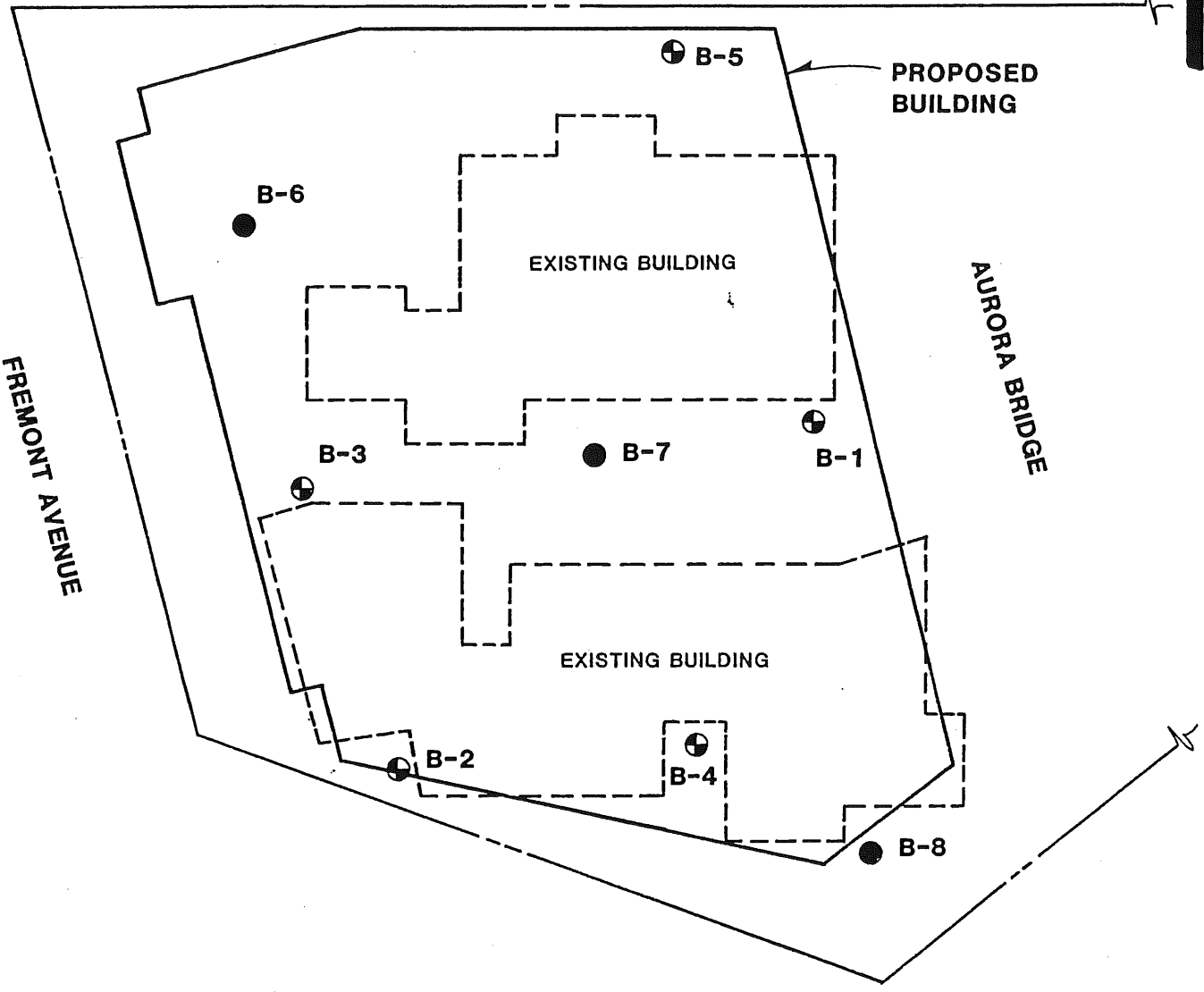
**GEOTECH
CONSULTANTS**

**VICINITY MAP
700 N NORTHLAKE WAY
SEATTLE, WA**

Job No.: 96176	Date: JULY 1996	Logged By:	Plate: 1
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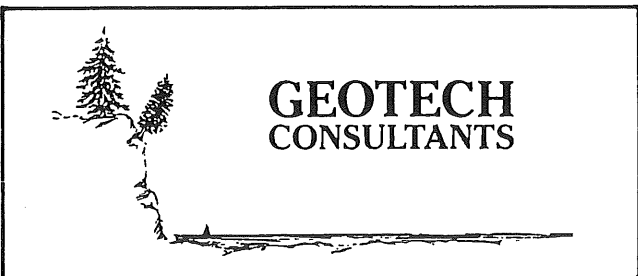


N 34th STREET



LEGEND:

- ⊕ APPROXIMATE BORING LOCATIONS PRESENT STUDY
- APPROXIMATE BORING LOCATIONS 1988 STUDY



SITE EXPLORATION PLAN
700 N NORTHLAKE WAY
SEATTLE, WA

Job No.:	Date:		Plate:
96176	JULY 1996		2

BORING 1

Moisture Content (%)	Sample	Blows per Foot	USCS	Description
				Mottled, gravelly SAND, dry, loose
45.1	1	7		-significant amounts of sawdust
				-becomes wet to saturated
	2	6		
			FILL	
	3	2		-lens of coarse sand & wood
	4	19		
	5	12		-becomes very sandy, little wood
				Gray SAND & silty SAND, fine- to medium-grained, wet medium-dense to dense
18.3	6	29	SP SM	
	7	48		-becomes dense

Test boring 1 continued on the next page.



TEST BORING LOG 700 N NORTHLAKE WAY SEATTLE, WA			
Job No: 96176	Date: JUNE 1996	Logged by: DRW	Plate: 3

BORING 1 Continued

Moisture Content (%)	Sample	Blows Per Foot	USCS	Description
	8	37		
	9	50/6"	SM	-becomes silty
	10	80	ML	Gray SILT, low to medium plasticity, wet, very stiff

Test boring terminated at 51 feet below grade on 6-6-96.
Groundwater seepage was encountered at 10 feet during drilling.



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TEST BORING LOG
700 N NORTHLAKE WAY
SEATTLE, WA

Job No:
96176

Date:
JUNE 1996

Logged by:
DRW

Plate:
4

BORING 2

Moisture Content (%)	Sample	Blows per Foot	USCS	Description
				Brown SAND & silty SAND, moist, loose
	1	9	FILL	
	2	10		-sawdust
17.0	3	34		Gray, gravelly SAND, very coarse-grained, saturated, medium-dense
	4	20		-becomes brown, fine-grained
	5	26	SP	-becomes gray, fine- to coarse-grained
	6	62		-becomes very dense
	7	64		

Test boring 2 continued on the next page.



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TEST BORING LOG
700 N NORTHLAKE WAY
SEATTLE, WA

Job No:
96176

Date:
JUNE 1996

Logged by:
DRW

Plate:
5

BORING 2 Continued

Moisture Content (%)	Sample	Blows Per Foot	USCS	Description
	8	80		-becomes silty, fine-grained
21.2	9	85	ML	Gray, sandy SILT, low plasticity, wet, very dense
	10	52		

45

50

55

Test boring terminated at 51.5 feet below grade on 6-6-96.
Groundwater seepage was encountered at 15 feet during drilling.



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TEST BORING LOG
700 N NORTHLAKE WAY
SEATTLE, WA

Job No:
96176

Date:
JUNE 1996

Logged by:
DRW

Plate:
6

BORING 3

Moisture Content (%)	Sample	Blows per Foot	USCS	Description
				Old topsoil
	1	12		Brown SAND, medium-grained, wet, loose
	2	30		-becomes grayish, mostly coarse-grained, medium-dense
	3	61		-becomes saturated, very dense, lens of silt
	4	62	SP	
	5	57		
	6	33		-becomes very silty
19.7	7	51	SM	
	8	50/6"		

Test boring terminated at 41 feet below grade on 6-6-96.
Groundwater seepage was encountered at 12.5 during drilling.



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TEST BORING LOG

700 N NORTHLAKE WAY
SEATTLE, WA

Job No:
96176

Date:
JUNE 1996

Logged by:
DRW

Plate:
7

BORING 4

Moisture Content (%)	Sample	Blows per Foot	USCS	Description
				Asphalt & crushed rock base over: Brown, silty, fine- to medium-grained SAND with traces of gravel, very moist, loose
	1	12	FILL	-becomes mottled, gray & brown, low plasticity SILT with organics, moist, stiff
	2	15	FILL	-becomes dark gray, silty, fine- to medium-grained SAND with wood and sawdust debris, wet, loose
	3	10	FILL	-wood plug
	4	9	FILL	-wood plug -wood in tip
	5	26	SP	Gray, fine- to medium-grained SAND with traces of silt, saturated, medium-dense
	6	21	SP	-becomes more silty
	7	20	SP SM	-becomes silty, fine-grained with organic (peaty) lenses

Test boring 4 continued on the next page.



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TEST BORING LOG
700 N NORTHLAKE WAY
SEATTLE, WA

Job No:
96176

Date:
JUNE 1996

Logged by:
JHS

Plate:
8

BORING 4 Continued

Moisture Content (%)	Sample	Blows per Foot	USCS	Description
	8	33	SP	Gray, fine- to medium-grained SAND, wet, dense
45				-becomes finer grained, slightly silty
	9	75	SP	
			SM	
50	10	70		-becomes more medium-grained
55	11	61	SP	-becomes less silty
60	12	91	SM	Gray, silty SAND with silt, till-like, moist, very dense
65	13	39	ML	Gray, low plasticity SILT, moist, dense
30				
35				
40				

Test boring terminated at 66.5 feet below grade on 6-7-96.
Groundwater seepage was encountered at 12 feet during drilling.



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TEST BORING LOG
700 N NORTHLAKE WAY
SEATTLE, WA

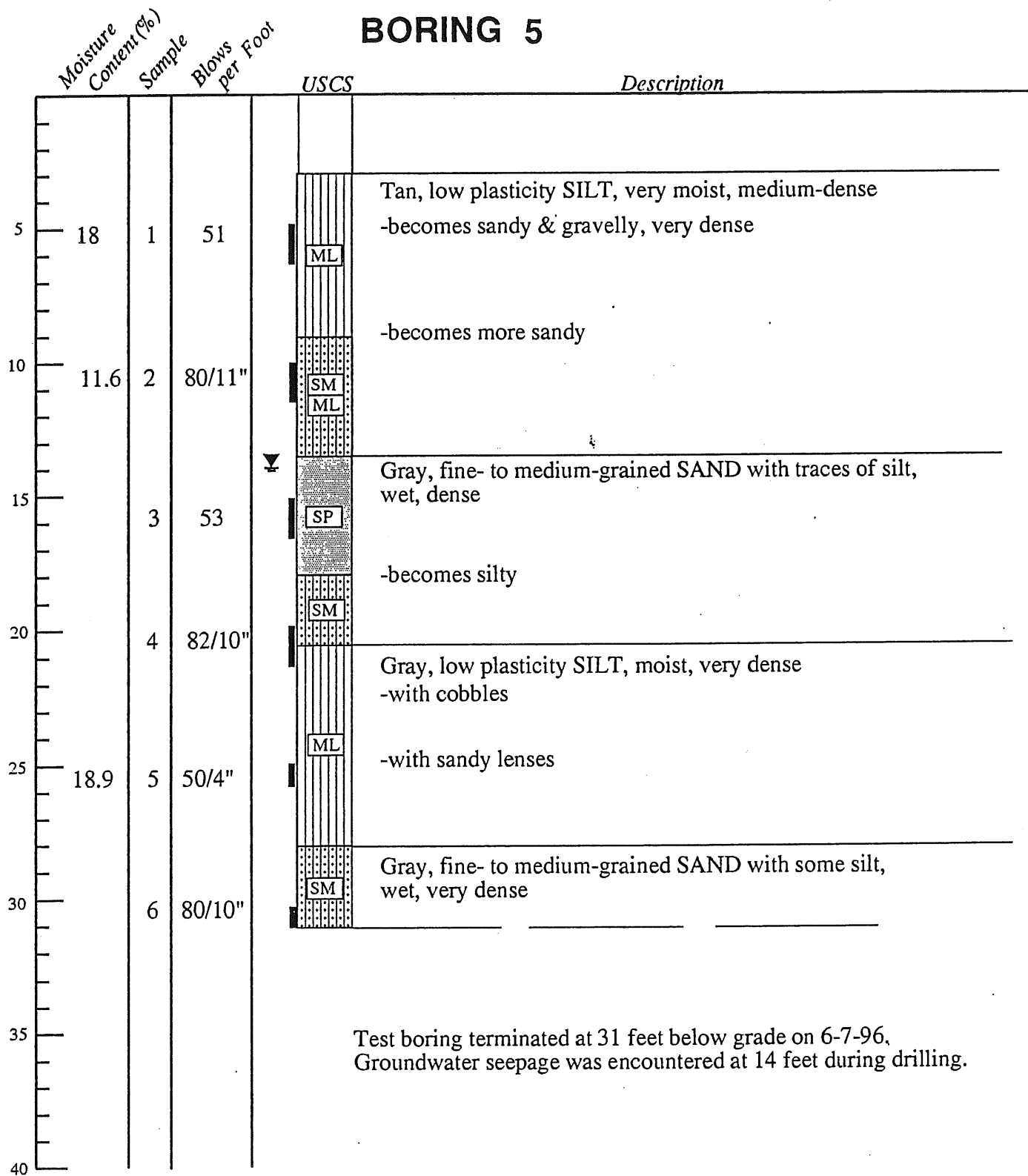
Job No:
96176

Date:
JUNE 1996

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JHS

Plate:
9

BORING 5



GEOTECH
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TEST BORING LOG
700 N NORTHLAKE WAY
SEATTLE, WA

Job No:
96176

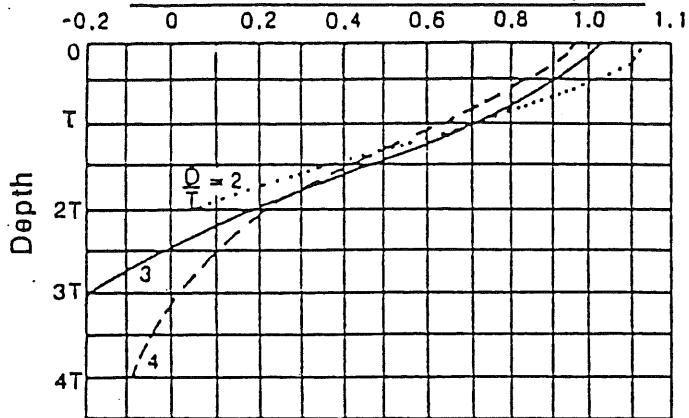
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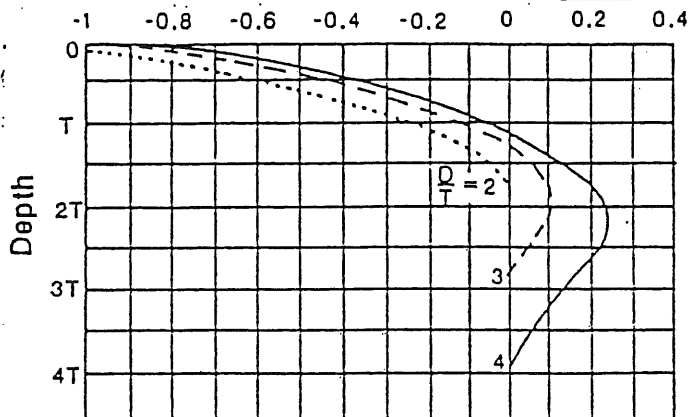
Plate:
10

DEFLECTION & MOMENT COEFFICIENTS

DEFLECTION COEFFICIENT, A_x



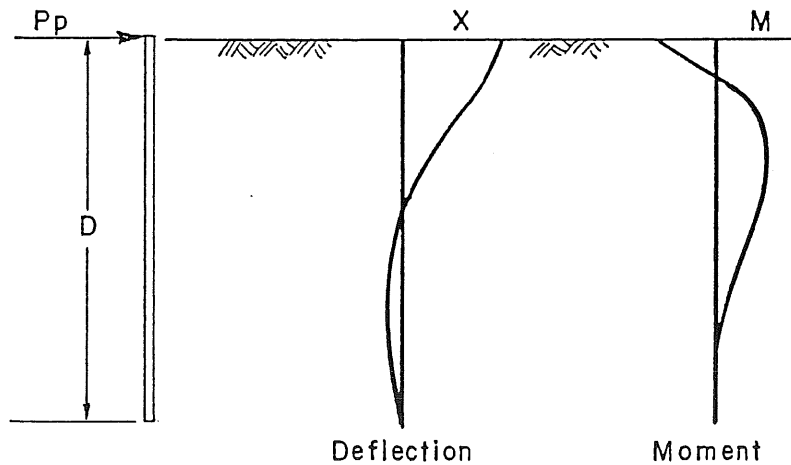
MOMENT COEFFICIENT, A_m



DEFINITIONS

- X = Lateral pile deflection at any point at or below the pile cap
- M = Internal pile moment at any point at or below the pile cap
- P_p = Lateral load applied to the pile at the pile cap
- M_p = Moment applied to the pile at the pile cap
- A_x, B_x = Deflection coefficients from Plate
- A_m, B_m = Moment coefficients from Plate
- E = Modulus of elasticity of the pile
- I = Moment of inertia of the pile cross section
- T = Relative stiffness factor = $5 \sqrt{EI/Kh}$
- Kh = Coefficient of variation of horizontal subgrade reaction in points per cubic inch (pci)
- D = Depth of pile embedment below ground surface

GENERALIZED DEFLECTION & MOMENT CURVES



**GEOTECH
CONSULTANTS**

LATERALLY LOADED PILES
IN ELASTIC SUBGRADE
FIXED - HEAD CONDITION

Job No.:
96176

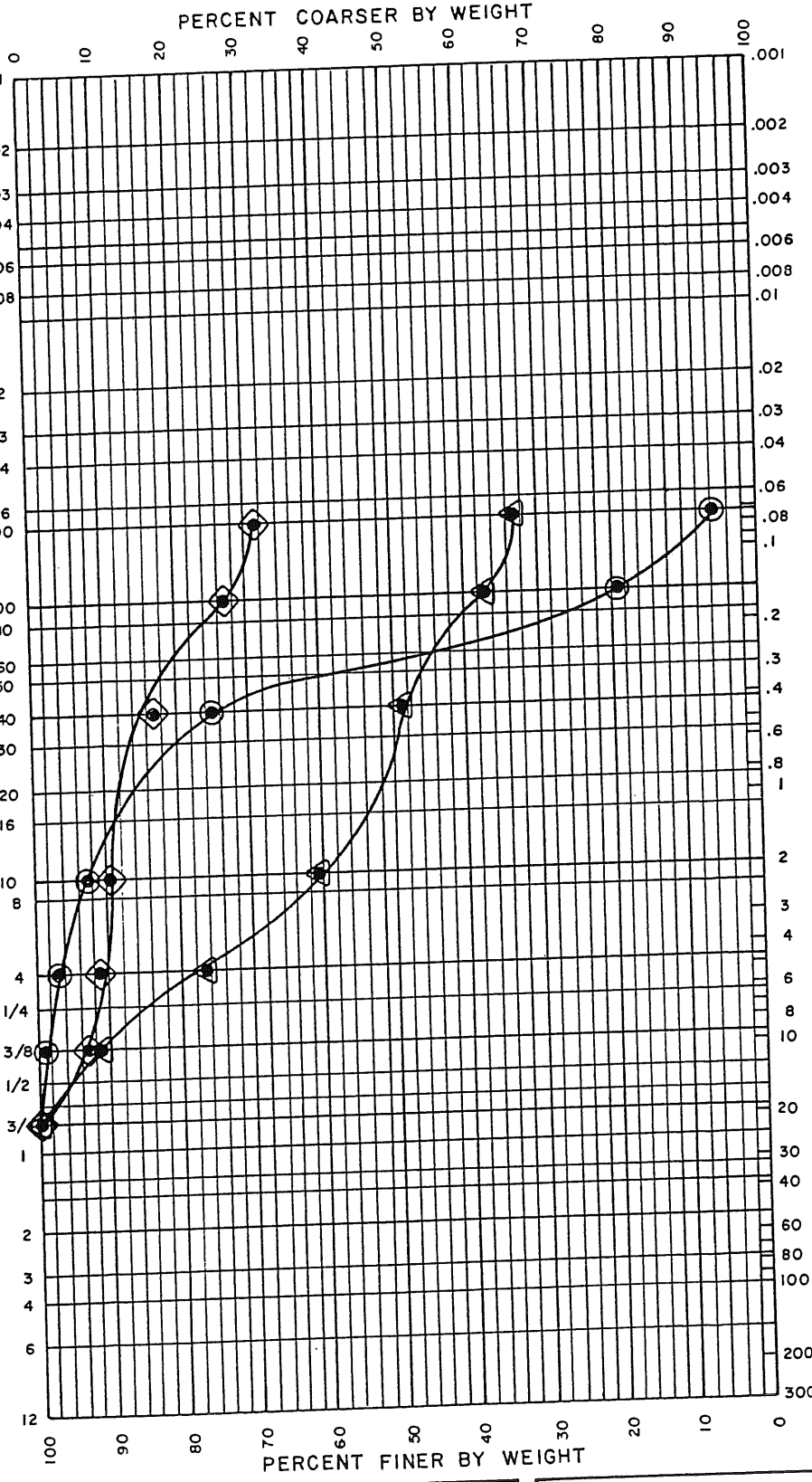
Date:
JULY 1996

Plate:
11

HYDROMETER ANALYSIS

SIEVE ANALYSIS

GRAIN SIZE IN MILLIMETERS
 NUMBER OF MESH PER INCH US STD
 SIZE OF OPENING IN INCHES



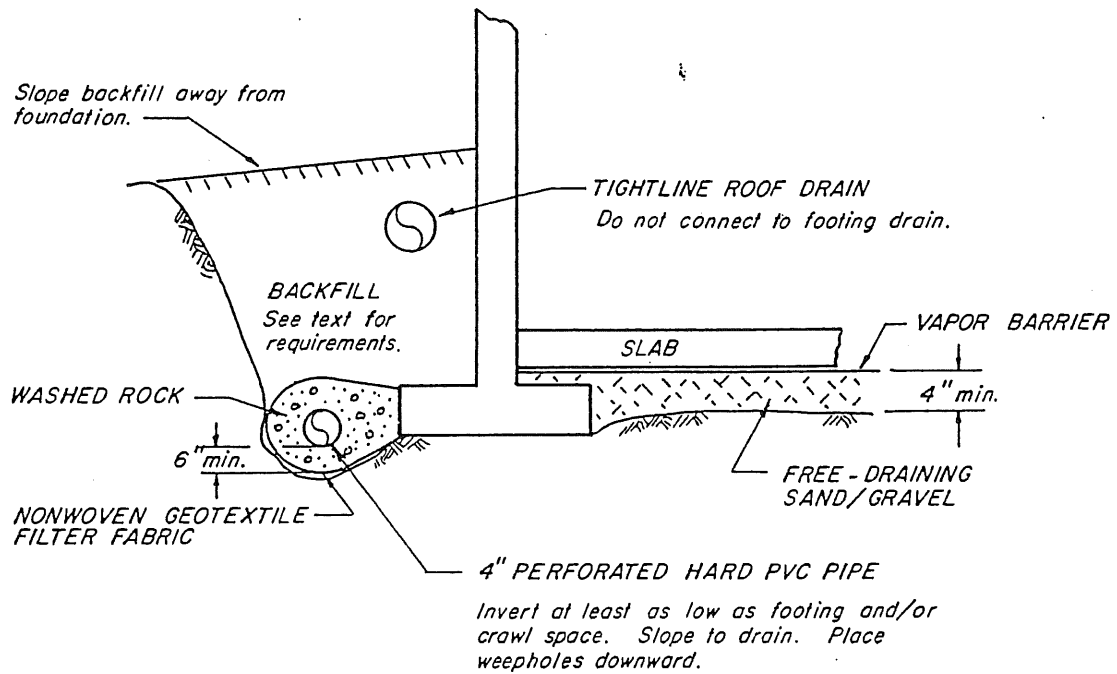
BORING/ TEST PIT	DEPTH	SAMPLE	MOISTURE	KEY	SYMBOL	SOIL CLASSIFICATION	
						SAND	SILT
1	30'	6	18.3%	⊙	SP/SM	SAND	SILT
5	5'	1	18.0%	◇	ML	SAND	SILT
5	10'	2	11.6%	△	SM	SAND	SILT



**GEOTECH
CONSULTANTS**

GRAIN SIZE ANALYSIS
700 N NORTHLAKE WAY
SEATTLE, WA

Job No.: 96176	Date: JULY 1996	By:	Plate: 12
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**GEOTECH
CONSULTANTS**

**FOOTING DRAIN DETAIL
700 N NORTHLAKE WAY
SEATTLE, WA**

Job No.:
96176

Date:
JULY 1996

Scale:
N.T.S.

Plate:
13

GEOTECH CONSULTANTS, INC.

3256 NE 20th Street, Suite 16
Bellevue, WA 98005
(425) 747-5618
FAX (425) 747-8561

November 25, 1997

JN 96176-3

The Quadrant Corporation
PO Box 130
Bellevue, Washington 98009

Attention: Ben Conwell

Subject: Geotechnical Engineering Considerations
Proposed Building 3 of East Development
Quadrant Lake Union Center
Seattle, Washington

Late View Bldg

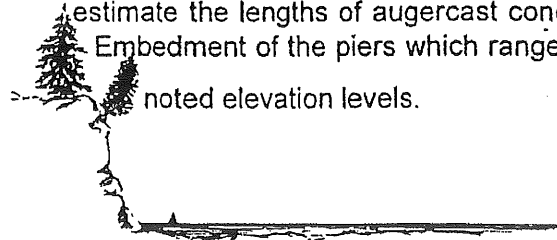
Dear Mr. Conwell:

This letter addresses specific geotechnical engineering considerations for the proposed Building 3 in the East Development of the Quadrant Lake Union Center. We previously prepared a geotechnical engineering report for all of Phase 1 dated July 3, 1996, but additional test pits and test borings have recently been done specifically in the envelope of Building 3 to supplement the explorations done prior to the study. In addition, our personnel have observed the drilling of augercast piers that were needed for the foundation of Buildings 1 and 2. We have reviewed the logs of the pier drillings adjacent to Building 3 in preparation of this letter.

Two test borings were drilled prior to the preparation of our July 1996 geotechnical engineering study in the area of the proposed Building 3. Since that time, our personnel observed and logged the drilling of augercast concrete piers for Buildings 1 and 2 which were done in June and July of 1997, and we also drilled two additional test borings and observed the excavation of test pits in September of 1997. The explorations and drillings revealed that dense to very dense soils are located near the ground surface on the northern side of Building 3 and at depths of up to about 30 feet on the southern side. Loose fill soil and/or soft and loose, native soil overlie the dense, native soil. We have attached a plan view drawing of Building 3 that includes the locations of notable test pits and all test borings. We have included elevations, which note the approximate depth to dense soils, adjacent to these exploration locations, as well as the elevations to dense soils at certain locations along the adjacent walls of Buildings 1 and 2 that were noted during the augercast drillings. The logs of the four test borings shown on the drawing are also attached to this letter.

Similar to what was done along the northern edge of Building 2, the foundation along the northernmost edge of Building 3 can be founded on conventional footings that bear on dense to very dense, native soil adjacent to the existing street retaining wall. A 5,000 pound per square foot (psf) bearing capacity for the northern footings can be used. The elevations to the dense soil shown on the attached drawing should provide relatively accurate data which can be used to estimate the lengths of augercast concrete piers needed to support the remainder of the building. Embedment of the piers which ranged from 10 to 20 feet for Buildings 1 and 2, begins below the

noted elevation levels.



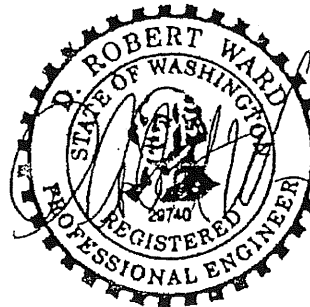
Some of the major problems during the installation of the augercast piers was drill refusal because large pieces of concrete were encountered (this was mostly a problem at the southeastern corner of Building 1), and the loss of concrete where the drilling encountered pockets of very loose, wood-debris fill. The test pits and test borings, as well as our notes of the augercast piers drilled near the proposed Building 3, indicate that debris is lightly scattered in the loose fill in the area of Building 3. Therefore, it appears that the potential for auger refusal due to obstructions is low. We anticipate that only a very low percentage of piers would be affected by the debris.

As for the concrete loss situation, we did encounter some wood and sawdust debris in the newest test borings on the southern side of Building 3, although the debris does not seem to be as extensive as was encountered where the concrete loss occurred. In addition, the concrete loss situation was being eliminated by the drilling contractor during the pier installations on Buildings 1 and 2 after they gained experience, although the wood fill was still being encountered. Therefore, in summary, because the wood fill appears to be less extensive, and the drilling contractor apparently effectively solved the concrete loss problem with experience gained, we believe that the concrete loss situation should only be a minor problem (if at all) during the pier installations for Building 3. If the same drilling contractor for Buildings 1 and 2 is not used for Building 3, we recommend that the new contractor be informed of the wood debris situation and the measures necessary to eliminate the concrete loss situation.

This letter should be considered an addendum to our July 3, 1996 report. All the soil parameters and recommendations given in that report are still valid for Building 3. If you have any questions, or if we can be of further service, please do not hesitate to contact us.

Respectfully submitted,

GEOTECH CONSULTANTS, INC.

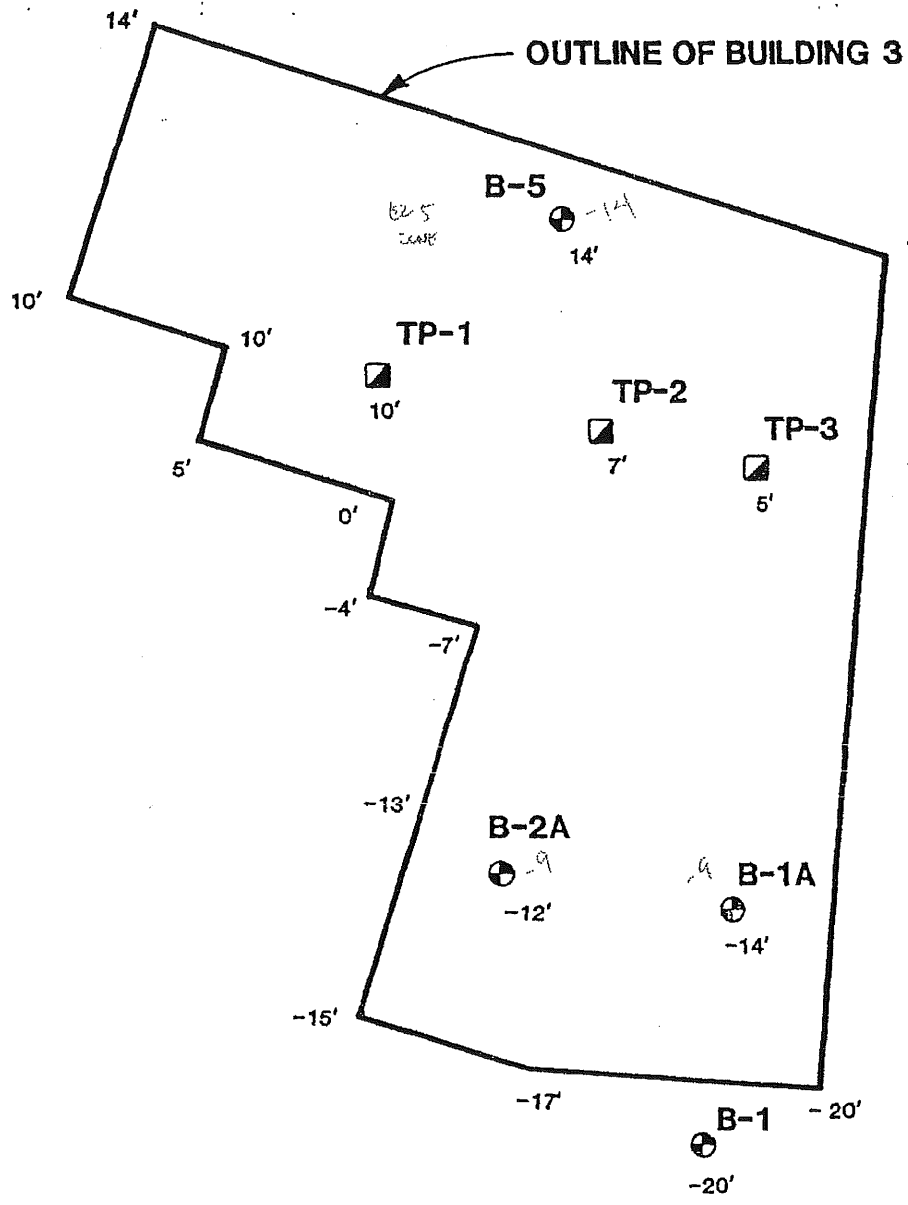


EXPIRES 10-21-99

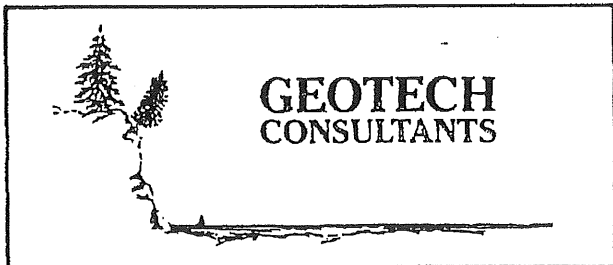
D. Robert Ward, P.E.
Associate

DRW:alt

Attachments: Site Plan & Four Test Borings



- LEGEND:
- ⊕ B-1 & B-5 BORINGS DRILLED JUNE 1998
 - ⊕ B-1A & B-2A BORINGS DRILLED SEP 1997
 - ▣ TP-1 TP-2 & TP-3 TEST PITS EXCAVATED SEP 1997
 - 13' DENOTES APPROXIMATE ELEVATION OF TOP OF DENSE SOIL



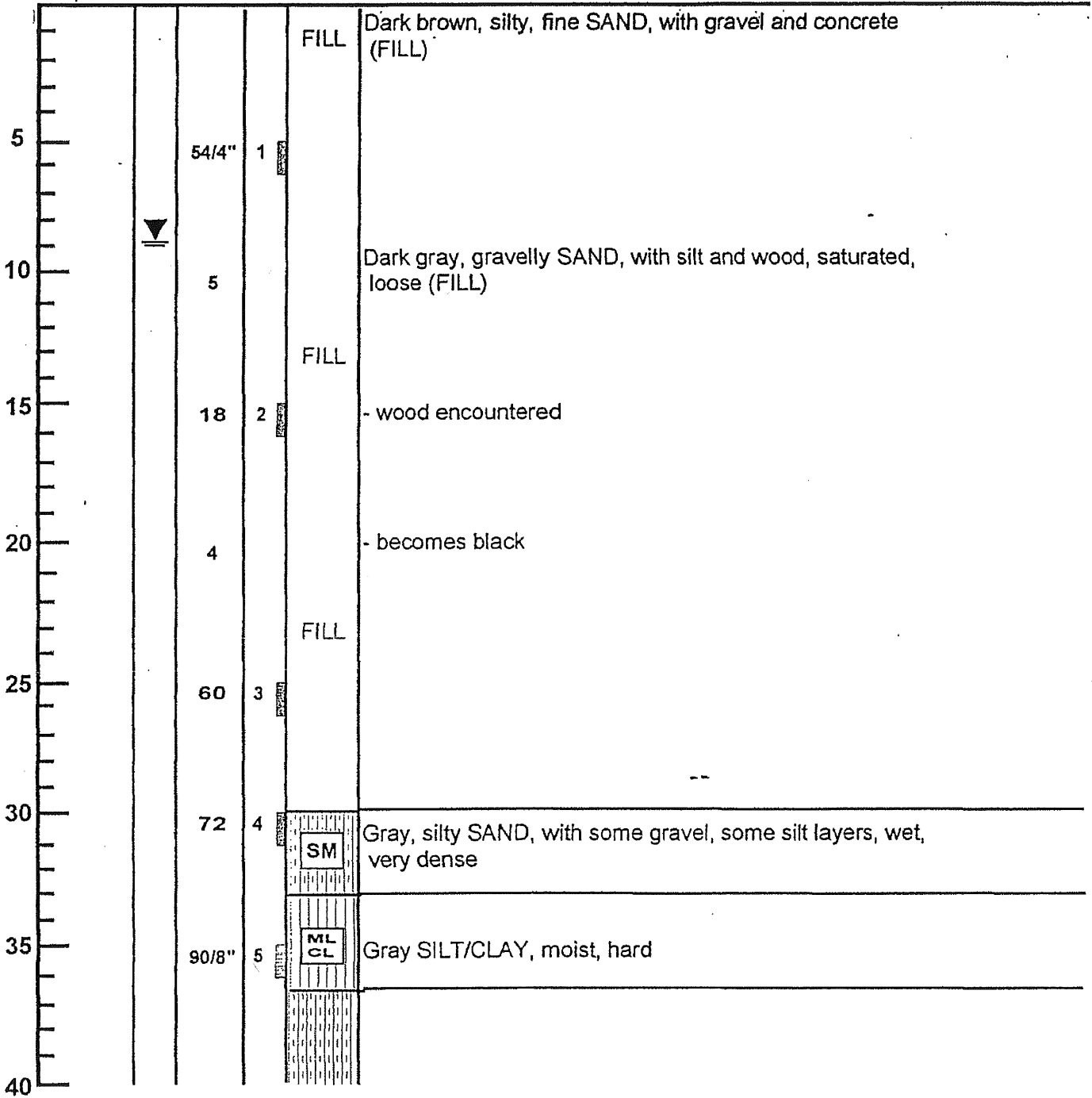
SITE PLAN
BUILDING 3, PHASE 1
QUADRANT LAKE UNION CENTER
SEATTLE, WA

Job No.: 97178-3	Date: NOV 1987	Plate: 1
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BORING 1A

Description

Well Design
Water Table
Blows per Foot
Sample
USCS




GEOTECH
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BORING LOG 1A
Quadrant Lake Union Center, Building 3
435 North 34th Street
Seattle, Washington

Job No: 96176-3	Date: September 97	Logged by: DBG	Plate: 2
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BORING 1 A (continued) *Description*

Well Design
Water Table
Blows Per Foot
Sample
USCS

45		50/4"	6		Gray, gravelly, silty SAND, wet, very dense
		55/6"	7		

- * Boring drilled to 45.5 feet on September 30, 1997.
- * Groundwater observed at 9 feet during drilling.



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BORING LOG 1A (continued)

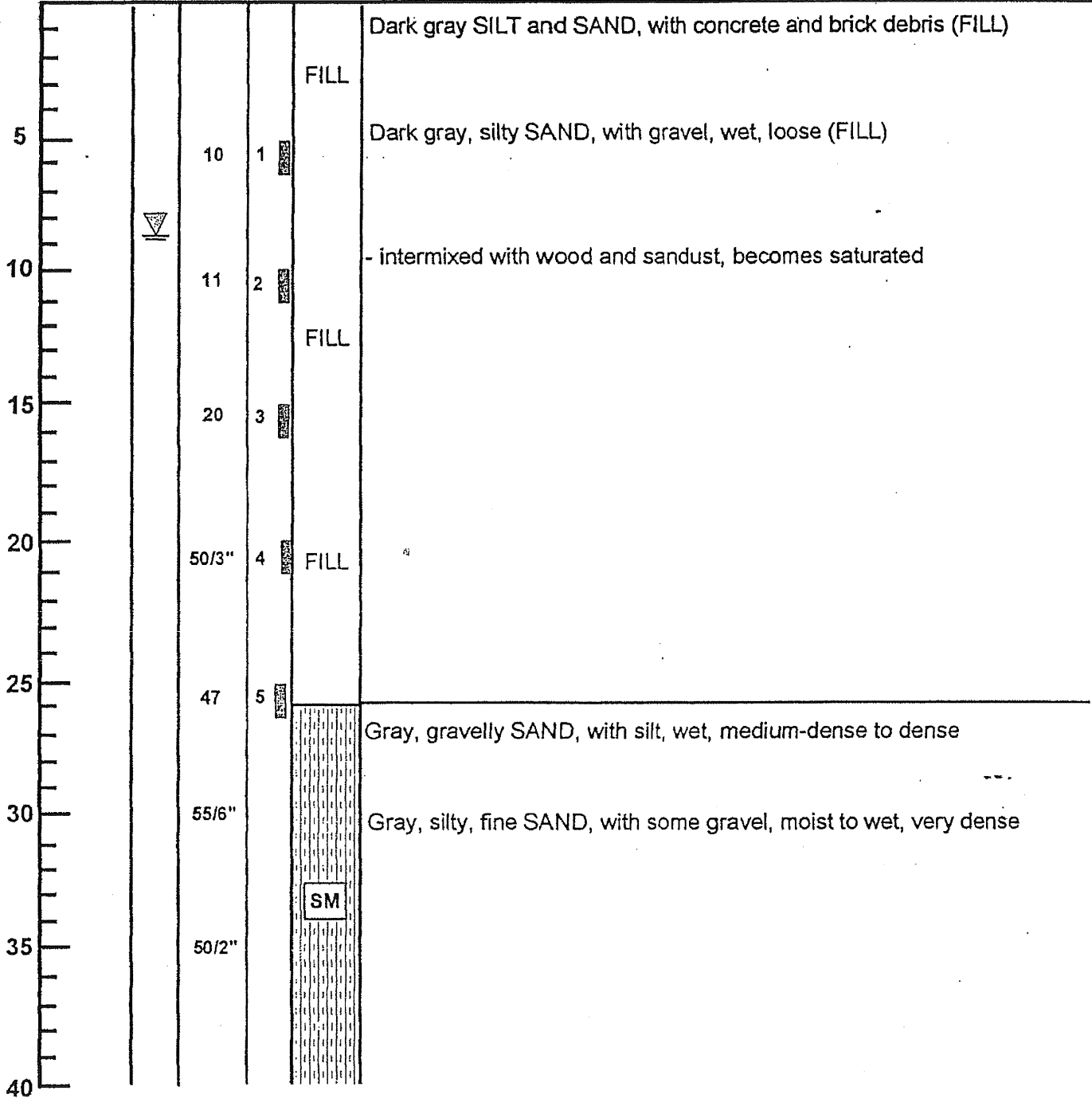
Quadrant Lake Union Center, Building 3
435 North 34th Street
Seattle, Washington

<i>Job No:</i> 96176-3	<i>Date:</i> September 97	<i>Logged by:</i> DBG	<i>Plate:</i> 3
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BORING 2A

Description

Moisture Content (%)
Water Table
Blows Per Foot
Sample
USCS



GEOTECH
CONSULTANTS, INC.

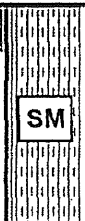
BORING LOG 2A

Quadrant Lake Union Center, Building 3
435 North 34th Street
Seattle, Washington

Job No: 96176-3	Date: September 97	Logged by: DBG	Plate: 4
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BORING 2A (continued) *Description*

Well Design
Water Table
Blows Per Foot
Sample
USCS

45	50/4"	4	
	50/5"		
50			
55			
60			
65			
70			
75			
80			

- * Boring drilled to 46 feet on September 30, 1997.
- * Groundwater observed at 9 feet during drilling.



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CONSULTANTS, INC.

BORING LOG 2A
(continued)
Quadrant Lake Union Center, Building 3
435 North 34th Street
Seattle, Washington

<i>Job No:</i> 96176-3	<i>Date:</i> September 97	<i>Logged by:</i> DBG	<i>Plate:</i> 5
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BORING 1

Moisture Content (%)	Sample	Blows per Foot	USCS	Description
				Mottled, gravelly SAND, dry, loose
45.1	1	7		-significant amounts of sawdust
				-becomes wet to saturated
	2	6		
			FILL	
	3	2		-lens of coarse sand & wood
	4	19		
	5	12		-becomes very sandy, little wood
				Gray SAND & silty SAND, fine- to medium-grained, wet medium-dense to dense
18.3	6	29	SP SM	
	7	48		-becomes dense

Test boring 1 continued on the next page.



TEST BORING LOG
700 N NORTHLAKE WAY
SEATTLE, WA

Job No: 96178-3	Date: JUNE 1996	Logged by: DRW	Plate:
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BORING 1 Continued

Moisture Content (%)	Sample	Blows per Foot	USCS	Description
	8	37		
45	9	50/6"	SM	-becomes silty
50	10	80	ML	Gray SILT, low to medium plasticity, wet, very stiff
55				

Test boring terminated at 51 feet below grade on 6-6-96.
Groundwater seepage was encountered at 10 feet during drilling.



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TEST BORING LOG
700 N NORTHLAKE WAY
SEATTLE, WA

Job No: 98176-3	Date: JUNE 1996	Logged by: DRW	Plate:
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BORING 5

Moisture Content (%)	Sample	Blows per Foot	USCS	Description
18	1	51	ML	Tan, low plasticity SILT, very moist, medium-dense -becomes sandy & gravelly, very dense
11.6	2	80/11"	SM ML	-becomes more sandy
	3	53	SP	Gray, fine- to medium-grained SAND with traces of silt, wet, dense -becomes silty
	4	82/10"	SM	
18.9	5	50/4"	ML	Gray, low plasticity SILT, moist, very dense -with cobbles -with sandy lenses
	6	80/10"	SM	Gray, fine- to medium-grained SAND with some silt, wet, very dense

Test boring terminated at 31 feet below grade on 6-7-96.
Groundwater seepage was encountered at 14 feet during drilling.



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CONSULTANTS, INC.

TEST BORING LOG
700 N NORTHLAKE WAY
SEATTLE, WA

Job No: 98176-3	Date: JUNE 1996	Logged by: JHS	Plate:
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Bothell, WA 98011-8016
Tel. 425.485.5000
Fax. 425.486.9766

January 30, 2001
Project 793645(02)

Mr. Benjamin Conwell
Quadrant
P.O Box 130
Bellevue, Washington 98009

Re: Groundwater Analytical Results from December 26, 2000, Sampling Event
Proposed Lakeview Building
Quadrant Lake Union Center

Dear Mr. Conwell:

IT Corporation (ITC) has prepared this letter to summarize results of analytical testing conducted on groundwater samples collected on December 26, 2000 from two dewatering wells located within the proposed boundaries of the Lakeview Building at Quadrant's Lake Union Center development. The purpose of the sampling was to further evaluate the presence of pentachlorophenol (PCP) in groundwater at the site. The sampling was performed consistent with the recommendation in ITC's December 28, 2000 letter summarizing previous groundwater sampling events at the site.

Field Sampling

Dewatering wells W-2 and W-5 were resampled on December 26, 2000, using the same procedures used for previous sampling events. The wells were sampled after purging the wells for a minimum of 15 minutes using the submersible pump installed in each well. The water samples were then collected from the discharge of each well utilizing the laboratory-provided bottles. The samples were analyzed in the field to determine pH and turbidity. The purge water was discharged to the on site sanitary sewer under a temporary discharge permit obtained by GLY Construction. The discharge rates at the time of sampling for wells W-2 and W-5 were estimated to be approximately 20 gallons per minute (gpm) and 50 gpm, respectively.

The groundwater samples were transported under chain of custody to North Creek Analytical, Inc. in Bothell, Washington, for analysis of PCP using GC/MS with selective ion monitoring.

Mr. Benjamin Conwell
January 30, 2001
Page 2

Project 793645(02)

Laboratory Results

The PCP laboratory results and field measurements of pH and turbidity for all sampling events to date (November 28 and December 11, 20, and 26) are summarized in the attached Table 2 from ITC's December 28, 2000 letter. A copy of the December 26, 2000, sample laboratory report is attached.

PCP was detected in the December 26 groundwater samples from W-2 and W-5 at concentrations of 1.2 and 0.67 micrograms per liter ($\mu\text{g/L}$), respectively (Table 2). The concentration of PCP found in W-2 is similar to the concentration found in the November 28 sample from the same well. The PCP concentrations in well W-5 apparently decreased from the November 28 to the December 26 sampling events (1.22 to 0.67 $\mu\text{g/L}$). PCP was not detected at or above a method reporting limit of 0.500 $\mu\text{g/L}$ for the December 20 groundwater samples from both wells. Turbidity values ranged from 4.27 to 44.7 NTUs and pH ranged from 6.4 to 6.8.

The November 28 PCP concentrations from W-2 and W-5 and the December 26 PCP concentration from W-2 slightly exceed the MTCA Method B cleanup level (0.73 $\mu\text{g/L}$) and the federal drinking water maximum contaminant level (MCL; 1.0 $\mu\text{g/L}$). The November 28 PCP concentrations from both wells and the December 26 PCP concentration from W-5 were below the MTCA Method B and the MCL.

The PCP results were also compared to the freshwater aquatic chronic criteria (Chapter 173-201A WAC) because of the proximity of the Lake Washington Ship Canal. Using the range of pH values from the December sampling events, the calculated freshwater aquatic chronic criteria for PCP ranges from 3.13 to 4.68 $\mu\text{g/L}$ for a pH range of 6.4 to 6.8. As can be seen in Table 2, all of the detected PCP concentrations are well below the freshwater aquatic criteria.

Conclusions

The monitoring results to date indicate that PCP is intermittently present in groundwater beneath the site at concentrations that slightly exceed cleanup levels (MCTA Method B and MCL) based on the use of the groundwater for drinking water purposes. However, because groundwater at the site is not currently used for drinking water purposes nor is it reasonably likely to be used in the future, the detected concentrations of PCP do not appear to present a threat to human health. In addition, the results were well below the freshwater chronic criteria, which indicates that the PCP in groundwater does not pose a threat to the environment should it migrate to the ship canal.

Mr. Benjamin Conwell
January 30, 2001
Page 3

Project 793645(02)

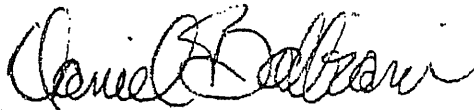
The source of the PCP in groundwater is unknown at this time. Historical information regarding this portion of the Lake Union Center did not indicate prior use of PCP. ITC believes that a potential source of the PCP may be the buried wood debris that is present beneath the proposed building location. This material will be excavated and disposed of at a permitted off-site facility to allow construction of the subterranean parking structure.

ITC concludes that the PCP concentrations in groundwater do not pose a threat to human health or the environment and we do not recommend active remediation for this site. ITC recommends that additional groundwater monitoring be conducted at the completion of construction (i.e., after the excavation of the buried wood debris, etc.) to monitor the concentrations of PCP in groundwater. ITC further recommends that Ecology is notified of these findings and Quadrant's planned development and monitoring activities. Once the post-construction monitoring results are obtained, ITC recommends submitting a request for no further action under Ecology's voluntary cleanup program.

ITC appreciates the opportunity to be of service on this project. If you have any questions regarding this letter or require additional information, please do not hesitate to call me.

Sincerely,

IT CORPORATION

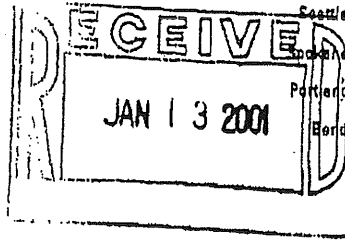


Daniel Balbiani, PE
Project Director

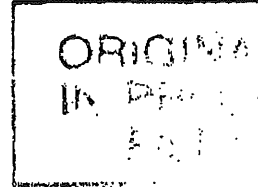
Attachments: Table 2
Laboratory Report

Table 2
Summary of Groundwater Sampling Results
Pentachlorophenol, pH, and Turbidity
Lake View Building
Quadrant Lake Union Center

Location	Date Sampled	PCP (µg/L)	Turbidity (NTUs)	pH
Method B Cleanup Level/MCL ^a		0.73/1.0	NA	NA
Freshwater Aquatic Chronic Criteria ^b		3.13 – 4.68 ^c	NA	NA
W-2	11/28/00	1.26	--	--
	12/11/00	NR	44.7	6.4
	12/20/00	<0.500	43.1	6.4
	12/26/00	1.2	14.7	6.7
W-5	11/28/00	1.22	--	--
	12/11/00	NR	4.27	6.6
	12/20/00	<0.500	9.58	6.5
	12/26/00	0.67	16.2	6.8
NOTE: NR = not reported. NA = not available. -- = not analyzed. ^a MTCA Method B Cleanup Level/ Maximum Contaminant Level. ^b Freshwater Aquatic Chronic Criteria from Water Quality Standards for Surface waters of the State of Washington, Chapter 173-201A WAC. ^c Freshwater aquatic criteria are based on pH. Range provided is for pH range of 6.4 to 6.8.				



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8223
 425.420.9200 fax 425.420.9210
 East 11115 Montgomery, Suite B, Spokane, WA 99208-4778
 509.924.9200 fax 509.924.9293
 Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
 503.908.9200 fax 503.908.9210
 Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-8711
 541.383.9310 fax 541.382.7588



12 January, 2001

Dan Balbiani
 IT Corporation - Bothell
 18912 North Creek Pkwy, Ste 200
 Bothell, WA 98011

RE: Quadrant Fremont

Enclosed are the results of analyses for samples received by the laboratory on 12/26/00 08:40. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jeanne Garthwaite

Jeanne Garthwaite
 Project Manager



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-6223
 425.420.9200 fax 425.420.9210
 Spokane East 11115 Montgomery, Suite B, Spokane, WA 99208-4772
 509.924.9200 fax 509.924.9290
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 503.808.9200 fax 503.908.9210
 Bend 20332 Empru Avenue, Suite F-1, Bend, OR 97701-6711
 541.383.9310 fax 541.382.7588

IT Corporation - Bothell 18912 North Creek Pkwy, Ste 200 Bothell WA, 98011	Project: Quadrant Fremont Project Number: 793642 (02) Project Manager: Dan Balbiani	Reported: 01/11/01 13:47
--	---	-----------------------------

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Well-2-122600	BOL0591-01	Water	12/26/00 08:05	12/26/00 08:40
Well-5-122600	BOL0591-02	Water	12/26/00 08:15	12/26/00 08:40

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Jeanne Garthwaite
 Jeanne Garthwaite, Project Manager

North Creek Analytical, Inc.
 Environmental Laboratory Network



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8223
 425.420.9200 fax 425.420.9210
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 503.808.9200 fax 503.905.9210
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IT Corporation - Bothell 18912 North Creek Pkwy, Ste 200 Bothell WA, 98011	Project: Quadrant Fremont Project Number: 793642 (02) Project Manager: Dan Balbiani	Reported: 01/11/01 13:47
--	---	-----------------------------

**Pentachlorophenol by GC/MS with Selected Ion Monitoring
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Well-2-122600 (BOL0591-01RE1) Water	Sampled: 12/26/00 08:05 Received: 12/26/00 08:40								
Pentachlorophenol	1.2	0.50	ug/l	1	0L26011	12/26/00	01/08/01	GC/MS-SIM	
Surrogate: 2,4,6-TBP	81.9 %	30-150			"	"	"	"	
Well-5-122600 (BOL0591-02RE1) Water	Sampled: 12/26/00 08:15 Received: 12/26/00 08:40								
Pentachlorophenol	0.67	0.50	ug/l	1	0L26011	12/26/00	01/08/01	GC/MS-SIM	
Surrogate: 2,4,6-TBP	79.8 %	30-150			"	"	"	"	

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

JMG
 Jeanne Garthwaite, Project Manager

North Creek Analytical, Inc.
 Environmental Laboratory Network



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 541.383.9310 fax 541.382.7688

IT Corporation - Bothell 18912 North Creek Pkwy, Ste 200 Bothell WA, 98011.	Project: Quadrant Fremont Project Number: 793642 (02) Project Manager: Dan Balbiani	Reported: 01/11/01 13:47
---	---	-----------------------------

**Pentachlorophenol by GC/MS with Selected Ion Monitoring - Quality Control
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0L26011: Prepared 12/26/00 Using EPA 3510C/600 Series										
Blank (0L26011-BLK2)										
Pentachlorophenol	ND	0.50	ug/l							
Surrogate: 2,4,6-TBP	32.7		"	50.0		65.4	30-150			
LCS (0L26011-BS1)										
Pentachlorophenol	14.5	0.50	ug/l	20.0		72.5	30-150			
Surrogate: 2,4,6-TBP	54.1		"	50.0		108	30-150			
LCS Dup (0L26011-BSD1)										
Pentachlorophenol	14.1	0.50	ug/l	20.0		70.5	30-150	2.80	50	
Surrogate: 2,4,6-TBP	51.7		"	50.0		103	30-150			

North Creek Analytical - Bothell

The results in this report apply to the samples analysed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

JMG
 Jeanne Garthwaite, Project Manager

North Creek Analytical, Inc.
 Environmental Laboratory Network



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503.908.8200 fax 503.908.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-6711
541.383.9310 fax 541.562.7568

IT Corporation - Bothell
18912 North Creek Pkwy, Ste 200
Bothell WA, 98011

Project: Quadrant Fremont
Project Number: 793642 (02)
Project Manager: Dan Balbiani


Reported:
01/11/01 13:47

Notes and Definitions

DET Analyte DETECTED
ND Analyte NOT DETECTED at or above the reporting limit
NR Not Reported
dry Sample results reported on a dry weight basis
RPD Relative Percent Difference

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.


Jeanne Garthwaite, Project Manager

North Creek Analytical, Inc.
Environmental Laboratory Network

Page 4 of 4

Associated Earth Sciences, Inc.

Subsurface Exploration, and
Geotechnical Engineering Report

QUADRANT LAKE UNION CENTER LAKEVIEW BUILDING

University Place, Washington

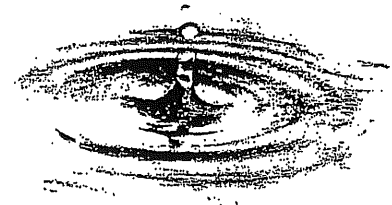
Prepared for

Quadrant Corporation

Project No. KE00162G
May 10, 2000



Geotechnical Engineering



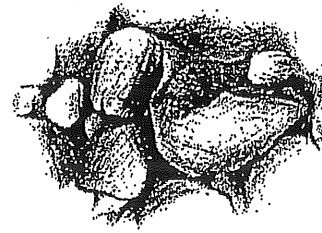
Water Resources



Solid and Hazardous Waste



Ecological/Biological Sciences



Geologic Assessments



I. PROJECT AND SITE CONDITIONS

1.0 INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering study for the proposed Lakeview Building at Quadrant Lake Union Center. Our recommendations are based on the current plans for the project, which have not been finalized. The proposed building location and approximate locations of the explorations accomplished for this study are presented on the Site and Exploration Plan, Figure 1. In the event that any changes in the nature, design or location of the structure are planned, the conclusions and recommendations contained in this report should be reviewed and modified, or verified, as necessary.

1.1 Purpose and Scope

The purpose of this study was to provide subsurface data to be utilized in the design of the above referenced project. Our study included a review of available literature, drilling test borings and performing geologic studies to assess the type, thickness, distribution and physical properties of the subsurface sediments and shallow ground water conditions. Engineering studies were also conducted to determine the type of suitable foundation, allowable bearing pressures, anticipated settlements, basement/retaining wall lateral pressures, floor support recommendations and drainage considerations. This report summarizes our current fieldwork and offers geotechnical design recommendations based on our present understanding of the project.

1.2 Authorization

Authorization to proceed with this study was granted by Mr. Benjamin Conwell of the Quadrant Corporation. Our study was accomplished in general accordance with our scope of work letter dated March 27, 2000. This report has been prepared for the exclusive use of the Quadrant Corporation and their agents, for specific application to this project. Within the limitations of scope, schedule and budget, our services have been performed in accordance with generally accepted geotechnical engineering and engineering geology practices in effect in this area at the time our report was prepared. No other warranty, expressed or implied is made.

2.0 PROJECT AND SITE DESCRIPTION

This report was completed with an understanding of the project based on design drawings referenced as Quadrant Lake Union Center, MUP set, dated June 25, 1998. This plan set

contains a total of 40 sheets, including cover sheets. Many of the sheets in the plan set have different dates and revision dates than the date on the plan set cover and footer.

The proposed project would include construction of a new building on the Quadrant Lake Union Center site. The new Lakeview building would be situated east of the existing Plaza Building, and north of the existing Adobe Waterfront Building. The new building will include three levels of parking below, and three levels of office space above, with the floor slab of the lowest parking level at approximately elevation 10 feet. The new building will be similar in construction materials and style to the existing adjacent buildings. Reinforced concrete parking levels are planned. Upper levels would consist of steel framework, post tensioned concrete floors, and masonry exterior. The adjacent buildings were constructed with pile foundation support, and pile support is planned for the Lakeview building.

The site is at the northeast corner of the Quadrant Lake Union Center, and is bordered by North 34th Street to the north, by the Plaza building to the west, by the Adobe Waterfront building to the south, and by the Aurora Bridge, commercial buildings, and a marina to the east. The project area is currently occupied by a landscaped lawn and parking area at the ground surface, with considerable thickness of existing fill in some areas. A substantial landscape mound on the south part of the building is constructed of existing fill. Portions of parking levels A, B, and C have already been constructed beneath the Plaza building and existing landscaping, and the new parking level construction will join and be continuous with the existing parking levels.

3.0 SUBSURFACE EXPLORATION

Our field study included drilling three exploration borings to gain information about the site. The various types of sediments as well as the depths where characteristics of the sediments changed are indicated on the exploration logs presented in the Appendix. The depths indicated on the logs where conditions changed may represent gradational variations between sediment types in the field. If changes occurred between sample intervals in our borings, they were interpreted. Our explorations were approximately located in the field by measuring from known site features shown on the site plans referenced above. The Site and Exploration Plan included with this report shows the approximate exploration locations relative to existing site features.

As a part of this study, we also reviewed subsurface data collected previously by others during earlier design phases for the Quadrant Lake Union Center. The previous explorations, along with selected augercast pile installation information, is summarized in a report by Geotech Consultants titled *Geotechnical Engineering Considerations, Proposed Building 3 of East Development, Quadrant Lake Union Center*, their project Number JN96176-3, dated November 25, 1997.

The conclusions and recommendations presented in this report are based on the ~~three~~ exploration borings completed for this study, and on the referenced subsurface information and plans by others. The number, location, and depth of the explorations were completed within site and budgetary constraints. Because of the nature of exploratory work below ground, extrapolation of subsurface conditions between field explorations is necessary. It should be noted that differing subsurface conditions may sometimes be present due to the random nature of deposition and the alteration of topography by past grading and/or filling. The nature and extent of any variations between the field explorations may not become fully evident until construction. If variations are observed at that time, it may be necessary to re-evaluate specific recommendations in this report and make appropriate changes.

3.1 Exploration Borings

The exploration borings were completed by advancing a 3-3/8 inch inside-diameter, hollow-stem auger with a trailer-mounted drill rig. During the drilling process, samples were obtained at generally 2½ or 5-foot depth intervals. The borings were continuously observed and logged by a geologist from our firm. The exploration logs presented in the Appendix are based on the field logs, drilling action, and inspection of the samples secured.

Disturbed but representative samples were obtained by using the Standard Penetration Test procedure in accordance with ASTM:D 1586. This test and sampling method consists of driving a standard 2-inch outside-diameter split barrel sampler a distance of 18 inches into the soil with a 140-pound hammer free-falling a distance of 30 inches. The number of blows for each 6 inch interval is recorded and the number of blows required to drive the sampler the final 12 inches is known as the Standard Penetration Resistance ("N") or blow count. If a total of 50 is recorded within one 6-inch interval, the blow count is recorded as 50 blows for the number of inches of penetration. The resistance, or N-value, provides a measure of the relative density of granular soils or the relative consistency of cohesive soils; these values are plotted on the attached boring logs.

The samples obtained from the split barrel sampler were classified in the field and representative portions placed in watertight containers. The samples were then transported to our laboratory for further visual classification and laboratory testing, as necessary.

4.0 SUBSURFACE CONDITIONS

Subsurface conditions at the project site were inferred from the field explorations accomplished for this study, visual reconnaissance of the site and review of the previous subsurface explorations by others, and on information gathered from a review of applicable geologic literature. As shown on the field logs, the exploration holes generally encountered fill materials overlying natural deposits of hard silt, very dense sand, or very dense silty sand with gravel. The following section describes these layers of subsurface soil in greater detail.

4.1 Stratigraphy

Fill

Fill soils (those not naturally placed) were encountered in each of the explorations accomplished for this study to depths ranging from approximately 15 to 24 feet below the existing ground surface. Previous explorations by others identified fill thicknesses within the proposed building area ranging from approximately 0 to 30 feet. Fill thickness is generally least near the north building margin, and becomes deeper to the southeast. The fill composition is highly variable. At shallow depths, the fill contains some rubble and quarry spalls in a silty sand matrix. Below that, the fill typically consists of silty sand with varying wood and gravel content. Our explorations occasionally encountered intervals composed entirely of wood or sawdust. Due to the low density and high wood content of the fill, it is not considered suitable for support of foundations or other structural loads.

Hydraulic Fill/Aluvium

Below the fill, some of the explorations encountered a layer of very loose granular deposits. These deposits may represent fill materials that would probably have been hydraulically placed, or may represent naturally occurring alluvial deposits. The granular fill/alluvium layer is not considered suitable for support of foundations or other structural loads.

Glacial Sediments

Below the fill/alluvium, our explorations encountered glacially consolidated sediments that were variable in grain size distribution and density. Some deposits were fine-grained silt or lean clay; others were silty gravelly sand that more closely resembles lodgement till. Some of the deposits displayed effervescence with hydrochloric acid, which is thought to be typical of older glacial deposits that were deposited in and / or exposed to a marine environment. The overall character of these sediments changed significantly in relatively short lateral and vertical distances, although the depth to the shallowest glacially consolidated deposits is relatively well documented and relatively predictable, based on existing subsurface information. The glacially consolidated sediments are at or near the surface below the north part of the building, and are as deep as 30 to 35 feet below the surface (elevation -11 to -16 feet) near the southeast building corner. These sediments are considered suitable for support of pile foundations, as recommended in this report.

The Site and Exploration Plan, Figure 1 attached with this report indicates the approximate elevation at which bearing sediments are expected to be encountered, based on explorations performed by AESI and others. The elevations shown are the estimated surface of the bearing layer. Pile foundations will penetrate below the surface of the bearing layer to achieve embedment into the bearing sediments. It should be noted that some of the explorations may have been completed with ground surface elevations different than those present today, and

depths may not account for the mound of fill that currently exists on the south part of the project site. Elevations of the top of the bearing surface should be used in project planning, and not depths below ground surface as presented on the exploration logs presented in this report or previously completed by others.

4.2 Hydrology

Ground water seepage was encountered in the explorations completed for this study at depths of approximately 4 to 9 feet below the ground surface (elevation 10 to 15 feet). The shallower groundwater probably represents groundwater perched in the loose fill. The loose granular sediments that were observed in some explorations immediately below the fill were also saturated. In general, the presence of groundwater at shallow depth should be expected, but the depths where it will be encountered and the volume and rate of flow will be variable in the fill material. Fluctuations in groundwater levels should be expected in response to changes in season, precipitation, on and off site land usage, and other factors. Our experience on the Evanston, Canal, Parkview and Waterside buildings indicated that ground water is slightly above the level of Lake Union.

II. DESIGN RECOMMENDATIONS

5.0 INTRODUCTION

Our explorations indicate that, from a geotechnical standpoint, the parcel is suitable for the proposed development contingent on the foundation support recommendations presented in this report. The bearing stratum is relatively shallow in the north portion of the building area, but drops off steeply to the south and east. Pile foundation support is recommended for the Lakeview Building due to the significant deposits of existing fill, and the fact that the existing Plaza Building that the Lakeview Building will join, is also pile supported. Subsurface drainage is also a significant issue. The Plaza Building parking garage has a history of drainage related problems that are to be avoided with the new building. Important drainage features of the Lakeview building will include a cutoff drain on the north side of the project, and subfloor drains beneath the lowest floor slab.

6.0 SITE PREPARATION

Most of the existing buried utilities were held out of the Lakeview Building footprint to allow for future construction. Any existing utilities or other structures that are not to remain should be removed from the building footprint. Any resulting depressions should be backfilled with structural fill as discussed under the *Structural Fill* section. Existing parking lot paving, sidewalks, landscaping, irrigation, lighting, and other improvements should be removed from the construction area. Existing topsoil should also be removed.

In our opinion, stable construction slopes should be the responsibility of the contractor and should be determined during construction. For estimating purposes, however, we anticipate that temporary, unsupported cut slopes in the existing fill can be made at a maximum slope of 1.5H:1V (Horizontal:Vertical). As is typical with earthwork operations, some sloughing and raveling may occur and cut slopes may have to be adjusted in the field. In addition, WISHA/OSHA regulations should be followed at all times.

We recommend that the elevations of the top and bottom of the North 34th Street retaining wall foundation be established prior to construction. If new building excavations encroach on the bearing soils at the existing footings, provisions for protection of the bearing soil (shoring) or foundation underpinning may be required.

The on-site soils contain a high percentage of fine-grained material that makes them moisture-sensitive and subject to disturbance when wet. The Contractor must use care during site preparation and excavation operations so that the underlying soils are not softened. If disturbance occurs, the softened soils should be removed and the area brought to grade with structural fill. Depending on the time of year that construction occurs, consideration should be

After recompaction of the exposed ground is tested and approved, or a free-draining rock course is laid, structural fill may be placed to attain desired grades. Structural fill is defined as non-organic soil, acceptable to the geotechnical engineer, placed in maximum 8 inch loose lifts with each lift being compacted to 95 percent of the modified Proctor maximum density using ASTM:D 1557 as the standard. In the case of roadway and utility trench filling, the backfill should be placed and compacted in accordance with current local or county codes and standards. The top of the compacted fill should extend horizontally outward a minimum distance of 3 feet beyond the location of the perimeter footings or roadway edge before sloping down at an angle of 2H:1V.

The contractor should note that any proposed fill soils must be evaluated by Associated Earth Sciences, Inc. (AESI) prior to their use in fills. This would require that we have a sample of the material 48 hours in advance to perform a Proctor test and determine its field compaction standard. Soils in which the amount of fine-grained material (smaller than No. 200 sieve) is greater than approximately 5 percent (measured on the minus No. 4 sieve size) should be considered moisture-sensitive. Use of moisture-sensitive soil in structural fills should be limited to favorable dry weather conditions.

The site soils that will be excavated to reach building grade are expected to consist of existing fill material that contains significant rubble and wood. Groundwater seepage will also be encountered. It is expected that little of the excavated material will be suitable for use as structural fill due to high content of moisture and deleterious material.

A representative from our firm should inspect stripped subgrades and be present during placement of structural fill to observe the work and perform a representative number of in-place density tests. In this way, the adequacy of the earthwork may be evaluated as filling progresses and any problem areas may be corrected at that time. It is important to understand that taking random compaction tests on a part-time basis will not assure uniformity or acceptable performance of a fill. As such, we are available to aid the owner in developing a suitable monitoring and testing program.

8.0 FOUNDATIONS

Cast-in-place concrete piles (Augercast) may be used for foundation support. We recommend that the placement of all piles be accomplished by a contractor experienced in their installation. Existing fill may contain obstacles and rubble, and soils of glacial origin may contain gravel lenses or boulders. It may be necessary to have a backhoe present during pile installation to dig out obstacles and backfill the excavation prior to drilling piling. Because of the variable nature of the subsurface soils, pile lengths will vary to achieve the minimum embedment depth into competent bearing soil as recommended in this report. One should refer to the elevations of the top of the bearing layer as shown on the Site and Exploration Plan, Figure 1. As a general guideline, we expect pile lengths on the order of 15 to 40 feet, with shorter piles

beneath the north part of the building, and the longest piles under the southeast building corner.

Augercast piles with a minimum diameter of 18 inches will be capable of supporting allowable loads of 80 tons vertical compressive capacity when embedded a minimum distance of 10 feet into the very dense silty gravelly sand or hard silt. Allowable design loads may be increased by one third for short-term wind or seismic loading. Anticipated settlements of pile supported structures will generally be on the order of one half inch. All piles should be a minimum of 15 feet in length.

8.1 Lateral Pile Capacity

Lateral capacity of piles installed as recommended will be 10 tons assuming an allowable deflection of 1 inch at the top of the pile, and assuming that pile heads will be fixed against rotation at the ground surface by a rigid pile cap or grade beam. The lateral capacity given also assumes that piles will be spaced at least 5 pile diameters from center to center in the direction of lateral load application. Closer spacing may result in a reduced lateral capacity due to group effects. We should be allowed to offer situation specific recommendations if pile group effects need to be considered.

8.2 Uplift Capacity

Resistance to uplift loads, such as wind and seismic forces, can be provided through skin friction along the pile shaft. Provided the minimum embedment into the bearing layer is achieved, an allowable uplift capacity of 30 tons can be used in design at each pile.

8.3 Pile Inspections

The actual total length of each pile will be determined in the field based on required capacity and conditions encountered during drilling. Since completion of the pile takes place below ground, the judgment and experience of the geotechnical engineer or his field representative must be used as a basis for determining the required penetration and acceptability of each pile. Consequently, use of the presented pile capacities in the design requires that all piles be inspected by a qualified geotechnical engineer or engineering geologist from our firm who can interpret and collect the installation data and examine the contractors operations. AESI, acting as the owner's field representative, would determine the required lengths of the piles and keep records of pertinent installation data. A final summary report would then be distributed, following completion of pile installation.

to excavate these soils without disturbance, the soil under the footings must be recompacted to 95 percent of the above-mentioned standard for this value to apply.

10.0 FLOOR SUPPORT

Due to the loose and organic nature of the existing fill, we recommend that the floor slab be supported on the pile foundation system or "floated" over a structural fill mat. The structural support alternative eliminates the risk of post-construction settlement. With the structural fill mat, post-construction settlements of 1 inch are possible. In either case, the floor slab should be underlain by the pitrun construction pad as recommended in the *Site Preparation* section of this report, and by the subfloor drainage system as recommended in the *Drainage Considerations* section of this report. We also recommend that the floor slab be underlain by a 6-inch gravel layer of pea gravel or granolithic material to act as a capillary break, and an impervious moisture barrier. The gravel layer should communicate freely with the underslab drainage system. The impervious moisture barrier can be eliminated below parking garage floors, but should be included below heated or habitated space.

11.0 DRAINAGE CONSIDERATIONS

The building should be provided with a perimeter drainage system at foundation grade. The northern segment of this system will also serve as a cutoff drain for groundwater entering the building area from the north. Drains should consist of schedule 3034 rigid, perforated, PVC pipe surrounded by washed pea gravel. The level of the perforations in the pipe should be set slightly below the bottom of the grade beams at all locations and the drains should be constructed with sufficient gradient to allow gravity discharge away from the building. In addition, all basement and retaining walls should be lined with a minimum 12-inch thick washed gravel blanket provided over the full-height of the wall, and which ties into the footing drain. Roof and surface runoff should not discharge into the footing drain system but should be handled by a separate, rigid tightline drain. In planning, exterior grades adjacent to walls should be sloped downward away from the structure to achieve surface drainage.

The floor slab should be provided with a subsurface drainage system. The drainage system should consist of the previously mentioned layer of washed gravel rock at least 6 inches thick beneath the floor slab. The drainage layer should be continuous with, and freely communicate with drain trenches placed 25 feet on center beneath the slab. The trenches should be as deep as possible while still maintaining a positive gradient to the discharge point. We understand that this will allow trenches approximately 18 inches below the floor slab. Each of the trenches should be lined with geotextile filter fabric such as Mirafi 140N or equivalent, provided with a rigid perforated drainpipe, and backfilled with washed drain rock.

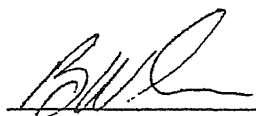
12.0 PROJECT DESIGN AND CONSTRUCTION MONITORING

At the time of this report, site grading, structural plans, and construction methods have not been finalized. We are available to provide additional geotechnical consultation as the project design develops and possibly changes from that upon which this report is based. We recommend that AESI perform a geotechnical review of the plans prior to final design completion. In this way, our earthwork and foundation recommendations may be properly interpreted and implemented in the design.

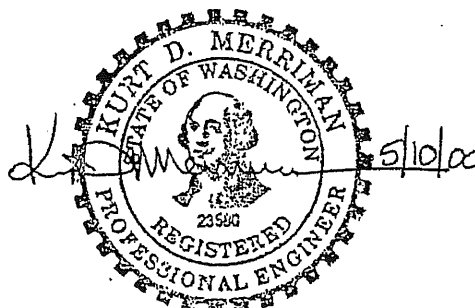
We are also available to provide geotechnical engineering and monitoring services during construction. The integrity of the foundation depends on proper site preparation and construction procedures. In addition, engineering decisions may have to be made in the field in the event that variations in subsurface conditions become apparent. Construction monitoring services are not part of this current scope of work. If these services are desired, please let us know and we will prepare a cost proposal.

We have enjoyed working with you on this study and are confident that these recommendations will aid in the successful completion of your project. If you should have any questions, or require further assistance, please do not hesitate to call.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington



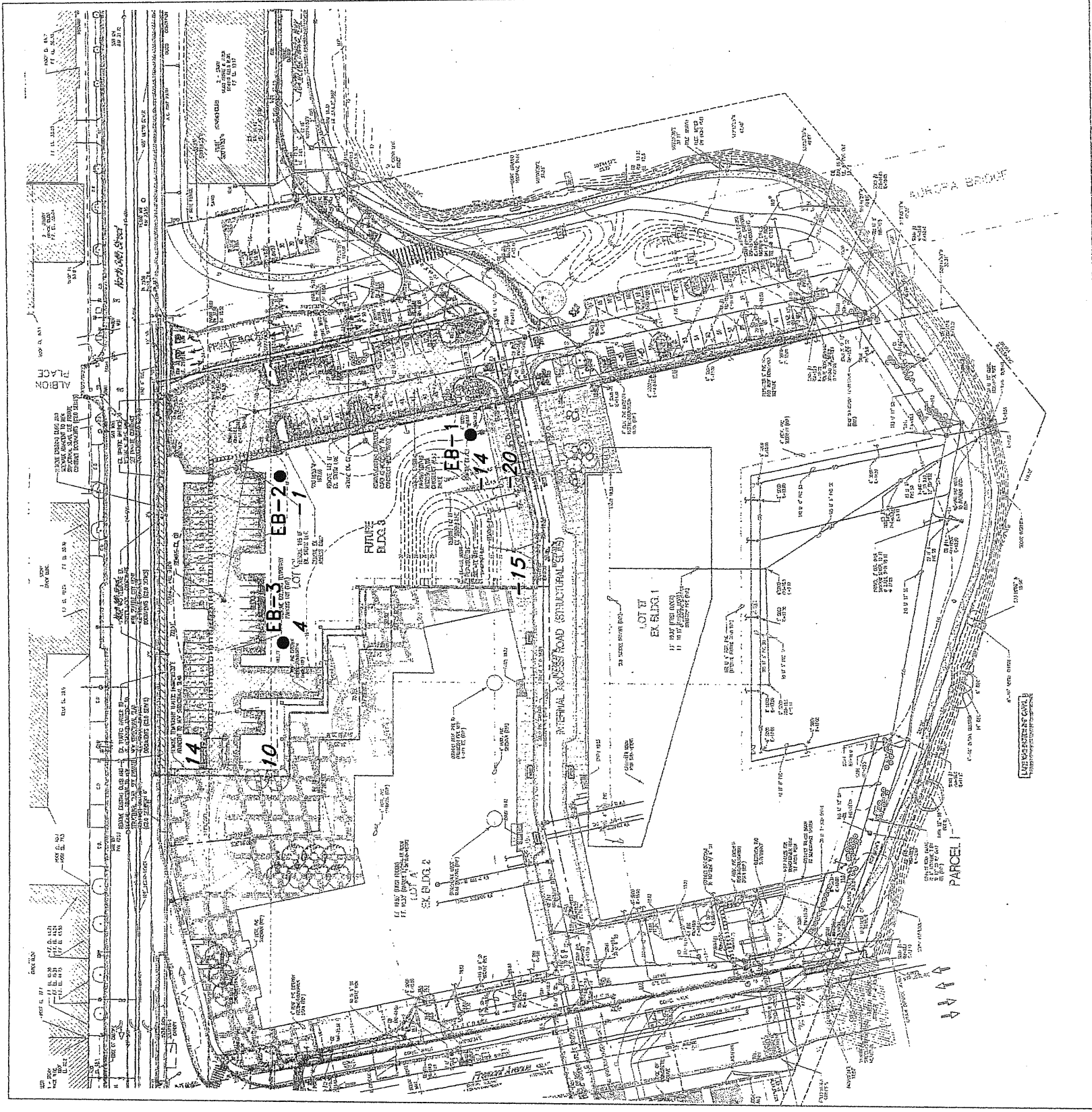
Bruce Guenzler
Project Geologist



EXPIRES 11/20/00

Kurt D. Merriman, P.E.
Associate

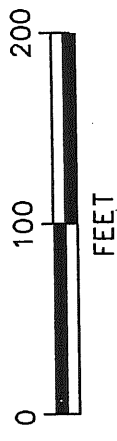
Attachments: Figure 1: Site and Exploration Plan
 Appendix: Exploration Logs



LEGEND

EB-1 ● Approximate location of exploration boring

-14 Approximate elevation of glacially consolidated sediments (ft), based on data from AESI and others



REFERENCE: BUSH, ROED & HITCHINGS, INC.

SITE AND EXPLORATION PLAN
QUADRANT LAKE UNION CTR. - LAKEVIEW BUILDING
SEATTLE, WASHINGTON

FIGURE



ASSOCIATED
 EARTH
 SCIENCES, INC

APPENDIX



Exploration Log

Project Number
KE00162G

Exploration Number
EB-1

Sheet
1 of 2

Project Name Quadrant Lake Union Center
 Location Seattle, WA
 Driller/Equipment Boretec
 Hammer Weight/Drop 140# / 30"

Ground Surface Elevation (ft) 19
 Datum N/A
 Date Start/Finish 4/4/00, 04/04/2000
 Hole Diameter (in) _____

Depth, ft	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/Foot				Other Tests	
							10	20	30	40		
				Grass/Topsoil								
				Fill								
5		S-1		Loose to medium dense, damp, mixed gray, dark gray and brown, mixed gravelly SAND silty SAND with organics and silty sand with gravelly spalls and rubble.								
		S-2		Medium dense, wet, brown, silty fine SAND; some wood, trace rubble and cobbles.								
10		S-3		Medium dense, wet, brown, silty SAND with wood.								
15		S-4		Wood, trace soil.								
20		S-5		Sawdust								
25		S-6		Alluvium Very loose, saturated, gray, fine SAND, little fine gravel, little silt (SM).								
30		S-7										
35		S-8		Till Very dense, wet, gray, silty fine SAND, some fine gravel (SM).								

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT) No Recovery M - Moisture
- 3" OD Split Spoon Sampler (D & M) Ring Sample Water Level ()
- Grab Sample Shelby Tube Sample Water Level at time of drilling (ATD)

Logged by: BG
 Approved by:



Exploration Log

Project Number
KE00162G

Exploration Number
EB-1

Sheet
2 of 2

Project Name Quadrant Lake Union Center
 Location Seattle, WA
 Driller/Equipment Boretac
 Hammer Weight/Drop 140# / 30"

Ground Surface Elevation (ft) 19
 Datum N/A
 Date Start/Finish 4/4/00, 04/04/2000
 Hole Diameter (in) _____

Depth, ft	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests	
								10	20	30	40		
		S-9		Very dense, wet, gray, fine to coarse SAND, trace fine gravel and silt.			19 22 41						▲63
				Glacial Lacustrine									
45		S-10		Hard, moist, gray, SILT to lean clay (ML to CL).			16 42 50/5"						▲50/5"
				Bottom of exploration boring at 46.5 feet									
50													
55													
60													
65													
70													
75													

AESIBOR 00162.GPJ May 3, 2000

Sampler Type (ST):

<input type="checkbox"/> 2" OD Split Spoon Sampler (SPT)	<input type="checkbox"/> No Recovery	M - Moisture	Logged by: BG
<input type="checkbox"/> 3" OD Split Spoon Sampler (D & M)	<input type="checkbox"/> Ring Sample	∇ Water Level ()	Approved by:
<input type="checkbox"/> Grab Sample	<input checked="" type="checkbox"/> Shelby Tube Sample	∇ Water Level at time of drilling (ATD)	



Exploration Log

Project Number
KE00162G

Exploration Number
EB-2

Sheet
1 of 1

Project Name Quadrant Lake Union Center
 Location Seattle, WA
 Driller/Equipment Boretec
 Hammer Weight/Drop 140# / 30"

Ground Surface Elevation (ft) 19
 Datum N/A
 Date Start/Finish 4/4/00, 04/04/2000
 Hole Diameter (in) _____

Depth, ft	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/Foot				Other Tests	
						Blows/6"	10	20	30		40
			Grass/Topsoil								
			Fill								
5	S-1		Blow count overstated, Dense?, damp, gray, silty fine to coarse SAND with rubble and quarry spalls.		50/6"						▲50/6"
	S-2		Black silty SAND layers.		50/6"						▲50/6"
10	S-3		Loose, wet, black wood, waste and silty SAND		2 5 5		▲10				
15	S-4		Loose, saturated, brown, fine to medium SAND. Soft, wet, gray, CLAY.		12 5 1		▲6				
20	S-5		Undifferentiated Dense, saturated, gray, fine to coarse sandy fine GRAVEL, trace silt (GW).		18 20 20						▲40
25	S-6		Very dense, saturated, gray, fine SAND, little silt (SP).		15 50/5"						▲50/5"
30	S-7		Very dense, damp, gray, silty fine SAND, trace fine gravel (SM). Bottom of exploration boring at 30.5 feet		50/6"						▲50/6"

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT) No Recovery M - Moisture
- 3" OD Split Spoon Sampler (D & M) Ring Sample Water Level ()
- Grab Sample Shelby Tube Sample Water Level at time of drilling (ATD)

Logged by: BG
 Approved by:



**ASSOCIATED
EARTH
SCIENCES, INC**

Exploration Log

Project Number
KE00162G

Exploration Number
EB-3

Sheet
1 of 1

Project Name Quadrant Lake Union Center
 Location Seattle, WA
 Driller/Equipment Boretac
 Hammer Weight/Drop 140# / 30"

Ground Surface Elevation (ft) 19
 Datum N/A
 Date Start/Finish 4/4/00, 04/04/2000
 Hole Diameter (in) _____

Depth, ft	S	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
				Grass/Topsoil								
				FILL								
5		S-1		Blowcount overstated, medium dense, damp, dark brown, silty fine to coarse SAND, some gravel and quarry spalls.		31 30 22						▲52
		S-2				50/5"						▲50/5"
10		S-3		Loose, wet, brown WOOD with silty sand.		2 2 4	▲6					
15		S-4		Undifferentiated Hard, moist, gray, SILT to LEAN CLAY, sheared texture with fine sand seams (ML to CL).		18 26 18						▲44
20		S-5		Very dense, moist, gray, silty fine gravelly fine to coarse SAND (SM).		50/5.5"						▲50/5.5"
25		S-6				50/5"						▲50/5"
				Bottom of exploration boring at 25.5 feet								
30												
35												

Sampler Type (ST):

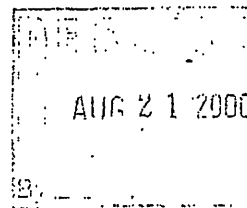
- | | | |
|--|--|---|
| <input type="checkbox"/> 2" OD Split Spoon Sampler (SPT) | <input type="checkbox"/> No Recovery | M - Moisture |
| <input type="checkbox"/> 3" OD Split Spoon Sampler (D & M) | <input type="checkbox"/> Ring Sample | ∇ Water Level () |
| <input type="checkbox"/> Grab Sample | <input checked="" type="checkbox"/> Shelby Tube Sample | ∇ Water Level at time of drilling (ATD) |

Logged by: BG
 Approved by:

Associated Earth Sciences, Inc.



August 16, 2000
Project No. KE00162G



Quadrant Corporation
P.O. Box 130
Bellevue, Washington 98009

Attention: Mr. Benjamin Conwell

Subject: Supplemental Exploration Pits
Lakeview Building
801 North 34th Street
Seattle, Washington

Dear Mr. Conwell:

This letter summarizes our observations of supplemental exploration pits advanced on August 9, 2000 by HOS Brothers and GLY Construction. The explorations were advanced in order to further characterize the existing fill that will be encountered during construction of the Lakeview Building. This phase of the project is supplementary to our previously completed work, which included advancing exploration borings and preparing a geotechnical report dated May 10, 2000. Previous explorations were also completed on the site by another consulting firm.

PROJECT BACKGROUND

The project will include construction of the Lakeview Building, the next phase of the Quadrant Lake Union Center campus. The Lakeview Building will be adjacent to the existing Plaza

Building and Adobe Waterfront Building, and will be similar to those buildings in construction type and appearance. Previous explorations on the site have identified an existing layer of surficial fill that is relatively thin at the northern edge of the planned building, and becomes thicker to the south. The fill is variable in density and contains demolition waste, and therefore is considered unsuitable for foundation support. The geotechnical report for the project recommends the use of foundation piles.

SUPPLEMENTARY EXPLORATION PITS

A total of seven supplementary exploration pits were advanced on August 9, 2000. The pits were labeled EP-101 through EP-107 to clearly identify them with respect to previously completed explorations on the Quadrant Lake Union Center campus. The approximate exploration locations are noted on the attached Site and Exploration Plan, Figure 1. Interpretive logs of the exploration pits are also attached with this letter.

The exploration pits generally encountered approximately 6 inches of topsoil, underlain by existing fill that was highly variable in composition. Based on previous work on-site, the fill consists of newer fill placed during construction of the adjacent existing buildings, and older fill that predates the recent construction. In exploration pits EP-1 and EP-2, the upper 1.5 to 3 feet of fill could clearly be identified as new, consisting of imported quarry spalls or select granular fill. In most of the other pits, the delineation between recent and old existing fill and the newer fill appeared intermixed, and consisted of dark brown to dark gray, silty sand with considerable non-soil content including demolition/construction waste and wood waste. In some cases the existing fill soil contained non-soil material including newer steel post-tensioning strands and snap ties mixed with older brick, wire, and wood waste. The attached exploration logs attempt to describe the approximate percentage and types of non-soil materials that were encountered in the fill.

The existing fill was extremely variable in density, moisture, gradation, and debris composition. The variations were both lateral and vertical. Based on our observations of all of the exploration pits completed on August 9th, some general patterns were observed. The upper 6 inches consisted of topsoil and grass, and the underlying existing fill was typically loose to medium dense, dark brown and/or dark gray, silty sand with varying wood debris and non-soil material as described above. At depths corresponding to approximately elevation 8 to 10 feet, several of the explorations encountered a layer relatively richer in building waste that may represent a previous building that was essentially demolished in place and filled over. Below this layer, at depths corresponding to elevations 4 to 8 feet, a layer richer in wood and sawdust waste was frequently encountered. The wood waste layer had considerable void spaces and typically contained significant ground water. The depth to ground water at the time

6'-4" BTM of DEEPEST Pilecap

of exploration corresponded to approximately elevation 6 to 7 feet. Due to the quantity of ground water, excavations significantly deeper than the wood waste layer were not possible without creating substantial negative site impacts. All of the explorations extended to anticipated excavation depths for pile cap and grade beam bases.

During excavation of the exploration pits, we collected samples of the encountered soils in laboratory-prepared glass jars. Sampling, packaging, preservation, and chain-of-custody procedures were used consistent with local standards of practice for environmental sampling. Typically, composite samples were collected, and represent average values over relatively large depth intervals. In localized areas of exploration pits EP-106 and EP-107 where hydrocarbon-like odors were noted, discreet samples were obtained. The samples were transferred to IT Corporation, the environmental consultant to Quadrant Corporation for the Quadrant Lake Union Center campus projects.

CONCLUSIONS AND RECOMMENDATIONS

The observations of the exploration pits completed during this supplemental work phase confirmed that the building pad is underlain by fill unsuitable for shallow foundation construction. Ground water observed in the supplementary exploration pits will likely be encountered at or near the elevation for the bases of the planned pile caps and grade beams. The construction process is expected to require excavation dewatering to place the granular construction surface and drainage materials within the building pad. Refer to the May 10, 2000 geotechnical report, Section 6.0 *Site Preparation*, for construction working surface recommendations. Dewatering of the building pad excavation is expected to be feasible using pumped sumps and ditches. Deeper excavations, such as excavations for the elevator pit and any below grade mechanical spaces, may require dewatering wells or more substantial dewatering. The dewatering procedures are expected to be similar to those used for completion of the existing buildings on the Quadrant Lake Union Center campus. We recommend that dewatering systems be configured at the time of construction, when actual soil and ground water conditions at the building grade are known.

CLOSURE

We appreciate the opportunity to be of continued service. If you should have any questions, or if we can be of additional help to you, please do not hesitate to call.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington



Bruce Guenzler
Project Geologist

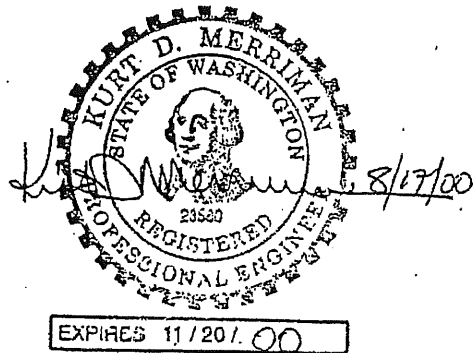
Attachments: Figure 1: Site and Exploration Plan
Exploration Logs

cc: NBBJ
111 South Jackson Street
Seattle, Washington 98104
Attention: Richard Lundstrom

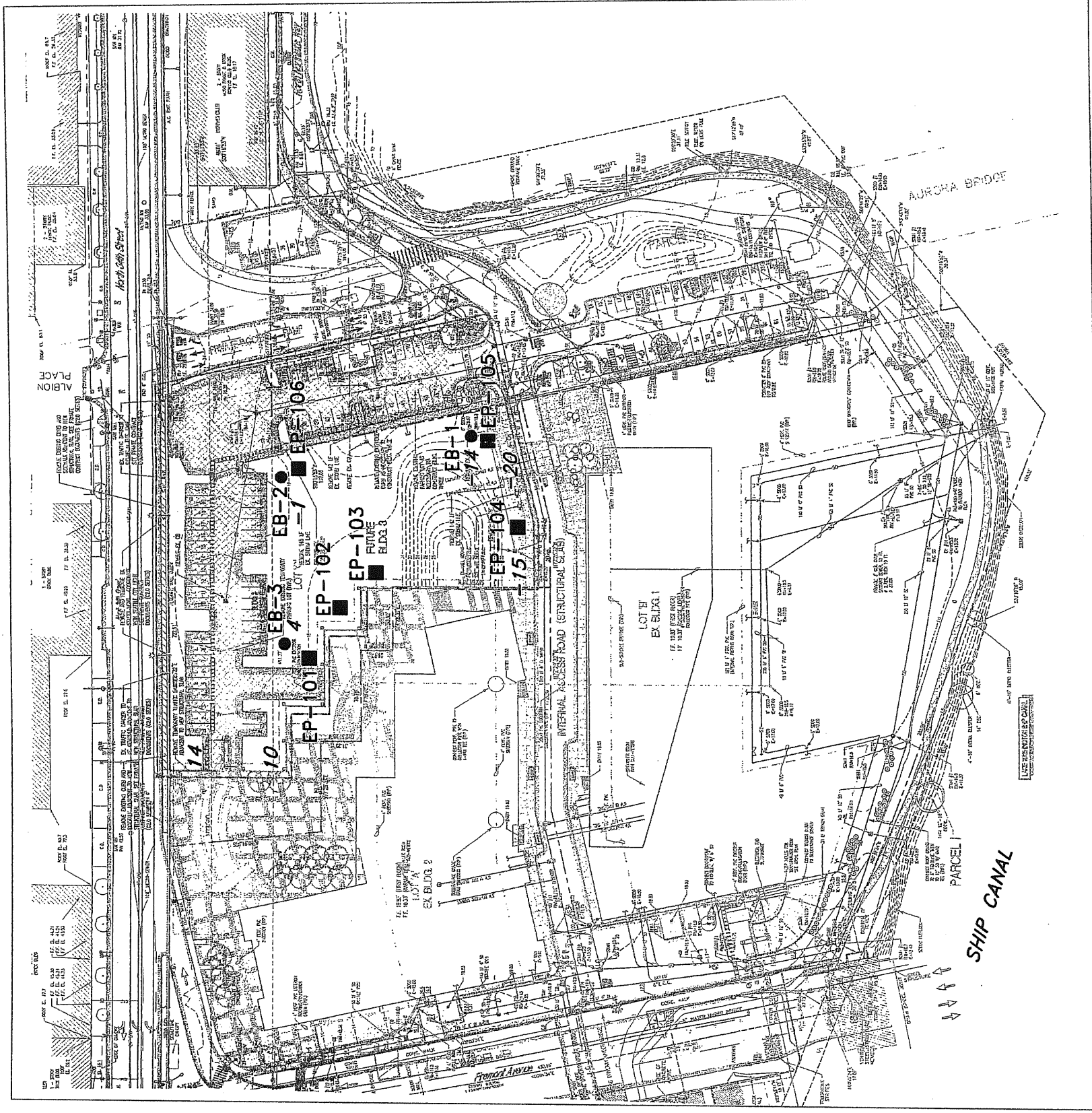
Coughlin, Porter, Lundeen
217 Pine Street, Suite 520
Seattle, Washington 98101
Attention: Steve Porter

GLY Construction
100 116th Avenue SE
Bellevue, Washington 98008-0728
Attention: Bob Beebe

KDM/da - KE00162G3 - LD-D:\da\8-00 - W2K

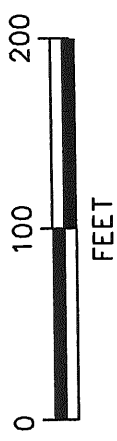


Kurt D. Merriman, P.E.
Associate Engineer



LEGEND

- EB-1 ● Approximate location of exploration boring, April 2000
- EP-101 ■ Approximate location of exploration pit, August 2000
- 14 - - - Approximate elevation of glacially consolidated sediments (ft), based on data from AESI and others



REFERENCE: BUSH, ROED & HITCHINGS, INC.



SITE AND EXPLORATION PLAN
 QUADRANT LAKE UNION CTR. - LAKEVIEW BUILDING
 SEATTLE, WASHINGTON

FIGURE

1

LOG OF EXPLORATION PIT NO. EP-101

Depth, ft	DESCRIPTION
1	<p>This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.</p> <p style="text-align: center;">Fill</p> <p>Grass, underlain by mixed quarry spalls and recycled concrete in brown SAND matrix. Geotextile fabric at 1.5' (Mirafi 500X or similar).</p>
2	Highly variable laterally and vertically. Mixture of brown silty SAND with gravel, gray gravelly silty SAND, trace topsoil, logs, dimensional lumber, rebar, etc.
3	
4	
5	
6	
7	
8	
9	
10	
11	Fill and/or Alluvium
12	Brown, silty SAND, few gravel. Abundant organic material-fine, decomposed.
13	
14	
15	Glacially consolidated
16	Dense, wet, gray gravelly SAND with silt. (SM)
17	Bottom of exploration pit at depth 16 feet Moderate to strong seepage below 14'. Moderate caving below 14'. Composite sample S-1 1.5'-11'. Composite sample S-2 11'-15'. No significant odors.
18	
19	
20	

Quadrant Lake Union Center-Lakeview Building Seattle, WA

Logged by:
Approved by:



Project No. KE00162G
August 2000

LOG OF EXPLORATION PIT NO. EP-102

Depth, ft	DESCRIPTION
	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	Topsoil and grass
1	Fill
2	Loose, moist, gray, fine SAND, few medium sand trace silt. Geotextile at 3'.
3	Loose, moist, brown with gray stringers, silty fine SAND, trace fine gravel, trace litter (mostly paper), trace demolition/construction waste (brick and rebar), trace wood.
4	
5	
6	
7	
8	
9	
10	
11	
12	Loose, wet, brown and gray mixed, with brown organic layers, silty SAND, with fine organics.
13	
14	Dredge Sand
15	Loose, wet, gray, fine to medium SAND with fine to coarse gravel, trace silt. (SW)
16	Alluvium?
16	Soft, wet, brown organic (peat-like).
17	Bottom of exploration pit at depth 16 feet Weak seepage 13'-15'. Moderate to severe caving 0-16'. Sample #1 3.0'-12' composite. Sample #2 14'-15.5'. Organic, peat-like odor below 12'.
18	
19	
20	

Quadrant Lake Union Center-Lakeview Building Seattle, WA

Logged by:
Approved by:



Project No. KE00162G
August 2000

LOG OF EXPLORATION PIT NO. EP-103

Depth, ft	DESCRIPTION
	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	Topsoil and grass
1	Fill
2	Loose to medium dense, dark gray, fine SAND with silt, few fine gravel. 25% (est) waste including brick, pipe, topsoil, wood, post-tension strands, concrete.
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	Bottom of exploration pit at depth 15 feet Moderate to strong seepage below 13.5'. Moderate to severe caving below approximately 10'. Composite sample S-1 .5'-15'. Note: probing with backhoe bucket suggests gravelly sand (native?) below 16'.
17	
18	
19	
20	

Quadrant Lake Union Center-Lakeview Building Seattle, WA

Logged by:
Approved by:



Project No. KE00162G
August 2000

LOG OF EXPLORATION PIT NO. EP-104

Depth, ft	DESCRIPTION
	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	Topsoil and grass
1	Fill
2	Loose to medium dense, moist, dark gray, fine SAND with some gravel and silt. 25% (est) waste, including brick, roots, decomposed sawdust and topsoil, concrete, rebar, snap ties, logs, lumber.
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	No seepage. Minor caving 0-16'. Composite sample S-1 2.5'-16'. Decomposing organic odor.
18	
19	
20	

**Quadrant Lake Union Center-Lakeview Building
Seattle, WA**

Logged by:
Approved by:



Project No. KE00162G
August 2000

LOG OF EXPLORATION PIT NO. EP-105

Depth, ft	DESCRIPTION
	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	Topsoil
1	Fill
2	Medium dense, moist, dark gray SAND with some gravel and silt. 15% (est) brick, plastic, copper wire, asphalt, rubble, dimensional lumber, brick.
3	
4	
5	
6	
7	
8	
9	
10	
11	Grades with 50% (est) sawdust and mill-end lumber.
12	
13	
14	
15	Bottom of exploration pit at depth 14 feet Moderate to strong seepage below 13.5. Composite sample S-1 0.5'-11' (no substantial odor). Sample S-2: discreet sample at 14' with hydrocarbon odor, 20% (est) fine decomposed sawdust in sample.
16	
17	
18	
19	
20	

**Quadrant Lake Union Center-Lakeview Building
Seattle, WA**

Logged by:
Approved by:



Project No. KE00162G
August 2000

LOG OF EXPLORATION PIT NO. EP-106

Depth, ft	DESCRIPTION
	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	Topsoil and grass
1	Fill
2	Medium dense, moist, dark gray, silty SAND, some gravel. 15% (est) wood, brick, asphalt rubble, steel.
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	Grades with 25% (est) wood and sawdust.
13	
14	
15	Bottom of exploration pit at depth 14 feet Strong seepage 13.5'. Weak caving below 10'. Composite sample S-1 0.5'-14'.
16	
17	
18	
19	
20	

**Quadrant Lake Union Center-Lakeview Building
Seattle, WA**

Logged by:
Approved by:



Project No. KE00162G
August 2000

LOG OF EXPLORATION PIT NO. EP-107

Depth, ft	DESCRIPTION
	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	Topsoil
1	Fill
2	Medium dense, moist, dark gray, silty SAND with gravel. 20% (est) concrete, brick, asphalt rubble, steel, fine decomposed wood.
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	Grades with 50% (est) wood and sawdust.
14	
15	
16	Bottom of exploration pit at depth 15 feet Moderate to strong seepage 14'. Composite sample S-1 0.5'-12.5. Composite sample S-2 12.5'-15'. Slight hydrocarbon odor-not localized but about 4'-8'?
17	
18	
19	
20	

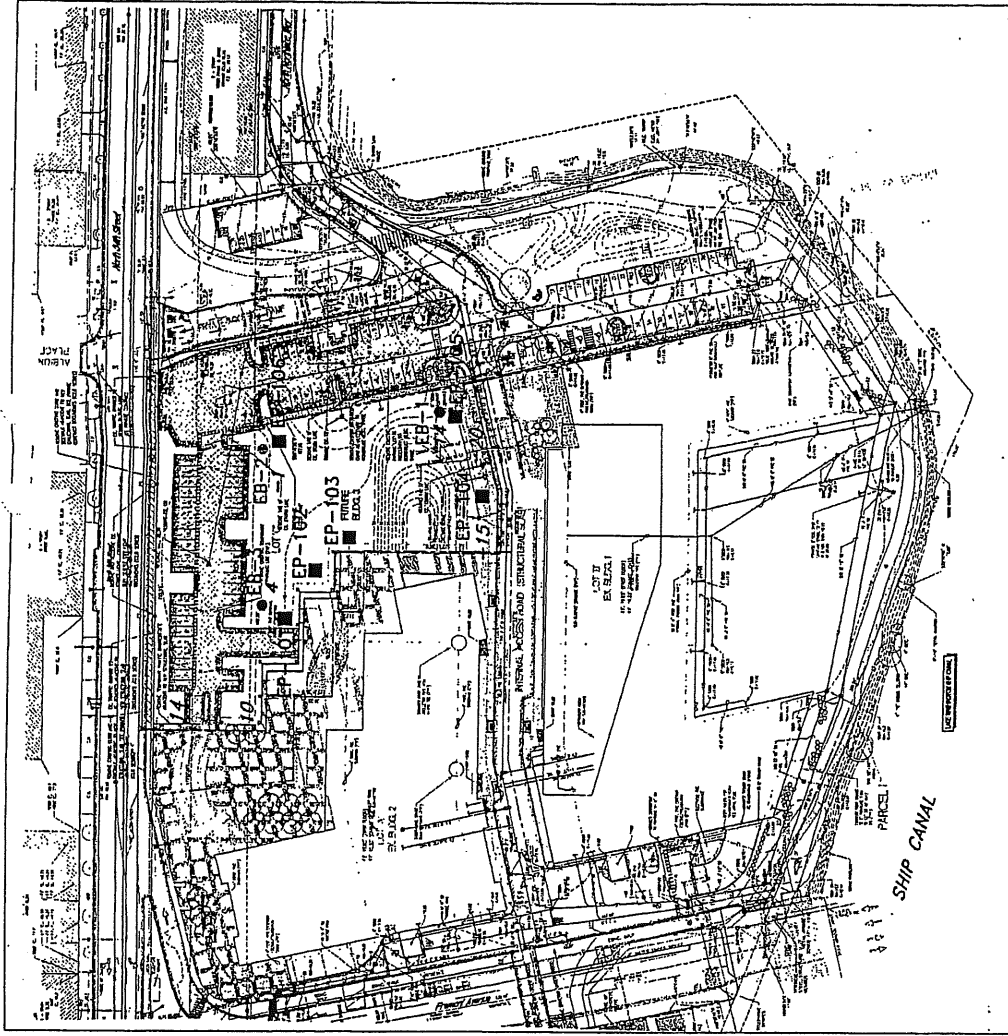
Quadrant Lake Union Center-Lakeview Building Seattle, WA

Logged by:
Approved by:



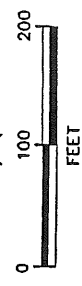
Project No. KE00162G

August 2000



LEGEND

- EB-1 ● Approximate location of exploration boring, April 2000
- EP-101 ■ Approximate location of exploration pit, August 2000
- 14 Approximate elevation of glacially consolidated sediments (ft), based on data from AESI and others



REFERENCE: BUSH, ROED & HITCHINGS, INC.



SITE AND EXPLORATION PLAN
QUADRANT LAKE UNION CTR. - LAKEVIEW BUILDING
SEATTLE, WASHINGTON

FIGURE

February 21, 2001
Project No. KE00162G

Quadrant Corporation
P.O. Box 130
Bellevue, Washington 98009

Attention: Mr. Benjamin Conwell

Subject: Lake View Building Dewatering Profiles
801 North 34th Street
Seattle, Washington

Dear Mr. Conwell:

This letter summarizes our observations during a pilot dewatering effort for construction of the Lake View Building. This letter represents a continuation of our geotechnical participation in the project, which has included completion of subsurface explorations, preparation of a geotechnical report, and ongoing geotechnical support as the design progresses.

Dewatering Issues

During November 2000, HOS Bros. Construction, Inc. (HOS) coordinated with a subcontractor to have five pilot dewatering wells installed. Associated Earth Sciences, Inc. (AESI) did not continuously observe dewatering well installation, but we observed the procedures used and the finished wells. The attached Site Plan, Figure 1, shows the locations of the five dewatering wells (P-1 through P-5), and the three piezometers (PZ-1 through PZ-3).

During the weeks following installation of the dewatering wells, we measured water levels in the dewatering wells and standpipe piezometers under different conditions of pumping and recharging. We also periodically monitored turbidity of the water produced from the dewatering wells. In the pilot dewatering wells and piezometers, water levels appeared to draw down and stabilize within approximately 5 to 10 days of continuous pump operation. Recharge was generally slower, and appears to take approximately 10 to 20 days to recover from maximum drawdown until pre-drawdown levels are restored.

In general, the dewatering system discharge was silty at the time the wells were completed. Within 1 day, turbidity levels of 5 to 10 nephelometric turbidity units (NTU) were measured in discharge water from each of the five dewatering wells. If these turbidity values exceed permissible levels for discharge, mitigation will be required. Turbidity mitigation was not considered as part of this study, but any mitigation measures used could increase costs and/or limit pumping rates.

Three cross section views attached with this letter show the existing topography, the dewatering wells, the piezometers, and measured and projected ground water levels in the area of the pilot dewatering tests.

Conclusions and Recommendations

The dewatering wells that were installed during the pilot dewatering program were installed within existing fill soils that are variable in composition and density. These variations have the potential to cause significant variations in characteristics that can affect dewatering system design. The pilot dewatering results can be used as a guideline for project planning, but plans may need to be modified based on system performance at the time of construction. We recommend that we observe dewatering system performance as the system is installed and activated. Performance of the system can then be observed and the system can be modified to achieve the desired results. We recommend that AESI, GLY Construction (GLY), HOS, and the owner be prepared to make observations and decisions regarding dewatering system performance as work progresses.

The standpipe piezometers were affected primarily by dewatering wells P-1, P-2, and P-4 during drawdown tests when all of those pumps were operating. Flow meters were not provided, and discharge pipes were not accessible for manual pumping rate measurements. The spacing of these dewatering wells is approximately 100 feet on-center. With dewatering wells installed 100 feet on-center, in a way that the water levels within the dewatering wells can be drawn down to approximately elevation -10 feet, dewatering appears to have been effective to approximately the target elevation of +5 feet. Therefore, we recommend preliminary dewatering well spacing of 100 feet around the excavation perimeter with dewatering pump intakes set at elevation -10 feet. A total of approximately 20 wells are expected. As is typical with field dewatering installation, the actual number of wells required may vary from this estimate considering the variable nature of the fill soils. We recommend that the dewatering system be installed and activated as long as possible prior to the beginning of excavation, but not less than 14 days prior to excavation.

Limitations

AESI did not perform any sampling or analysis related to the presence of materials in soils or ground water that might be considered contaminants. Environmental consulting services for this project are provided by IT Corporation.

The intent of the pilot dewatering program and this letter are to provide initial guidance concerning dewatering system design. Detailed preliminary design of temporary dewatering systems is often not cost-effective. Typically, an initial design is implemented and modified based on the results that are achieved in the field based on actual performance. We could provide a more detailed preliminary dewatering analysis, if requested.

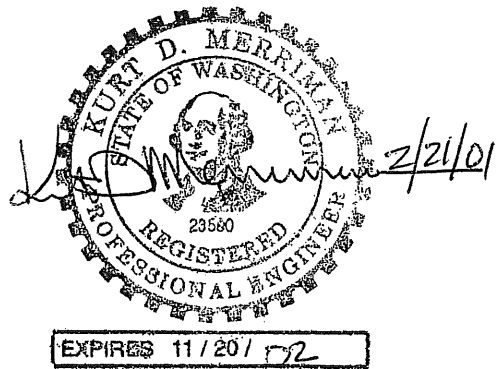
Closure

We appreciate the opportunity to be of continued service. If you should have any questions, or if we can be of additional help to you, please do not hesitate to call.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington

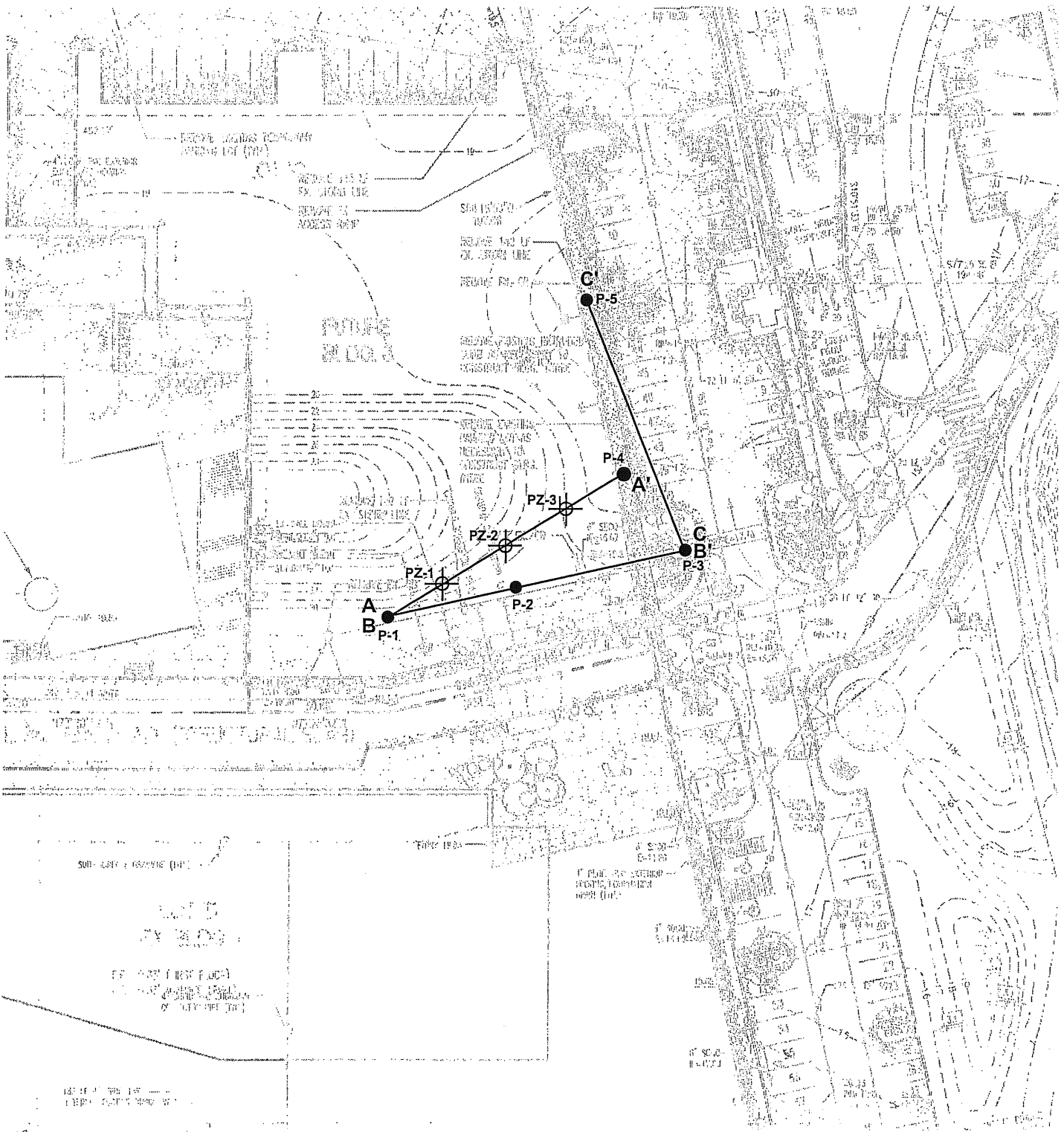


Bruce Guenzler
Project Geologist



Kurt D. Merriman, P.E.
Associate Engineer

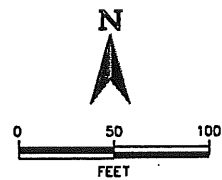
Attachments: Figure 1: Site Plan
Cross Sections



LEGEND

P-1 ● Approximate location of pumping well

PZ-1 ⊕ Approximate location of open standpipe piezometer



00162 quadrant lake union\00162 pumpingwell.dwg

Associated Earth Sciences, Inc.



PUMPING WELL AND PIEZOMETER PLAN
QUADRANT LAKE UNION CTR. - LAKEVIEW BUILDING
SEATTLE, WASHINGTON

FIGURE 1

DATE 10/00

PROJECT NO. KE00162G



Exploration Log

Project Number
KE00162G

Exploration Number
PZ-1

Sheet
1 of 1

Project Name Quadrant Lake Union Center
 Location Seattle, WA
 Driller/Equipment Davies Drilling
 Hammer Weight/Drop 140# / 30"

Ground Surface Elevation (ft) N/A
 Datum N/A
 Date Start/Finish 09/29/00, 9/29/2000
 Hole Diameter (in) 6"

Depth, ft	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level Blows/6"	Blows/Foot				Other Tests	
							10	20	30	40		
				Grass Surface								
				Fill	Concrete seal 0'-5'							
					1-1/4" ID Schedule 80 PVC 0'-9.8'							
5		S-1		Loose to medium dense, damp, dark gray, fine SAND, some silt, trace fine to coarse gravel, trace wood.		6 6 5		▲11				
					Bentonite seal 2.5'-9'							
10		S-2		Grades to medium dense with gray intervals.		5 5 10		▲15				
					#10/20 silica sand 9'-25'							
15		S-3		Medium dense, damp grading to wet, gray, fine SAND, some silt, trace fine gravel.		6 7 11		▲18				
				Drilling obstacles (demolition waste).	1-1/4" ID Schedule 80 PVC screen 9.8'-24.8'							
20		S-4		Blow count overstated (log).		44 21 50/5"						▲71/11"
25		S-5		Sawdust.		6 3 2		▲5				
				Bottom of exploration boring at 26.5 feet								

ESIBOR 00162.GPJ November 2, 2000

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: **BWG**
 Approved by:



**ASSOCIATED
EARTH
SCIENCES, INC**

Exploration Log

Project Number
KE00162G

Exploration Number
PZ-2

Sheet
1 of 1

Project Name Quadrant Lake Union Center
 Location Seattle, WA
 Driller/Equipment Davies Drilling
 Hammer Weight/Drop 140# / 30"

Ground Surface Elevation (ft) N/A
 Datum N/A
 Date Start/Finish 09/29/00, 9/29/2000
 Hole Diameter (in) 6"

Depth, ft	S	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/Foot				Other Tests	
							10	20	30	40		
				Grass/Topsoil								
				Fill	Concrete seal 0'-2'							
				1-1/4" ID Schedule 80 PVC 0'-14'								
5		S-1		Medium dense, moist, dark gray, fine SAND with silt, gravel, and wood.		13 8 6					▲14	
				Bentonite seal 2'-12.5'								
10		S-2		As above, with brick rubble.		15 18 15					▲33	
				#10/20 silica sand 12.5'-30.5'								
15		S-3		Grades with gray intervals.		4 4 3					▲7	
20		S-4		Grades with ~25% wood.		6 3 2					▲5	
				1-1/4" ID Schedule 80 PVC Screen 14'-29'								
25		S-5		As above.		4 4 6					▲10	
30		S-6		As above.		4					▲4/6"	
				Bottom of exploration boring at 30.5 feet								

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- Water Level (10/4/00)
- Water Level at time of drilling (ATD)

Logged by: BWG
 Approved by:



Exploration Log

Project Number
KE00162G

Exploration Number
PZ-3

Sheet
1 of 1

Project Name Quadrant Lake Union Center
 Location Seattle, WA
 Driller/Equipment Davies Drilling
 Hammer Weight/Drop 140# / 30"

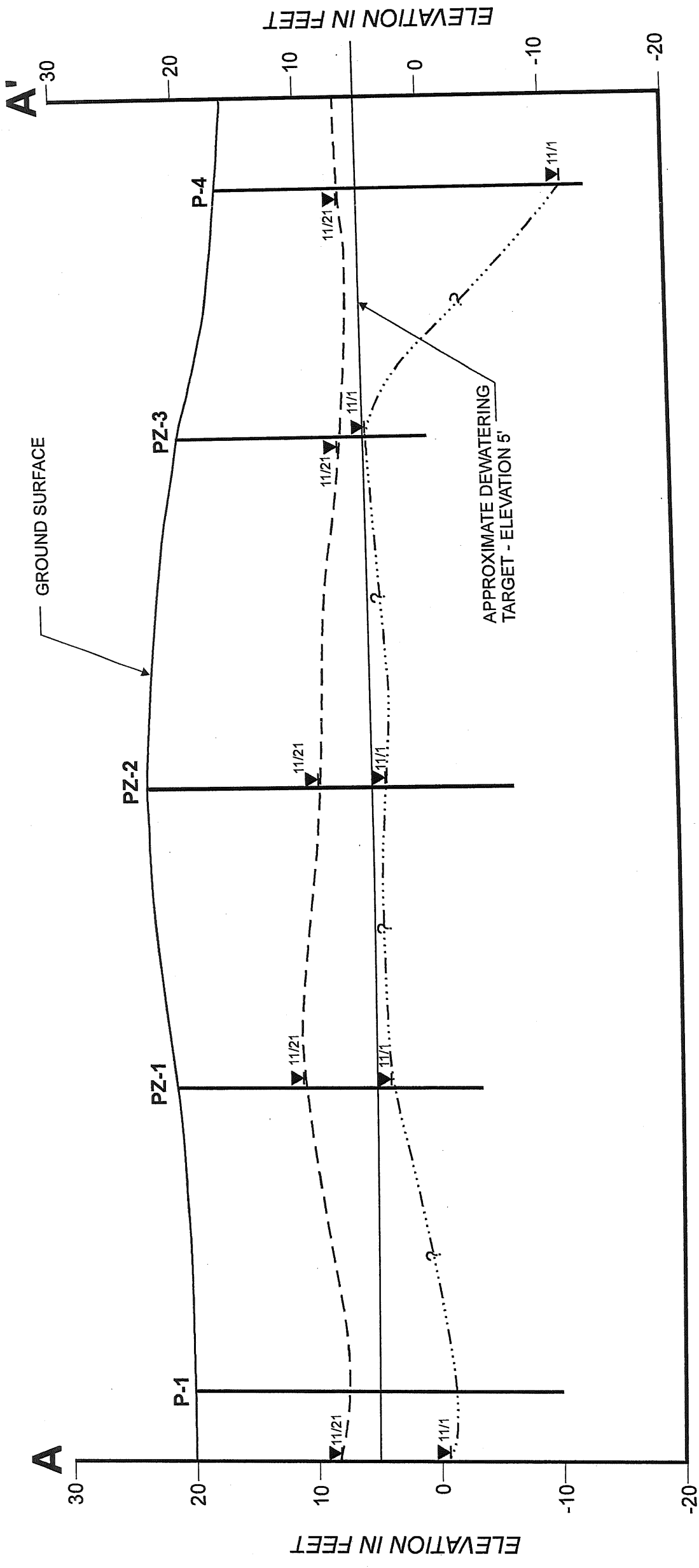
Ground Surface Elevation (ft) N/A
 Datum N/A
 Date Start/Finish 09/29/00, 9/29/2000
 Hole Diameter (in) 6"

Depth, ft	S	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/Foot				Other Tests	
							10	20	30	40		
				Grass/Topsoil								
				Fill	Concrete seal 0'-2.5'							
					1-1/4" ID Schedule 80 PVC 0'-9.7'							
5		S-1		Loose, moist, dark gray SAND with silt, gravel, rubbles, and wood.		7						
					Bentonite seal 2.5'-8'	4						
					#10/20 silica sand 8'-21.5'	5						
10		S-2		Grades to wet.		1						
						2						
						8						
15		S-3		Grades with trace rubble and ~20% wood.		3						
					1-1/4" ID Schedule 80 PVC Screen 9.7'-20'	14						
						9						
20		S-4		As above.		6						
						8						
						9						
				Bottom of exploration boring at 21.5 feet								
25												
30												
35												

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- Water Level (10/4/00)
- Water Level at time of drilling (ATD)

Logged by: BWG
 Approved by:



- Legend
- ▼ Static water level
 - - - - - Approximate water level 11/21/00, pumps turned off.
 - Approximate water level 11/01/00, drawdown after 6 days continuous pumping, all pumps.

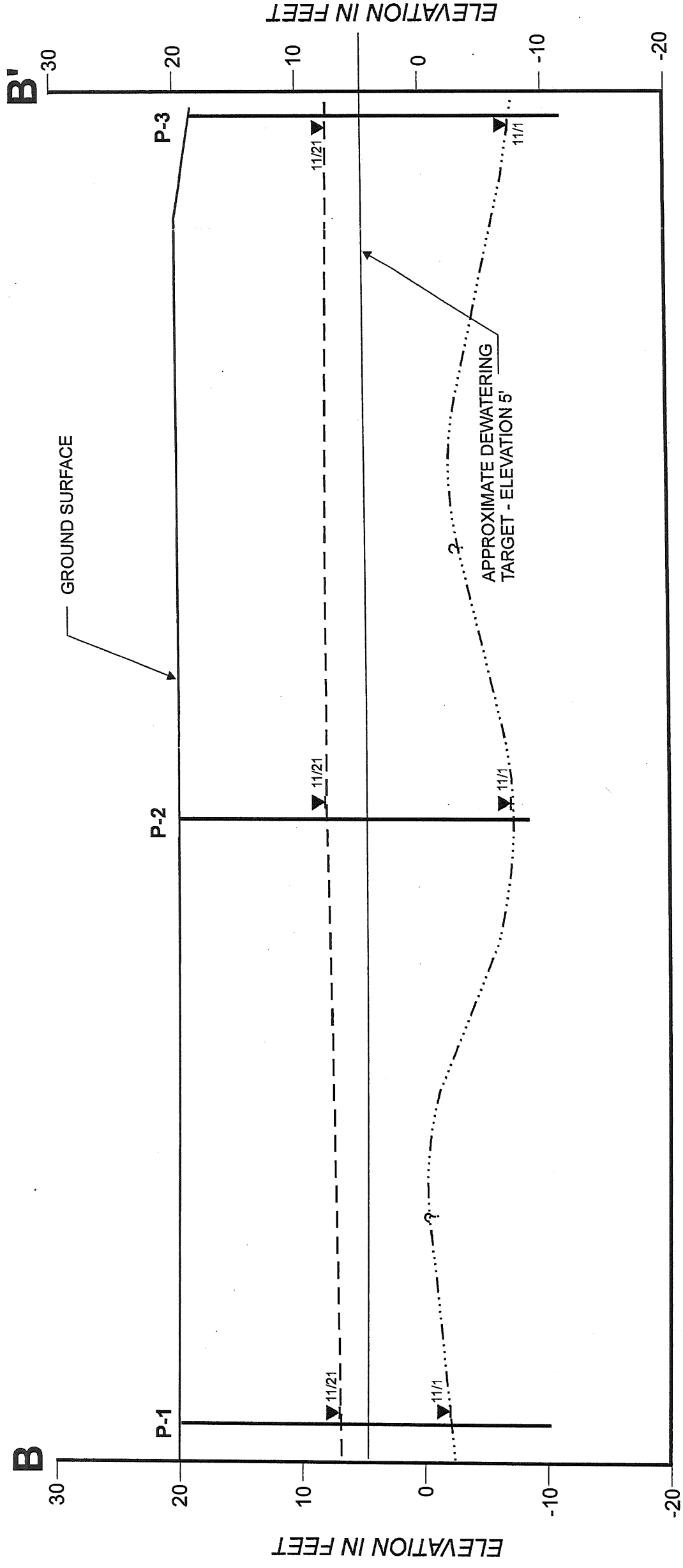
HORIZONTAL SCALE IN FEET
 0 10
 VERTICAL SCALE IN FEET
 0 10

FIGURE 2
 DATE 2/01
 PROJ. NO. KE00162G

CROSS-SECTION A-A'
QUADRANT LAKE UNION CENTER, LAKEVIEW BUILDING
SEATTLE, WASHINGTON

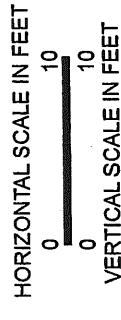
Associated Earth Sciences, Inc.

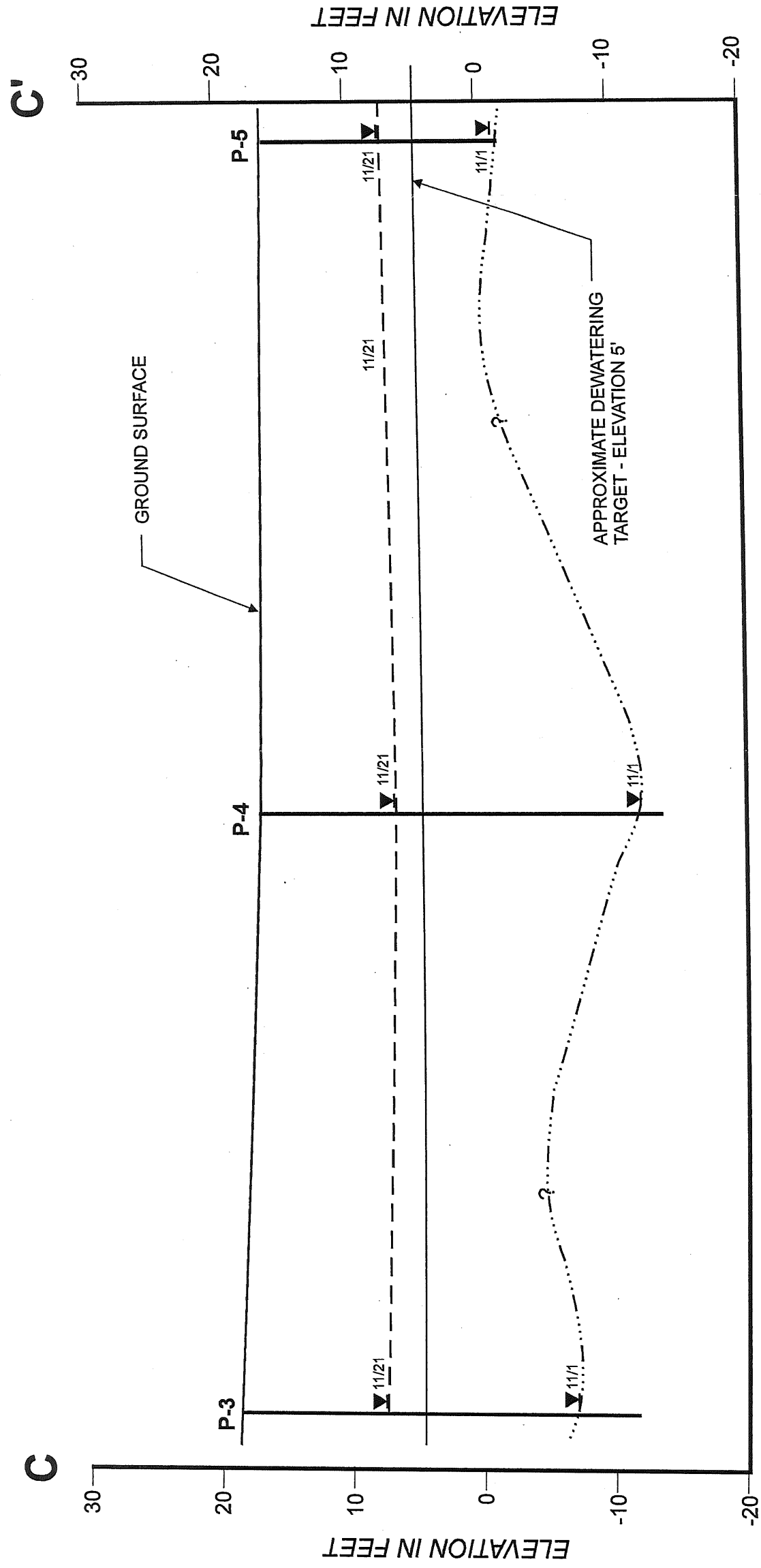




Legend

- ▼ Static water level
- - - - - Approximate water level 11/21/00, pumps turned off.
- Approximate water level 11/01/00, drawdown after 6 days continuous pumping, all pumps.





- Legend
- ▼ Static water level
 - - - - - Approximate water level 11/21/00, pumps turned off.
 - Approximate water level 11/01/00, drawdown after 6 days continuous pumping, all pumps.

HORIZONTAL SCALE IN FEET
0 10
VERTICAL SCALE IN FEET
0 10

FIGURE 4
DATE 2/01
PROJ. NO. KE00162G

CROSS-SECTION C-C'
QUADRANT LAKE UNION CENTER, LAKEVIEW BUILDING
SEATTLE, WASHINGTON

Associated Earth Sciences, Inc.



Celebrating Over 25 Years of Service

September 7, 2007
Project No. KE070183A

Foushée
3260 118th Avenue SE
Bellevue, Washington 98005

Attention: Mr. Mike Fey

Subject: Environmental Closure Letter
Lakeview Building
Seattle, Washington

Dear Mr. Fey:

This letter summarizes the results of Associated Earth Science, Inc. (AESI) environmental observations, sampling, and testing performed during mass excavation, augercast pile installation, and other construction-related excavation activities at the Lakeview Building between May 7, 2007 and August 23, 2007.

Detectable concentrations of petroleum hydrocarbons were observed in much of the soil from the basement excavation. Although concentrations were below Model Toxics Control Act (MTCA) cleanup levels in most areas, all soils with odor or other observable indications of petroleum contamination were disposed of at the Rinker facility, located in Everett, Washington.

All soils from the basement excavation were exported from the site by J.R. Hayes & Sons (Hayes). Soils determined to be clean were transported to the Hayes' pit in Maple Valley, Washington. Contaminated soils were transported by Hayes to Rinkor.

AESI work at the site included:

- Observation of test pits excavated at the site.
- Observation of soil and groundwater conditions during excavation activities, including installation of augercast piles. AESI monitored the soils and groundwater for any observable indications of contamination, such as odor, sheen, and staining.
- Collection of representative environmental grab samples of the soils. The samples were transported daily under strict chain-of-custody to a local environmental testing laboratory (Friedman & Bruya, Inc.) for testing and storage.

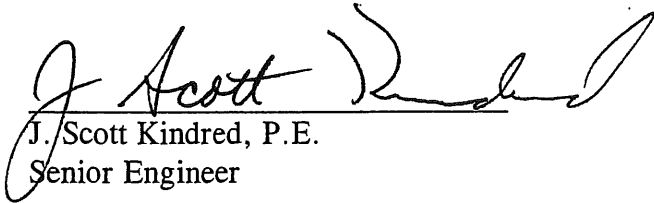
Approximate locations of environmental samples and test pits are shown on Sheet 1. Testing of one ground water sample at the site indicated chemical concentrations in ground water were below cleanup standards for the tested analytes. The ground water test data are contained in the Appendix. A summary of the laboratory soil test data (Table 1) is attached to this letter. Soil test data indicate that metals concentrations and the majority of the hydrocarbon (diesel and motor oil) concentrations in soils are below MTCA Method A cleanup levels. One soil sample from test pit TP 211, in the northeast corner of the building, yielded elevated levels of arsenic at about two times the MTCA Method A cleanup level of 20 parts per million (ppm). The cause of the elevated arsenic level is not known but does not appear to occur elsewhere across the site. The only observed area of elevated hydrocarbon concentrations above the MTCA Method A cleanup level occurs in the extreme southeast corner of the site, in the vicinity of test pit TP-205. In some cases, contamination was observed within or below the bottom of the excavation (below about elevation 9 feet above mean sea level). Concentrations of diesel and motor oil in soil samples below the building subgrade are shown on Sheet 1. Based on these results and field observations, the approximate limits of contamination left in place below the building are presented on Sheet 1.

We trust that the information presented in this letter will meet your current project needs. If you have any questions or require additional information, please call us at your earliest convenience.

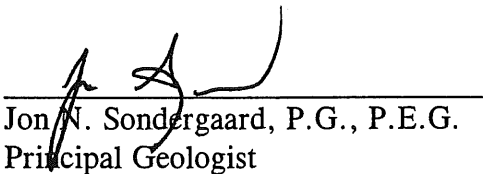
Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington



Frank S. Mocker, P.G., P.E.G.
Senior Staff Geologist



J. Scott Kindred, P.E.
Senior Engineer



Jon N. Sondergaard, P.G., P.E.G.
Principal Geologist

- Attachments: Sheet 1: Environmental Sample Location Map
Table 1: Summary of Laboratory Test Results
Appendix: Laboratory Analytical Results

APPENDIX B

Laboratory Analytical Results

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

MAY 18 2007

May 16, 2007

Scott Kindred, Project Manager
Associated Earth Sciences, Inc.
911 5th Avenue, Suite 100
Kirkland, WA 98033

Dear Mr. Kindred:

Included are the results from the testing of material submitted on May 2, 2007 from the Quadrant Lake Union Center Lakeview building, F&BI 705035 project. There are 28 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
AE10516R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/02/07

Project: Quadrant Lake Union Center Lakeview building, F&BI 705035

Date Extracted: 05/04/07

Date Analyzed: 05/07/07

**RESULTS FROM THE ANALYSIS OF THE WATER SAMPLES
FOR BENZENE, TOLUENE, ETHYLBENZENE,
XYLENES AND TPH AS GASOLINE
USING EPA METHOD 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl Benzene</u>	<u>Total Xylenes</u>	<u>Gasoline Range</u>	<u>Surrogate (% Recovery)</u> (Limit 52-124)
MW S-1 705035-01	<1	<1	<1	<3	<100	79
Method Blank	<1	<1	<1	<3	<100	69

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/02/07

Project: Quadrant Lake Union Center Lakeview building, F&BI 705035

Date Extracted: 05/03/07

Date Analyzed: 05/03/07

**RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS**

DIESEL AND MOTOR OIL

USING METHOD NWTPH-D_x

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 67-127)
TP 201 Composite 705035-02	93 x	450	79
TP 202 S-1 8' 705035-03	<50	260	85
TP 202 S-2 11' 705035-04	130 x	800	80
TP 203 S-1 0-8' composite 705035-05	<50	330	80
TP 203 S-2 10' 705035-06	100 x	310	76
TP 204 S-1 0'-7' composite 705035-07	75 x	530	78
TP 204 S-2 8.5'-9.5' 705035-08	<50	210 j	86
Method Blank	<50	<125 j	82

x - The pattern of peaks present is not indicative of diesel. The result is due to overlap from the motor oil range.

j - The result is below normal reporting limits. The value reported is an estimate.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/02/07

Project: Quadrant Lake Union Center Lakeview building, F&BI 705035

Date Extracted: 05/03/07

Date Analyzed: 05/10/07

**RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx
Sample Extracts Passed Through a
Silica Gel Column Prior to Analysis
Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 53-144)
TP 201 Composite 705035-02	120 x	470	92
TP 202 S-1 8' 705035-03	83 x	190 j	91
TP 202 S-2 11' 705035-04	140 x	690	91
TP 203 S-1 0-8' composite 705035-05	120 x	400	98
TP 203 S-2 10' 705035-06	210 x	460	91
TP 204 S-1 0'-7' composite 705035-07	100 x	460	92
TP 204 S-2 8.5'-9.5' 705035-08	88 x	280	94
Method Blank	<50	<125 j	91

x - The pattern of peaks present is not indicative of diesel.

j - The result is below normal reporting limits. The value reported is an estimate.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/02/07

Project: Quadrant Lake Union Center Lakeview building, F&BI 705035

Date Extracted: 05/03/07

Date Analyzed: 05/03/07

**RESULTS FROM THE ANALYSIS OF THE WATER SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx
Results Reported as ug/L (ppb)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 52-134)
MW S-1 705035-01	81	<250	97
Method Blank	<50	<250	93

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/02/07

Project: Quadrant Lake Union Center Lakeview building, F&BI 705035

Date Extracted: 05/03/07

Date Analyzed: 05/10/07

**RESULTS FROM THE ANALYSIS OF THE WATER SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx
Sample Extracts Passed Through a
Silica Gel Column Prior to Analysis
Results Reported as ug/L (ppb)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 51-132)
MW S-1 705035-01	<50	<250	98
Method Blank	<50	<250	76

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW S-1	Client:	Associated Earth Sciences, Inc.
Date Received:	05/02/07	Project:	Lakeview building, F&BI 705035
Date Extracted:	05/03/07	Lab ID:	705035-01
Date Analyzed:	05/03/07	Data File:	705035-01.028
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	97	60	125
Indium	93	60	125
Bismuth	94	60	125

Analyte:	Concentration ug/L (ppb)
Chromium	<1
Arsenic	<1
Selenium	<1
Silver	<1
Cadmium	<1
Barium	63.8
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Associated Earth Sciences, Inc.
Date Received:	NA	Project:	Lakeview building, F&BI 705035
Date Extracted:	05/03/07	Lab ID:	I7-161 mb
Date Analyzed:	05/03/07	Data File:	I7-161 mb.019
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	101	60	125
Indium	100	60	125
Bismuth	95	60	125

Analyte:	Concentration ug/L (ppb)
Chromium	<1
Arsenic	<1
Selenium	<1
Silver	<1
Cadmium	<1
Barium	<1
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/02/07

Project: Quadrant Lake Union Center Lakeview building, F&BI 705035

Date Extracted: 05/03/07

Date Analyzed: 05/04/07

**RESULTS FROM THE ANALYSIS OF THE WATER SAMPLES
FOR TOTAL MERCURY
USING EPA METHOD 1631E
Results Reported as $\mu\text{g/L}$ (ppb)**

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
MW S-1 705035-01	<0.2
Method Blank	<0.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	MW S-1	Client:	Associated Earth Sciences, Inc.
Date Received:	05/02/07	Project:	Lakeview building, F&BI 705035
Date Extracted:	05/03/07	Lab ID:	705035-01
Date Analyzed:	05/04/07	Data File:	050409.D
Matrix:	Water	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	54	16	92
Phenol-d6	29	10	91
2,4,6-Tribromophenol	75	50	150

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	Method Blank	Client:	Associated Earth Sciences, Inc.
Date Received:	Not Applicable	Project:	Lakeview building, F&BI 705035
Date Extracted:	05/03/07	Lab ID:	07-631mb
Date Analyzed:	05/04/07	Data File:	050408.D
Matrix:	Water	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	44	16	92
Phenol-d6	29	10	91
2,4,6-Tribromophenol	60	50	150

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	TP 201 Composite	Client:	Associated Earth Sciences, Inc.
Date Received:	05/02/07	Project:	Lakeview building, F&BI 705035
Date Extracted:	05/03/07	Lab ID:	705035-02 1/10
Date Analyzed:	05/05/07	Data File:	050420.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	81	50	150
Phenol-d6	65	50	150
2,4,6-Tribromophenol	51	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<1,000

Note: The sample was diluted due to sample matrix effects. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	TP 202 S-1 8'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/02/07	Project:	Lakeview building, F&BI 705035
Date Extracted:	05/03/07	Lab ID:	705035-03 1/10
Date Analyzed:	05/07/07	Data File:	050713.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	85	50	150
Phenol-d6	71	50	150
2,4,6-Tribromophenol	108	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<1,000

Note: The sample was diluted due to sample matrix effects. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	TP 202 S-2 11'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/02/07	Project:	Lakeview building, F&BI 705035
Date Extracted:	05/03/07	Lab ID:	705035-04 1/10
Date Analyzed:	05/07/07	Data File:	050714.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	75	50	150
Phenol-d6	72	50	150
2,4,6-Tribromophenol	38 vo	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<1,000

Note: The sample was diluted due to sample matrix effects. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

vo - The value reported fell outside the control limits established for this analyte.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	TP 203 S-1 0-8' composite	Client:	Associated Earth Sciences, Inc.
Date Received:	05/02/07	Project:	Lakeview building, F&BI 705035
Date Extracted:	05/03/07	Lab ID:	705035-05 1/10
Date Analyzed:	05/07/07	Data File:	050715.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	80	16	92
Phenol-d6	66	10	91
2,4,6-Tribromophenol	111	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<1,000

Note: The sample was diluted due to sample matrix effects. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	TP 203 S-2 10'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/02/07	Project:	Lakeview building, F&BI 705035
Date Extracted:	05/03/07	Lab ID:	705035-06 1/10
Date Analyzed:	05/05/07	Data File:	050419.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	73	16	92
Phenol-d6	60	10	91
2,4,6-Tribromophenol	54	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<1,000

Note: The sample was diluted due to sample matrix effects. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	TP 204 S-1 0'-7' composite	Client:	Associated Earth Sciences, Inc.
Date Received:	05/02/07	Project:	Lakeview building, F&BI 705035
Date Extracted:	05/03/07	Lab ID:	705035-07 1/10
Date Analyzed:	05/07/07	Data File:	050711.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	77	50	150
Phenol-d6	54	50	150
2,4,6-Tribromophenol	76	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<1,000

Note: The sample was diluted due to sample matrix effects. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	TP 204 S-2 8.5'-9.5'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/02/07	Project:	Lakeview building, F&BI 705035
Date Extracted:	05/03/07	Lab ID:	705035-08 1/10
Date Analyzed:	05/08/07	Data File:	050805.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	78	50	150
Phenol-d6	66	50	150
2,4,6-Tribromophenol	109	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<1,000

Note: The sample was diluted due to sample matrix effects. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	Method Blank	Client:	Associated Earth Sciences, Inc.
Date Received:	Not Applicable	Project:	Lakeview building, F&BI 705035
Date Extracted:	05/02/07	Lab ID:	07632mb
Date Analyzed:	05/04/07	Data File:	050412.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	76	50	150
Phenol-d6	72	50	150
2,4,6-Tribromophenol	67	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/02/07

Project: Quadrant Lake Union Center Lakeview building, F&BI 705035

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE, TOLUENE, ETHYLBENZENE,
XYLENES, AND TPH AS GASOLINE
USING EPA METHOD 8021B AND NWTPH-Gx**

Laboratory Code: 705016-08 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Toluene	mg/kg (ppm)	<0.02	<0.02	nm
Ethylbenzene	mg/kg (ppm)	<0.02	<0.02	nm
Xylenes	mg/kg (ppm)	<0.06	<0.06	nm
Gasoline	mg/kg (ppm)	<2	<2	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	93	66-121
Toluene	mg/kg (ppm)	0.5	85	72-128
Ethylbenzene	mg/kg (ppm)	0.5	93	69-132
Xylenes	mg/kg (ppm)	1.5	91	69-131
Gasoline	mg/kg (ppm)	20	91	61-153

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/02/07

Project: Quadrant Lake Union Center Lakeview building, F&BI 705035

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 705033-08 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	103	106	69-125	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	100	70-127

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/02/07

Project: Quadrant Lake Union Center Lakeview building, F&BI 705035

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 705033-08 (Matrix Spike) Silica Gel

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	106	117	71-137	10

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	123	70-129

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/02/07

Project: Quadrant Lake Union Center Lakeview building, F&BI 705035

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	120	123	73-142	2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/02/07

Project: Quadrant Lake Union Center Lakeview building, F&BI 705035

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	122	128	67-141	5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/02/07

Project: Quadrant Lake Union Center Lakeview building, F&BI 705035

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS
USING EPA METHOD 200.8**

Laboratory Code: 705037-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Chromium	ug/L (ppb)	<1	<1	nm	0-20
Arsenic	ug/L (ppb)	<1	<1	nm	0-20
Selenium	ug/L (ppb)	<1	<1	nm	0-20
Silver	ug/L (ppb)	<1	<1	nm	0-20
Cadmium	ug/L (ppb)	<1	<1	nm	0-20
Barium	ug/L (ppb)	1.71	1.58	8	0-20
Lead	ug/L (ppb)	<1	<1	nm	0-20

Laboratory Code: 705037-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Chromium	ug/L (ppb)	20	<1	101	50-150
Arsenic	ug/L (ppb)	10	<1	96	50-150
Selenium	ug/L (ppb)	5	<1	94	50-150
Silver	ug/L (ppb)	5	<1	101	50-150
Cadmium	ug/L (ppb)	5	<1	94	50-150
Barium	ug/L (ppb)	50	1.71	97	50-150
Lead	ug/L (ppb)	10	<1	99	50-150

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/02/07

Project: Quadrant Lake Union Center Lakeview building, F&BI 705035

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS
USING EPA METHOD 200.8**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Chromium	ug/L (ppb)	20	108	70-130
Arsenic	ug/L (ppb)	10	96	70-130
Selenium	ug/L (ppb)	5	94	70-130
Silver	ug/L (ppb)	5	107	70-130
Cadmium	ug/L (ppb)	5	98	70-130
Barium	ug/L (ppb)	50	104	70-130
Lead	ug/L (ppb)	10	102	70-130

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/02/07

Project: Quadrant Lake Union Center Lakeview building, F&BI 705035

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES FOR
TOTAL MERCURY
USING EPA METHOD 1631E**

Laboratory Code: 704318-03 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MS	Acceptance Criteria	RPD (Limit 20)
Mercury	µg/L (ppb)	0.5	<0.2	147	151 vo	50-150	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	µg/L (ppb)	0.5	151 vo	70-130

vo - The value reported fell outside the control limits established for this analyte.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/02/07

Project: Quadrant Lake Union Center Lakeview building, F&BI 705035

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR PNA'S BY EPA METHOD 8270C SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Pentachlorophenol	ug/L (ppb)	7.5	87	88	20-114	1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/02/07

Project: Quadrant Lake Union Center Lakeview building, F&BI 705035

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL
SAMPLES FOR PNA'S BY EPA METHOD 8270C SIM

Laboratory Code: 705035-06 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference (Limit 20)
Pentachlorophenol	ug/kg (ppb)	<1,000	<1,000	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Pentachlorophenol	ug/kg (ppb)	250	91	94	41-122	3

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

MAY 18 2007

May 16, 2007

Scott Kindred, Project Manager
Associated Earth Sciences, Inc.
911 5th Avenue, Suite 100
Kirkland, WA 98033

Dear Mr. Kindred:

Included are the results from the testing of material submitted on May 4, 2007 from the Lakeview Building, F&BI 705049 project. There are 11 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
AE10516R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07
 Date Received: 05/04/07
 Project: Lakeview Building, F&BI 705049
 Date Extracted: 05/04/07
 Date Analyzed: 05/04/07

**RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
 FOR TOTAL PETROLEUM HYDROCARBONS AS
 DIESEL AND MOTOR OIL
 USING METHOD NWTPH-Dx**
 Results Reported on a Dry Weight Basis
 Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 67-127)
TP-205, S-1, 0'-4' composite 705049-01	<50	<125 j	89
TP-205, S-2 8.5'-9.5' 705049-02	4,900 x	17,000	106
TP-206, 0'-5' composite 705049-03	<50	<125 j	87
TP-207, 0'-7' S-1 composite 705049-04	<50	310	84
TP-207, 8.5'-9.0' S-2 705049-05	<50	<125 j	81
Method Blank	<50	<125 j	79

x - The pattern of peaks present is not indicative of diesel. The result is due to overlap from the motor oil range.

j - The result is below normal reporting limits. The value reported is an estimate.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07
Date Received: 05/04/07
Project: Lakeview Building, F&BI 705049
Date Extracted: 05/04/07
Date Analyzed: 05/09/07 and 05/10/07

**RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-D_x
Sample Extracts Passed Through a
Silica Gel Column Prior to Analysis
Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> (% Recovery) (Limit 53-144)
TP-205, S-2 8.5'-9.5' 705049-02	4,700 x	10,000	125
TP-207, 0'-7' S-1 composite 705049-04	87 x	300	104
Method Blank	<50	<125 j	81

x - The pattern of peaks present is not indicative of diesel. The result is due to overlap from the motor oil range.

j - The result is below normal reporting limits. The value reported is an estimate.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	TP-205, S-1, 0'-4' composite	Client:	Associated Earth Sciences, Inc.
Date Received:	05/04/07	Project:	Lakeview Building, F&BI 705049
Date Extracted:	05/04/07	Lab ID:	705049-01
Date Analyzed:	05/04/07	Data File:	050415.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	83	50	150
Phenol-d6	79	50	150
2,4,6-Tribromophenol	83	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	TP-205, S-2 8.5'-9.5'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/04/07	Project:	Lakeview Building, F&BI 705049
Date Extracted:	05/04/07	Lab ID:	705049-02 1/50
Date Analyzed:	05/05/07	Data File:	050418.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	0 vo	50	150
Phenol-d6	77	50	150
2,4,6-Tribromophenol	68	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<5,000

Note: The sample was diluted due to sample matrix effects. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

vo - The value reported fell outside the control limits established for this analyte.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	TP-206, 0'-5' composite	Client:	Associated Earth Sciences, Inc.
Date Received:	05/04/07	Project:	Lakeview Building, F&BI 705049
Date Extracted:	05/04/07	Lab ID:	705049-03
Date Analyzed:	05/04/07	Data File:	050416.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	80	50	150
Phenol-d6	76	50	150
2,4,6-Tribromophenol	65	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	TP-207, 0'-7' S-1 composite	Client:	Associated Earth Sciences, Inc.
Date Received:	05/04/07	Project:	Lakeview Building, F&BI 705049
Date Extracted:	05/04/07	Lab ID:	705049-04 1/10
Date Analyzed:	05/04/07	Data File:	050417.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	68	50	150
Phenol-d6	68	50	150
2,4,6-Tribromophenol	24 vo	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<1,000

Note: The sample was diluted due to sample matrix effects. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

vo - The value reported fell outside the control limits established for this analyte.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	TP-207, 8.5'-9.0' S-2	Client:	Associated Earth Sciences, Inc.
Date Received:	05/04/07	Project:	Lakeview Building, F&BI 705049
Date Extracted:	05/04/07	Lab ID:	705049-05
Date Analyzed:	05/04/07	Data File:	050414.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	84	50	150
Phenol-d6	78	50	150
2,4,6-Tribromophenol	79	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270C SIM

Client Sample ID:	Method Blank	Client:	Associated Earth Sciences, Inc.
Date Received:	Not Applicable	Project:	Lakeview Building, F&BI 705049
Date Extracted:	05/04/07	Lab ID:	07632mb2
Date Analyzed:	05/04/07	Data File:	050413.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	81	50	150
Phenol-d6	75	50	150
2,4,6-Tribromophenol	75	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/04/07

Project: Lakeview Building, F&BI 705049

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 705049-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	104	106	69-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	105	70-127

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/04/07

Project: Lakeview Building, F&BI 705049

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 705049-01 (Matrix Spike) Silica Gel

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	104	104	71-137	0

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	107	70-129

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/16/07

Date Received: 05/04/07

Project: Lakeview Building, F&BI 705049

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL
SAMPLES FOR PNA'S BY EPA METHOD 8270C SIM**

Laboratory Code: 705035-06 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference (Limit 20)
Pentachlorophenol	ug/kg (ppb)	<1,000	<1,000	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Pentachlorophenol	ug/kg (ppb)	250	91	94	41-122	3

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

7-05049

SAMPLE CHAIN OF CUSTODY

ME 5/4/07 401

Send Report To Scott Kirkland

Company Associated Earth Sciences, Inc.

Address 911 6th Avenue, Ste. 100

City, State, ZIP Kirkland, WA 98038

Phone # (425) 827-7701 Fax # (425) 827-5424

SAMPLES (signature)	
PROJECT NAME/NO. <u>Levee Buildings</u>	PO #
REMARKS	

Page # 1 of 1

TURNAROUND TIME
 Standard (2 Weeks)
 RUSH
 Rush charges authorized by: _____

SAMPLE DISPOSAL
 Dispose after 30 days
 Return samples
 Will call with instructions

Sample ID	Lab ID	Date	Time	Sample Type	# of containers	ANALYSES REQUESTED						Notes		
						TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS		PCP	
TP-205, S-1, 0'-4' composite	01	5-4-07	07:20	Soil	1	X						X	SilverGel motor oil w/ dd002	(S) per SK 5/8/07
TP-205, S-2 8.5'-9.5'	-02	5-4-07	07:25	Soil	1	X						X		
TP-206, 0'-5' composite	03	5-4-07	07:40	Soil	1	X						X		
TP-207, 0'-7' S-1 composite	04	5-4-07	07:45	Soil	1	X						X		
TP-207, 8.5'-9.6' S-2	05	5-4-07	07:50	Soil	1	X						X		

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282

SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
Relinquished by: <u>[Signature]</u>		Charles Hampton		AESI		5-4-07	
Received by: <u>[Signature]</u>		Heather Rankin		F&B, I		5/4/07	8:14
Relinquished by:							

TX (5) 283

12

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

MAY 29 2007

May 21, 2007

Scott Kindred, Project Manager
Associated Earth Sciences, Inc.
911 5th Avenue, Suite 100
Kirkland, WA 98033

Dear Mr. Kindred:

Included are the results from the testing of material submitted on May 9, 2007 from the Lakeview/KE070183A, F&BI 705113 project. There are 28 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
AE10521R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/21/07
Date Received: 05/09/07
Project: Lakeview/KE070183A, F&BI 705113
Date Extracted: 05/09/07
Date Analyzed: 05/10/07 and 05/11/07

**RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx
Sample Extracts Passed Through a
Silica Gel Column Prior to Analysis
Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> (% Recovery) (Limit 53-144)
TP-203A/Elev 9' 705113-03	<50	160	107
TP-208/Elev 15' 705113-05	<50	160	110
TP-208/Elev 9' 705113-06	<50	<150	97
TP-208/Elev 7' 705113-07	<50	<150	102
TP-201/Elev 7.0'-7.5' 705113-08	<50	<150	101
TP-205/Elev 8' 705113-09	6,300	18,000	100
TP-202A/Elev. 8.5 705113-11	<50	<150	99
TP-204A/Elev. 7.23 705113-13	<50	<150	113
TP-209/Elev. 15' 705113-15	<50	<150	103
TP-209/Elev. 8' 705113-16	<50	<150	98
Method Blank	<50	<150	94

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP-203A/Elev 9'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-03
Date Analyzed:	05/10/07	Data File:	705113-03.034
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	103	60	125
Indium	92	60	125
Bismuth	119	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	15.6
Arsenic	2.36
Selenium	<1
Silver	<1
Cadmium	<1
Barium	83.5
Lead	39.7

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP-208/Elev 15'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-05
Date Analyzed:	05/10/07	Data File:	705113-05.035
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	101	60	125
Indium	97	60	125
Bismuth	116	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	15.7
Arsenic	3.91
Selenium	<1
Silver	<1
Cadmium	<1
Barium	56.7
Lead	27.9

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP-208/Elev 9'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-06
Date Analyzed:	05/10/07	Data File:	705113-06.036
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	103	60	125
Indium	95	60	125
Bismuth	123	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	8.73
Arsenic	3.04
Selenium	<1
Silver	<1
Cadmium	<1
Barium	80.4
Lead	55.6

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP-208/Elev 7'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-07
Date Analyzed:	05/10/07	Data File:	705113-07.037
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	104	60	125
Indium	96	60	125
Bismuth	123	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	12.2
Arsenic	3.97
Selenium	<1
Silver	<1
Cadmium	<1
Barium	89.4
Lead	28.8

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP-201/Elev 7.0'-7.5'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-08
Date Analyzed:	05/10/07	Data File:	705113-08.038
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	102	60	125
Indium	95	60	125
Bismuth	119	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	17.2
Arsenic	4.72
Selenium	<1
Silver	<1
Cadmium	<1
Barium	47.8
Lead	4.97

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP-205/Elev 8'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-09
Date Analyzed:	05/10/07	Data File:	705113-09.039
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	99	60	125
Indium	93	60	125
Bismuth	120	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	9.91
Arsenic	2.65
Selenium	<1
Silver	<1
Cadmium	<1
Barium	53.3
Lead	45.7

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP-202A/Elev. 8.5	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-11
Date Analyzed:	05/11/07	Data File:	705113-11.014
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	91	60	125
Indium	86	60	125
Bismuth	102	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	12.7
Arsenic	3.02
Selenium	<1
Silver	<1
Cadmium	<1
Barium	68.2
Lead	38.5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP-204A/Elev. 7.23	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-13
Date Analyzed:	05/11/07	Data File:	705113-13.015
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	88	60	125
Indium	85	60	125
Bismuth	100	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	10.1
Arsenic	1.51
Selenium	<1
Silver	<1
Cadmium	<1
Barium	14.8
Lead	1.86

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP-209/Elev. 15'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-15
Date Analyzed:	05/10/07	Data File:	705113-15.043
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	104	60	125
Indium	98	60	125
Bismuth	122	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	14.0
Arsenic	1.52
Selenium	<1
Silver	<1
Cadmium	<1
Barium	37.7
Lead	10.4

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP-209/Elev. 8'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-16
Date Analyzed:	05/11/07	Data File:	705113-16.016
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	87	60	125
Indium	84	60	125
Bismuth	100	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	8.79
Arsenic	1.69
Selenium	<1
Silver	<1
Cadmium	<1
Barium	26.5
Lead	1.65

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Associated Earth Sciences, Inc.
Date Received:	NA	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	I7-170 mb
Date Analyzed:	05/10/07	Data File:	I7-170 mb.020
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	101	60	125
Indium	97	60	125
Bismuth	117	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	<1
Arsenic	<1
Selenium	<1
Silver	<1
Cadmium	<1
Barium	<1
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/21/07
Date Received: 05/09/07
Project: Lakeview/KE070183A, F&BI 705113
Date Extracted: 05/10/07
Date Analyzed: 05/15/07

RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
FOR TOTAL MERCURY
USING EPA METHOD 1631E

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
TP-203A/Elev 9' 705113-03	<0.2
TP-208/Elev 15' 705113-05	<0.2
TP-208/Elev 9' 705113-06	0.27
TP-208/Elev 7' 705113-07	<0.2
TP-201/Elev 7.0'-7.5' 705113-08	<0.2
TP-205/Elev 8' 705113-09	<0.2
TP-202A/Elev. 8.5 705113-11	<0.2
TP-204A/Elev. 7.23 705113-13	<0.2
TP-209/Elev. 15' 705113-15	<0.2
TP-209/Elev. 8' 705113-16	<0.2
Method Blank	<0.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	TP-203A/Elev 9'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-03 1/10
Date Analyzed:	05/14/07	Data File:	051420.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	82	50	150
Phenol-d6	67	50	150
2,4,6-Tribromophenol	68	50	150

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<1,000

Note: The sample was diluted due to sample matrix effects. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	TP-208/Elev 15'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-05 1/10
Date Analyzed:	05/14/07	Data File:	051421.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	77	50	150
Phenol-d6	65	50	150
2,4,6-Tribromophenol	64	50	150

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<1,000

Note: The sample was diluted due to sample matrix effects. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	TP-208/Elev 9'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-06
Date Analyzed:	05/14/07	Data File:	051422.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	78	50	150
Phenol-d6	80	50	150
2,4,6-Tribromophenol	76	50	150

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	TP-208/Elev 7'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-07
Date Analyzed:	05/14/07	Data File:	051423.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	80	50	150
Phenol-d6	81	50	150
2,4,6-Tribromophenol	89	50	150

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	TP-201/Elev 7.0'-7.5'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-08
Date Analyzed:	05/14/07	Data File:	051412.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	96	50	150
Phenol-d6	81	50	150
2,4,6-Tribromophenol	86	50	150

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	TP-205/Elev 8'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-09 1/10
Date Analyzed:	05/14/07	Data File:	051413.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	71	50	150
Phenol-d6	57	50	150
2,4,6-Tribromophenol	68	50	150

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<1,000

Note: The sample was diluted due to sample matrix effects. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	TP-202A/Elev. 8.5	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-11
Date Analyzed:	05/14/07	Data File:	051415.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	76	50	150
Phenol-d6	76	50	150
2,4,6-Tribromophenol	73	50	150

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	TP-204A/Elev. 7.23	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-13
Date Analyzed:	05/14/07	Data File:	051414.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	81	50	150
Phenol-d6	80	50	150
2,4,6-Tribromophenol	83	50	150

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	TP-209/Elev. 15'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-15
Date Analyzed:	05/14/07	Data File:	051416.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	82	50	150
Phenol-d6	83	50	150
2,4,6-Tribromophenol	84	50	150

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	TP-209/Elev. 8'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/09/07	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	705113-16
Date Analyzed:	05/14/07	Data File:	051417.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	85	50	150
Phenol-d6	86	50	150
2,4,6-Tribromophenol	87	50	150

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	Method Blank	Client:	Associated Earth Sciences, Inc.
Date Received:	Not Applicable	Project:	Lakeview/KE070183A, F&BI 705113
Date Extracted:	05/10/07	Lab ID:	07680mb
Date Analyzed:	05/14/07	Data File:	051411.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	77	50	150
Phenol-d6	74	50	150
2,4,6-Tribromophenol	76	50	150

Compounds:	Concentration ug/L (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/21/07

Date Received: 05/09/07

Project: Lakeview/KE070183A, F&BI 705113

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 705113-11 (Matrix Spike) Silica Gel

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	124	118	71-137	5

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	118	70-129

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/21/07

Date Received: 05/09/07

Project: Lakeview/KE070183A, F&BI 705113

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8**

Laboratory Code: 704312-03 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Chromium	mg/kg (ppm)	14.5	13.9	4	0-20
Arsenic	mg/kg (ppm)	2.90	2.56	12	0-20
Selenium	mg/kg (ppm)	<1	<1	nm	0-20
Silver	mg/kg (ppm)	<1	<1	nm	0-20
Cadmium	mg/kg (ppm)	<1	<1	nm	0-20
Barium	mg/kg (ppm)	38.1	36.1	5	0-20
Lead	mg/kg (ppm)	21.7	24.1	10	0-20

Laboratory Code: 704312-03 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Chromium	mg/kg (ppm)	50	14.5	95 b	50-150
Arsenic	mg/kg (ppm)	10	2.90	99 b	50-150
Selenium	mg/kg (ppm)	5	<1	92	50-150
Silver	mg/kg (ppm)	10	<1	143	50-150
Cadmium	mg/kg (ppm)	10	<1	101	50-150
Barium	mg/kg (ppm)	50	38.1	102 b	50-150
Lead	mg/kg (ppm)	50	21.7	97 b	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Chromium	mg/kg (ppm)	50	102	70-130
Arsenic	mg/kg (ppm)	10	108	70-130
Selenium	mg/kg (ppm)	5	108	70-130
Silver	mg/kg (ppm)	10	148 vo	70-130
Cadmium	mg/kg (ppm)	10	105	70-130
Barium	mg/kg (ppm)	50	105	70-130
Lead	mg/kg (ppm)	50	99	70-130

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

vo - The value reported fell outside the control limits established for this analyte.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/21/07

Date Received: 05/09/07

Project: Lakeview/KE070183A, F&BI 705113

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES FOR
TOTAL MERCURY
USING EPA METHOD 1631E

Laboratory Code: 704312-03 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	mg/kg (ppm)	0.125	<0.2	105	123	50-150	16

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	mg/kg (ppm)	0.125	112	70-130

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/21/07

Date Received: 05/09/07

Project: Lakeview/KE070183A, F&BI 705113

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL
SAMPLES FOR PNA'S BY EPA METHOD 8270C SIM**

Laboratory Code: 705113-15 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference (Limit 20)
Pentachlorophenol	ug/kg (ppb)	<100	<100	nm

Laboratory Code: : 705113-15 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Pentachlorophenol	ug/kg (ppb)	250	<100	99	14-132

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Pentachlorophenol	ug/kg (ppb)	250	107	109	41-122	2

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

705113

SAMPLE CHAIN OF CUSTODY

ME 5/9/07

BT3

Send Report To Frank W. Moore

Company Associated Earth Sciences, Inc.

Address 911 6th Avenue, Ste. 100

City, State, ZIP Kirkland, WA 98033

Phone # (425) 827-7701 Fax # (425) 827-5424

SAMPLERS (signature) <u>[Signature]</u>	PROJECT NAME/NO. <u>Lakeview / EEO 20183A</u>	PO #
REMARKS		

Page # 1 of 1

TURNAROUND TIME
 Standard (2 Weeks)
 RUSH
 Rush charges authorized by: _____

SAMPLE DISPOSAL
 Dispose after 30 days
 Return samples
 Will call with instructions

Sample ID	Lab ID	Date	Time	Sample Type	# of containers	ANALYSES REQUESTED					Notes	
						TPH-Diesel <input checked="" type="checkbox"/>	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270		HFS
ES-19 / Elev 14-14'	01	5-9-07	08:20	Soil	1							Hold
TP-203A / Elev 11.5-12'	02	5-9-07	11:00	Soil	1							Hold
TP-203A / Elev 9'	03	5-9-07	11:10	Soil	1	X						Hold
TP-203A / Elev 7'	04	5-9-07	11:20	Soil	1							Hold
TP-208 / Elev 15'	05	5-9-07	11:40	Soil	1	X						
TP-208 / Elev 9'	06	5-9-07	11:45	Soil	1	X						
TP-208 / Elev 7'	07	5-9-07	11:50	Soil	1	X						
TP-201 / Elev 7.0-7.5'	08	5-9-07	12:05	Soil	1	X						
TP-205 / Elev 8'	09	5-9-07	12:20	Soil	1	X						
TP-202A / Elev 12'	10	5-9-07	12:35	Soil	1							Hold

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Phone (206) 285-8282
 Fax (206) 283-5044

SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
Relinquished by: <u>[Signature]</u>		<u>Frank Moore</u>		<u>FE3F</u>		<u>5/9/07</u>	<u>16:05</u>
Received by: <u>[Signature]</u>		<u>Nhan Phan</u>		<u>FE BT</u>		<u>5/9/07</u>	<u>16:05</u>
Relinquished by:							
Received by:							

Sample received at 2:22

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

JUN - 4 2007

May 30, 2007

Frank Mocker and Scott Kindred, Project Managers
Associated Earth Sciences, Inc.
911 5th Avenue, Suite 100
Kirkland, WA 98033

Dear Mr. Mocker and Mr. Kindred:

Included are the results from the testing of material submitted on May 10, 2007 from the Lakeview Building/KE070183A, F&BI 705122 project. There are 11 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
AE10530R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/30/07

Date Received: 05/10/07

Project: Lakeview Building/KE070183A, F&BI 705122

Date Extracted: 05/16/07

Date Analyzed: 05/16/07

**RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx
Sample Extracts Passed Through a
Silica Gel Column Prior to Analysis
Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> (% Recovery) (Limit 53-144)
ES-20 705122-01	<50	<125	100
Method Blank	<50	<125	106

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	ES-20	Client:	Associated Earth Sciences
Date Received:	05/10/07	Project:	KE070183A, F&BI 705122
Date Extracted:	05/16/07	Lab ID:	705122-01
Date Analyzed:	05/17/07	Data File:	705122-01.010
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	BTB

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	89	60	125
Indium	90	60	125
Bismuth	106	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	7.27
Arsenic	1.73
Selenium	<1
Silver	<1
Cadmium	<1
Barium	23.4
Lead	1.88

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Associated Earth Sciences
Date Received:	NA	Project:	KE070183A, F&BI 705122
Date Extracted:	05/16/07	Lab ID:	I7-182 mb
Date Analyzed:	05/17/07	Data File:	I7-182 mb.008
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	BTB

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	90	60	125
Indium	93	60	125
Bismuth	108	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	<2
Arsenic	<1
Selenium	<1
Silver	<1
Cadmium	<1
Barium	<1
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/30/07

Date Received: 05/10/07

Project: Lakeview Building/KE070183A, F&BI 705122

Date Extracted: 05/16/07

Date Analyzed: 05/22/07

**RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm).

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
ES-20 705122-01	<0.2
Method Blank	<0.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	ES-20	Client:	Associated Earth Sciences
Date Received:	05/10/07	Project:	KE070183A, F&BI 705122
Date Extracted:	05/16/07	Lab ID:	705122-01
Date Analyzed:	05/16/07	Data File:	051618.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	89	50	150
Phenol-d6	87	50	150
2,4,6-Tribromophenol	92	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	Method Blank	Client:	Associated Earth Sciences
Date Received:	Not Applicable	Project:	KE070183A, F&BI 705122
Date Extracted:	05/15/07	Lab ID:	07708mb2
Date Analyzed:	05/16/07	Data File:	051617.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	70	50	150
Phenol-d6	69	50	150
2,4,6-Tribromophenol	73	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/30/07

Date Received: 05/10/07

Project: Lakeview Building/KE070183A, F&BI 705122

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 705184-04 (Matrix Spike) Silica Gel

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	2,500	<50	104	106	71-137	2

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	2,500	105	70-129

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/30/07

Date Received: 05/10/07

Project: Lakeview Building/KE070183A, F&BI 705122

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 705122-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Chromium	mg/kg (ppm)	7.27	6.21	16	0-20
Arsenic	mg/kg (ppm)	1.73	1.46	17	0-20
Selenium	mg/kg (ppm)	<1	<1	nm	0-20
Silver	mg/kg (ppm)	<1	<1	nm	0-20
Cadmium	mg/kg (ppm)	<1	<1	nm	0-20
Barium	mg/kg (ppm)	23.4	20.0	16	0-20
Lead	mg/kg (ppm)	1.88	1.51	22 a	0-20

Laboratory Code: 705122-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Chromium	mg/kg (ppm)	50	7.27	107	50-150
Arsenic	mg/kg (ppm)	10	1.73	102	50-150
Selenium	mg/kg (ppm)	5	<1	99	50-150
Silver	mg/kg (ppm)	10	<1	123	50-150
Cadmium	mg/kg (ppm)	10	<1	105	50-150
Barium	mg/kg (ppm)	50	23.4	108 b	50-150
Lead	mg/kg (ppm)	20	1.88	102	50-150

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/30/07

Date Received: 05/10/07

Project: Lakeview Building/KE070183A, F&BI 705122

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Chromium	mg/kg (ppm)	50	105	70-130
Arsenic	mg/kg (ppm)	10	100	70-130
Selenium	mg/kg (ppm)	5	97	70-130
Silver	mg/kg (ppm)	10	118	70-130
Cadmium	mg/kg (ppm)	10	101	70-130
Barium	mg/kg (ppm)	50	107	70-130
Lead	mg/kg (ppm)	20	102	70-130

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/30/07

Date Received: 05/10/07

Project: Lakeview Building/KE070183A, F&BI 705122

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES FOR
TOTAL MERCURY
USING EPA METHOD 1631E

Laboratory Code: 705122-01(Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	mg/kg (ppm)	0.125	<0.2	116	113	50-150	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	mg/kg (ppm)	0.125	129	70-130

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/30/07

Date Received: 05/10/07

Project: Lakeview Building/KE070183A, F&BI 705122

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL
SAMPLES FOR PNA'S BY EPA METHOD 8270C SIM

Laboratory Code: 705184-04 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference (Limit 20)
Pentachlorophenol	ug/kg (ppb)	<100	<100	nm

Laboratory Code: 705184-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Pentachlorophenol	ug/kg (ppb)	250	<100	101	14-132

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Pentachlorophenol	ug/kg (ppb)	250	92	92	41-122	0

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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MAY 29 2007

May 22, 2007

Scott Kindred, Project Manager
Associated Earth Sciences, Inc.
911 5th Avenue, Suite 100
Kirkland, WA 98033

Dear Mr. Kindred:

Included are the results from the testing of material submitted on May 15, 2007 from the Lakeview Building/KE070183A, F&BI 705184 project. There are 19 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
AE10522R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/22/07
Date Received: 05/15/07
Project: Lakeview Building/KE070183A, F&BI 705184
Date Extracted: 05/15/07
Date Analyzed: 05/15/07 and 05/16/07

**RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx
Sample Extracts Passed Through a
Silica Gel Column Prior to Analysis
Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> (% Recovery) (Limit 53-144)
ES-31 705184-01	79	180	102
ES-34 705184-04	<50	<125	94
ES-35 705184-05	<50	<125	96
ES-36 705184-06	93 x	410	97
ES-38 705184-08	320 x	1,200	104
Method Blank	<50	<125	95

x - The pattern of peaks present is not indicative of diesel.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	ES-31	Client:	Associated Earth Sciences, Inc.
Date Received:	05/15/07	Project:	Lakeview Building/KE070183A
Date Extracted:	05/15/07	Lab ID:	705184-01
Date Analyzed:	05/15/07	Data File:	705184-01.037
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	113	60	125
Indium	98	60	125
Bismuth	104	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	11.0
Arsenic	2.56
Selenium	<1
Silver	<1
Cadmium	<1
Barium	51.6
Lead	30.3

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	ES-34	Client:	Associated Earth Sciences, Inc.
Date Received:	05/15/07	Project:	Lakeview Building/KE070183A
Date Extracted:	05/15/07	Lab ID:	705184-04
Date Analyzed:	05/15/07	Data File:	705184-04.038
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	109	60	125
Indium	94	60	125
Bismuth	103	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	11.7
Arsenic	1.96
Selenium	<1
Silver	<1
Cadmium	<1
Barium	31.3
Lead	6.81

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	ES-35	Client:	Associated Earth Sciences, Inc.
Date Received:	05/15/07	Project:	Lakeview Building/KE070183A
Date Extracted:	05/15/07	Lab ID:	705184-05
Date Analyzed:	05/15/07	Data File:	705184-05.039
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	114	60	125
Indium	95	60	125
Bismuth	102	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	18.4
Arsenic	3.06
Selenium	<1
Silver	<1
Cadmium	<1
Barium	49.5
Lead	12.5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	ES-36	Client:	Associated Earth Sciences, Inc.
Date Received:	05/15/07	Project:	Lakeview Building/KE070183A
Date Extracted:	05/15/07	Lab ID:	705184-06
Date Analyzed:	05/15/07	Data File:	705184-06.041
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	114	60	125
Indium	97	60	125
Bismuth	102	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	17.0
Arsenic	5.11
Selenium	<1
Silver	<1
Cadmium	<1
Barium	68.1
Lead	33.7

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	ES-38	Client:	Associated Earth Sciences, Inc.
Date Received:	05/15/07	Project:	Lakeview Building/KE070183A
Date Extracted:	05/15/07	Lab ID:	705184-08
Date Analyzed:	05/15/07	Data File:	705184-08.042
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	119	60	125
Indium	102	60	125
Bismuth	111	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	21.1
Arsenic	9.99
Selenium	<1
Silver	<1
Cadmium	<1
Barium	123
Lead	236

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Associated Earth Sciences, Inc.
Date Received:	NA	Project:	Lakeview Building/KE070183A
Date Extracted:	05/15/07	Lab ID:	I7-180 mb
Date Analyzed:	05/15/07	Data File:	I7-180 mb.032
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

	% Recovery:	Lower Limit:	Upper Limit:
Internal Standard:			
Germanium	106	60	125
Indium	99	60	125
Bismuth	101	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	<1
Arsenic	<1
Selenium	<1
Silver	<1
Cadmium	<1
Barium	<1
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/22/07
Date Received: 05/15/07
Project: Lakeview Building/KE070183A, F&BI 705184
Date Extracted: 05/15/07
Date Analyzed: 05/15/07

**RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
ES-31 705184-01	<0.2
ES-34 705184-04	<0.2
ES-35 705184-05	<0.2
ES-36 705184-06	<0.2
ES-38 705184-08	<0.2
Method Blank	<0.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	ES-31	Client:	Associated Earth Sciences, Inc.
Date Received:	05/15/07	Project:	Lakeview Building/KE070183A
Date Extracted:	05/15/07	Lab ID:	705184-01 1/10
Date Analyzed:	05/16/07	Data File:	051615.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	82	50	150
Phenol-d6	77	50	150
2,4,6-Tribromophenol	84	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<1,000

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	ES-34	Client:	Associated Earth Sciences, Inc.
Date Received:	05/15/07	Project:	Lakeview Building/KE070183A
Date Extracted:	05/15/07	Lab ID:	705184-04
Date Analyzed:	05/16/07	Data File:	051610.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	77	50	150
Phenol-d6	81	50	150
2,4,6-Tribromophenol	89	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	ES-35	Client:	Associated Earth Sciences, Inc.
Date Received:	05/15/07	Project:	Lakeview Building/KE070183A
Date Extracted:	05/15/07	Lab ID:	705184-05
Date Analyzed:	05/16/07	Data File:	051613.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	79	50	150
Phenol-d6	83	50	150
2,4,6-Tribromophenol	89	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	ES-36	Client:	Associated Earth Sciences, Inc.
Date Received:	05/15/07	Project:	Lakeview Building/KE070183A
Date Extracted:	05/15/07	Lab ID:	705184-06 1/10
Date Analyzed:	05/16/07	Data File:	051616.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	72	50	150
Phenol-d6	69	50	150
2,4,6-Tribromophenol	76	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<1,000

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	ES-38	Client:	Associated Earth Sciences, Inc.
Date Received:	05/15/07	Project:	Lakeview Building/KE070183A
Date Extracted:	05/15/07	Lab ID:	705184-08
Date Analyzed:	05/16/07	Data File:	051614.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	79	50	150
Phenol-d6	85	50	150
2,4,6-Tribromophenol	99	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	Method Blank	Client:	Associated Earth Sciences, Inc.
Date Received:	Not Applicable	Project:	Lakeview Building/KE070183A
Date Extracted:	05/15/07	Lab ID:	07708mb
Date Analyzed:	05/16/07	Data File:	051609.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	89	50	150
Phenol-d6	88	50	150
2,4,6-Tribromophenol	91	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/22/07

Date Received: 05/15/07

Project: Lakeview Building/KE070183A, F&BI 705184

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 705184-04 (Matrix Spike) Silica Gel

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	2,500	<50	104	106	71-137	2

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	2,500	105	70-129

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/22/07

Date Received: 05/15/07

Project: Lakeview Building/KE070183A, F&BI 705184

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8**

Laboratory Code: 705139-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Chromium	mg/kg (ppm)	13.3	13.8	4	0-20
Arsenic	mg/kg (ppm)	2.16	2.10	3	0-20
Selenium	mg/kg (ppm)	<1	<1	nm	0-20
Silver	mg/kg (ppm)	<1	<1	nm	0-20
Cadmium	mg/kg (ppm)	<1	<1	nm	0-20
Barium	mg/kg (ppm)	32.9	35.7	8	0-20
Lead	mg/kg (ppm)	6.22	8.72	33 hr	0-20

Laboratory Code: 705139-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Chromium	mg/kg (ppm)	50	13.3	98 b	50-150
Arsenic	mg/kg (ppm)	10	2.16	112 b	50-150
Selenium	mg/kg (ppm)	5	<1	107	50-150
Silver	mg/kg (ppm)	10	<1	108	50-150
Cadmium	mg/kg (ppm)	10	<1	104	50-150
Barium	mg/kg (ppm)	50	32.9	107 b	50-150
Lead	mg/kg (ppm)	50	6.22	102	50-150

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/22/07

Date Received: 05/15/07

Project: Lakeview Building/KE070183A, F&BI 705184

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Chromium	mg/kg (ppm)	50	101	70-130
Arsenic	mg/kg (ppm)	10	113	70-130
Selenium	mg/kg (ppm)	5	115	70-130
Silver	mg/kg (ppm)	10	107	70-130
Cadmium	mg/kg (ppm)	10	105	70-130
Barium	mg/kg (ppm)	50	106	70-130
Lead	mg/kg (ppm)	50	105	70-130

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/22/07

Date Received: 05/15/07

Project: Lakeview Building/KE070183A, F&BI 705184

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES FOR
TOTAL MERCURY
USING EPA METHOD 1631E

Laboratory Code: 705139-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	mg/kg (ppm)	0.125	<0.2	122	120	50-150	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	mg/kg (ppm)	0.125	123	70-130

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/22/07

Date Received: 05/15/07

Project: Lakeview Building/KE070183A, F&BI 705184

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL
SAMPLES FOR PNA'S BY EPA METHOD 8270C SIM

Laboratory Code: 705184-04 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference (Limit 20)
Pentachlorophenol	ug/kg (ppb)	<100	<100	nm

Laboratory Code: 705184-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Pentachlorophenol	ug/kg (ppb)	250	<100	101	14-132

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Pentachlorophenol	ug/kg (ppb)	250	92	92	41-122	0

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
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3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

JUN - 4 2007

May 29, 2007

Scott Kindred and Frank Mocker, Project Managers
Associated Earth Sciences, Inc.
911 5th Avenue, Suite 100
Kirkland, WA 98033

Dear Mr. Kindred and Mr. Mocker:

Included are the results from the testing of material submitted on May 16, 2007 from the Lakeview Building/KE070183A, F&BI 705200 project. There are 15 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
AE10529R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/29/07

Date Received: 05/16/07

Project: Lakeview Building/KE070183A, F&BI 705200

Date Extracted: 05/16/07

Date Analyzed: 05/16/07

**RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx
Sample Extracts Passed Through a
Silica Gel Column Prior to Analysis
Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 53-144)
TP 210@E1.16.5 705200-07	<50	<125	95
TP 211@E1.16.5-15 705200-08	<50	<125	98
TP 211@E1.13.5 705200-09	<50	<125	95
Method Blank	<50	<125	106

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP 210@E1.16.5	Client:	Associated Earth Sciences, Inc.
Date Received:	05/16/07	Project:	KE070183A, F&BI 705200
Date Extracted:	05/16/07	Lab ID:	705200-07
Date Analyzed:	05/17/07	Data File:	705200-07.013
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	BTB

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	95	60	125
Indium	91	60	125
Bismuth	106	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	12.4
Arsenic	5.61
Selenium	<1
Silver	<1
Cadmium	<1
Barium	48.1
Lead	2.52

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP 211@E1.16.5-15	Client:	Associated Earth Sciences, Inc.
Date Received:	05/16/07	Project:	KE070183A, F&BI 705200
Date Extracted:	05/16/07	Lab ID:	705200-08
Date Analyzed:	05/17/07	Data File:	705200-08.014
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	BTB

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	92	60	125
Indium	87	60	125
Bismuth	100	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	20.9
Arsenic	18.0
Selenium	<1
Silver	<1
Cadmium	<1
Barium	95.0
Lead	16.6

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP 211@E1.13.5	Client:	Associated Earth Sciences, Inc.
Date Received:	05/16/07	Project:	KE070183A, F&BI 705200
Date Extracted:	05/16/07	Lab ID:	705200-09
Date Analyzed:	05/17/07	Data File:	705200-09.015
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	BTB

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	92	60	125
Indium	89	60	125
Bismuth	101	60	125

Analyte:	Concentration mg/kg (ppm)
Arsenic	40.8
Selenium	<1
Silver	<1
Cadmium	<1
Barium	51.5
Lead	16.3
Chromium	16.9

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Associated Earth Sciences, Inc.
Date Received:	NA	Project:	KE070183A, F&BI 705200
Date Extracted:	05/16/07	Lab ID:	I7-182 mb
Date Analyzed:	05/17/07	Data File:	I7-182 mb.008
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	BTB

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	90	60	125
Indium	93	60	125
Bismuth	108	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	<2
Arsenic	<1
Selenium	<1
Silver	<1
Cadmium	<1
Barium	<1
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/29/07
Date Received: 05/16/07
Project: Lakeview Building/KE070183A, F&BI 705200
Date Extracted: 05/16/07
Date Analyzed: 05/22/07

**RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
FOR TOTAL MERCURY
USING EPA METHOD 1631E**
Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
TP 210@E1.16.5 705200-07	<0.2
TP 211@E1.16.5-15 705200-08	<0.2
TP 211@E1.13.5 705200-09	<0.2
Method Blank	<0.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	TP 210@E1.16.5	Client:	Associated Earth Sciences, Inc.
Date Received:	05/16/07	Project:	KE070183A, F&BI 705200
Date Extracted:	05/16/07	Lab ID:	705200-07
Date Analyzed:	05/16/07	Data File:	051619.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	69	50	150
Phenol-d6	65	50	150
2,4,6-Tribromophenol	75	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	TP 211@E1.16.5-15	Client:	Associated Earth Sciences, Inc.
Date Received:	05/16/07	Project:	KE070183A, F&BI 705200
Date Extracted:	05/16/07	Lab ID:	705200-08 1/10
Date Analyzed:	05/16/07	Data File:	051621.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	71	50	150
Phenol-d6	68	50	150
2,4,6-Tribromophenol	76	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<1,000

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	TP 211@E1.13.5	Client:	Associated Earth Sciences, Inc.
Date Received:	05/16/07	Project:	KE070183A, F&BI 705200
Date Extracted:	05/16/07	Lab ID:	705200-09
Date Analyzed:	05/16/07	Data File:	051620.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	82	50	150
Phenol-d6	87	50	150
2,4,6-Tribromophenol	96	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	Method Blank	Client:	Associated Earth Sciences, Inc.
Date Received:	Not Applicable	Project:	KE070183A, F&BI 705200
Date Extracted:	05/16/07	Lab ID:	07708mb2
Date Analyzed:	05/16/07	Data File:	051617.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	70	50	150
Phenol-d6	69	50	150
2,4,6-Tribromophenol	73	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/29/07

Date Received: 05/16/07

Project: Lakeview Building/KE070183A, F&BI 705200

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 705184-04 (Matrix Spike) Silica Gel

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	2,500	<25	104	106	71-137	2

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	2,500	105	70-129

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/29/07
 Date Received: 05/16/07
 Project: Lakeview Building/KE070183A, F&BI 705200

**QUALITY ASSURANCE RESULTS
 FOR THE ANALYSIS OF SOIL SAMPLES
 FOR TOTAL METALS USING EPA METHOD 200.8**

Laboratory Code: 705122-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Chromium	mg/kg (ppm)	7.27	6.21	16	0-20
Arsenic	mg/kg (ppm)	1.73	1.46	17	0-20
Selenium	mg/kg (ppm)	<1	<1	nm	0-20
Silver	mg/kg (ppm)	<1	<1	nm	0-20
Cadmium	mg/kg (ppm)	<1	<1	nm	0-20
Barium	mg/kg (ppm)	23.4	20.0	16	0-20
Lead	mg/kg (ppm)	1.88	1.51	22 a	0-20

Laboratory Code: 705122-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Chromium	mg/kg (ppm)	50	7.27	107	50-150
Arsenic	mg/kg (ppm)	10	1.73	102	50-150
Selenium	mg/kg (ppm)	5	<1	99	50-150
Silver	mg/kg (ppm)	10	<1	123	50-150
Cadmium	mg/kg (ppm)	10	<1	105	50-150
Barium	mg/kg (ppm)	50	23.4	108 b	50-150
Lead	mg/kg (ppm)	20	1.88	102	50-150

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/29/07

Date Received: 05/16/07

Project: Lakeview Building/KE070183A, F&BI 705200

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Chromium	mg/kg (ppm)	50	105	70-130
Arsenic	mg/kg (ppm)	10	100	70-130
Selenium	mg/kg (ppm)	5	97	70-130
Silver	mg/kg (ppm)	10	118	70-130
Cadmium	mg/kg (ppm)	10	101	70-130
Barium	mg/kg (ppm)	50	107	70-130
Lead	mg/kg (ppm)	20	102	70-130

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/29/07

Date Received: 05/16/07

Project: Lakeview Building/KE070183A, F&BI 705200

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES FOR
TOTAL MERCURY
USING EPA METHOD 1631E

Laboratory Code: 705122-01(Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	mg/kg (ppm)	0.125	<0.2	116	113	50-150	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	mg/kg (ppm)	0.125	129	70-130

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/29/07

Date Received: 05/16/07

Project: Lakeview Building/KE070183A, F&BI 705200

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL
SAMPLES FOR PNA'S BY EPA METHOD 8270C SIM

Laboratory Code: 705184-04 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference (Limit 20)
Pentachlorophenol	ug/kg (ppb)	<100	<100	nm

Laboratory Code: 705184-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Pentachlorophenol	ug/kg (ppb)	250	<100	101	14-132

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Pentachlorophenol	ug/kg (ppb)	250	92	92	41-122	0

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

705200

SAMPLE CHAIN OF CUSTODY

ME 05/16/07

BT3

Send Report To Frank Moore

Company Associated Earth Sciences, Inc.

Address 911 6th Avenue, Ste. 100

City, State, ZIP Kirkland, WA 98033

Phone # (425) 827-7701 Fax # (425) 827-6424

SAMPLERS (signature) [Signature]

PROJECT NAME/NO. Levee/Bldg/16070183A

PO #

REMARKS

Page # 1 of 1

TURNAROUND TIME

Standard (2 Weeks)

RUSH

Rush charges authorized by: _____

SAMPLE DISPOSAL

Dispose after 30 days

Return samples

Will call with instructions

Sample ID	Lab ID	Date	Time	Sample Type	# of containers	ANALYSES REQUESTED					Notes	
						TPH-Diesel <input checked="" type="checkbox"/>	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270		HFS
ES-39	01	5/15/07	1104	Soil	1							held
ES-40	02	5/15/07	1245	Soil	1							held
ES-41	03	5/15/07	1315	Soil	1							held
ES-42	04	5/15/07	1337	Soil	1							held
ES-43	05	5/15/07	1430	Soil	1							held
ES-44	06	5/15/07	1455	Soil	1							held
TP 210 @ El. 16.5	07	5/15/07	1535	Soil	1	X						held
TP 211 @ El. 16.5-15	08	5/15/07	1600	soil	1	X						held
TP 211 @ El. 13.5	09	5/15/07	1605	soil	1	X						held

Samples received at _____

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
<u>[Signature]</u>	Frank Moore	AESI	5/16/07	1137
<u>[Signature]</u>	David A. White	Chump	5-16-7	11:37

Friedman & Bryya, Inc.

3012 16th Avenue West

Seattle, WA 98119-2029

Ph. (206) 285-8282

283

19

19

19

5/16/07

11:37

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

JUN - 4 2007

May 29, 2007

Scott Kindred, Project Manager
Associated Earth Sciences, Inc.
911 5th Avenue, Suite 100
Kirkland, WA 98033

Dear Mr. Kindred:

Included are the results from the testing of material submitted on May 16, 2007 from the Lakeview building KE070183, F&BI 705206 project. There are 13 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
AE10529R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/29/07
Date Received: 05/16/07
Project: Lakeview building KE070183, F&BI 705206
Date Extracted: 05/16/07
Date Analyzed: 05/17/07

**RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-D_x
Sample Extracts Passed Through a
Silica Gel Column Prior to Analysis
Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 53-144)
ES-48/Elev 8.25' d 705206-04	63,000	46,000	53
ES-49/Elev 8.25'-8.5' 705206-05	<50	<125	84
TP-212/Elev 17' 705206-08	69 x	260	86
TP-212/Elev 13' 705206-09	<50	<125	83
Method Blank	<50	<125	106

x - The pattern of peaks present is not indicative of diesel.

d - The sample was diluted. Surrogate recoveries may not be meaningful.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP-212/Elev 17'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/16/07	Project:	KE070183, F&BI 705206
Date Extracted:	05/17/07	Lab ID:	705206-08
Date Analyzed:	05/17/07	Data File:	705206-08.033
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	BTB

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	116	60	125
Indium	103	60	125
Bismuth	110	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	12.8
Arsenic	3.34
Selenium	<1
Silver	<1
Cadmium	<1
Barium	44.5
Lead	35.4

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP-212/Elev 13'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/16/07	Project:	KE070183, F&BI 705206
Date Extracted:	05/17/07	Lab ID:	705206-09
Date Analyzed:	05/17/07	Data File:	705206-09.034
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	BTB

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	115	60	125
Indium	103	60	125
Bismuth	113	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	10.3
Arsenic	2.04
Selenium	<1
Silver	<1
Cadmium	<1
Barium	33.0
Lead	1.95

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Associated Earth Sciences, Inc.
Date Received:	NA	Project:	KE070183, F&BI 705206
Date Extracted:	05/17/07	Lab ID:	I7-182 mb
Date Analyzed:	05/17/07	Data File:	I7-182 mb.008
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	BTB

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	90	60	125
Indium	93	60	125
Bismuth	108	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	<2
Arsenic	<1
Selenium	<1
Silver	<1
Cadmium	<1
Barium	<1
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/29/07
Date Received: 05/16/07
Project: Lakeview building KE070183, F&BI 705206
Date Extracted: 05/17/07
Date Analyzed: 05/22/07

RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
FOR TOTAL MERCURY
USING EPA METHOD 1631E

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
TP-212/Elev 17' 705206-08	<0.2
TP-212/Elev 13' 705206-09	<0.2
Method Blank	<0.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	TP-212/Elev 17'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/16/07	Project:	KE070183, F&BI 705206
Date Extracted:	05/16/07	Lab ID:	705206-08 1/10
Date Analyzed:	05/18/07	Data File:	051812.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	79	50	150
Phenol-d6	64	50	150
2,4,6-Tribromophenol	68	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<1,000

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	TP-212/Elev 13'	Client:	Associated Earth Sciences, Inc.
Date Received:	05/16/07	Project:	KE070183, F&BI 705206
Date Extracted:	05/16/07	Lab ID:	705206-09
Date Analyzed:	05/18/07	Data File:	051808.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	79	50	150
Phenol-d6	81	50	150
2,4,6-Tribromophenol	65	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	Method Blank	Client:	Associated Earth Sciences, Inc.
Date Received:	Not Applicable	Project:	KE070183, F&BI 705206
Date Extracted:	05/15/07	Lab ID:	07708mb2
Date Analyzed:	05/16/07	Data File:	051617.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	70	50	150
Phenol-d6	69	50	150
2,4,6-Tribromophenol	73	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/29/07

Date Received: 05/16/07

Project: Lakeview building KE070183, F&BI 705206

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 705184-04 (Matrix Spike) Silica Gel

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	2,500	<25	104	106	71-137	2

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	2,500	105	70-129

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/29/07

Date Received: 05/16/07

Project: Lakeview building KE070183, F&BI 705206

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8**

Laboratory Code: 705122-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Chromium	mg/kg (ppm)	7.27	6.21	16	0-20
Arsenic	mg/kg (ppm)	1.73	1.46	17	0-20
Selenium	mg/kg (ppm)	<1	<1	nm	0-20
Silver	mg/kg (ppm)	<1	<1	nm	0-20
Cadmium	mg/kg (ppm)	<1	<1	nm	0-20
Barium	mg/kg (ppm)	23.4	20.0	16	0-20
Lead	mg/kg (ppm)	1.88	1.51	22 a	0-20

Laboratory Code: 705122-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Chromium	mg/kg (ppm)	50	7.27	107	50-150
Arsenic	mg/kg (ppm)	10	1.73	102	50-150
Selenium	mg/kg (ppm)	5	<1	99	50-150
Silver	mg/kg (ppm)	10	<1	123	50-150
Cadmium	mg/kg (ppm)	10	<1	105	50-150
Barium	mg/kg (ppm)	50	23.4	108 b	50-150
Lead	mg/kg (ppm)	20	1.88	102	50-150

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/29/07

Date Received: 05/16/07

Project: Lakeview building KE070183, F&BI 705206

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Chromium	mg/kg (ppm)	50	105	70-130
Arsenic	mg/kg (ppm)	10	100	70-130
Selenium	mg/kg (ppm)	5	97	70-130
Silver	mg/kg (ppm)	10	118	70-130
Cadmium	mg/kg (ppm)	10	101	70-130
Barium	mg/kg (ppm)	50	107	70-130
Lead	mg/kg (ppm)	20	102	70-130

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/29/07

Date Received: 05/16/07

Project: Lakeview building KE070183, F&BI 705206

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES FOR
TOTAL MERCURY
USING EPA METHOD 1631E**

Laboratory Code: 705122-01(Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	mg/kg (ppm)	0.125	<0.2	116	113	50-150	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	mg/kg (ppm)	0.125	129	70-130

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/29/07

Date Received: 05/16/07

Project: Lakeview building KE070183, F&BI 705206

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL
SAMPLES FOR PNA'S BY EPA METHOD 8270C SIM

Laboratory Code: 705184-04 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference (Limit 20)
Pentachlorophenol	ug/kg (ppb)	<100	<100	nm

Laboratory Code: 705184-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Pentachlorophenol	ug/kg (ppb)	250	<100	101	14-132

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Pentachlorophenol	ug/kg (ppb)	250	92	92	41-122	0

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

705206

SAMPLE CHAIN OF CUSTODY

ME. 05/16/07

Bill

Send Report To Scott Kindred

Company Associated Earth Sciences

Address 911 5th Avenue, Suite 100

City, State, ZIP Kirkland Washington

Phone # 425-827-7701 Fax # _____

SAMPLERS (signature) <u>[Signature]</u>		PROJECT NAME/NO. <u>Lakeview building</u>	PO # _____
REMARKS <u>KE070183</u>			

Page # 1 of 1

TURNAROUND TIME
 Standard (2 Weeks)
 RUSH 24 hrs
 Rush charges authorized by: SSK

SAMPLE DISPOSAL
 Dispose after 30 days
 Return samples
 Will call with instructions

Sample ID	Lab ID	Date	Time	Sample Type	# of containers	ANALYSES REQUESTED										Notes
						TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	PCP	RCRA 8 Mchl.			
ES-45 / Elev 8.5'	01	5-16-07	08:40	Soil	1											Hold
ES-46 / Elev 9'-11'	02		09:30		1											Hold
ES-47 / Elev 8'-9'	03		10:25		1											Hold
ES-48 / Elev 8.25'	04		11:40		1	X										
ES-49 / Elev 8.25-8.5'	05		11:55		1	X										
ES-50 / Elev 9'-14'	06		12:45		1											Hold
ES-51 / Elev 9'-9.5'	07		14:20		1											Hold
TP-212 / Elev 17'	08		15:20		1	X										
TP-212 / Elev 13'	09		15:30		1	X										

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282
 Fax (206) 283-5044
 FORMS\COC\COC.DOC

SIGNATURE		PRINT NAME		COMPANY		DATE		TIME	
<u>[Signature]</u>		Charles Hampton		AESI		5-16-07		10:15	
<u>[Signature]</u>		Michael Brady		Fibre		5/16/07		4:15	
Received by:		Received by:		Samples received at		20		07	

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
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JUN - 4 2007

May 30, 2007

Frank Mocker and Scott Kindred, Project Managers
Associated Earth Sciences, Inc.
911 5th Avenue, Suite 100
Kirkland, WA 98033

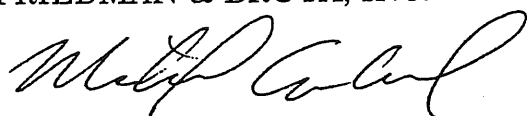
Dear Mr. Mocker and Mr. Kindred:

Included are the results from the testing of material submitted on May 17, 2007 from the Lakeview Building/KE070183A, F&BI 705220 project. There are 15 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
AE10530R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/30/07

Date Received: 05/17/07

Project: Lakeview Building/KE070183A, F&BI 705220

Date Extracted: 05/17/07

Date Analyzed: 05/17/07 and 05/18/07

**RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx
Sample Extracts Passed Through a
Silica Gel Column Prior to Analysis
Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 53-144)
ES-52 705220-01	300	170	96
ES-53 705220-02	<50	<125	104
ES-54 705220-03	440	280	102
Method Blank	<50	<125	99

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	ES-52	Client:	Associated Earth Sciences, Inc.
Date Received:	05/17/07	Project:	KE070183A, F&BI 705220
Date Extracted:	05/18/07	Lab ID:	705220-01
Date Analyzed:	05/18/07	Data File:	705220-01.023
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	88	60	125
Indium	83	60	125
Bismuth	98	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	12.3
Arsenic	4.58
Selenium	<1
Silver	<1
Cadmium	<1
Barium	63.1
Lead	46.7

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	ES-53	Client:	Associated Earth Sciences, Inc.
Date Received:	05/17/07	Project:	KE070183A, F&BI 705220
Date Extracted:	05/18/07	Lab ID:	705220-02
Date Analyzed:	05/18/07	Data File:	705220-02.024
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	92	60	125
Indium	88	60	125
Bismuth	105	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	11.4
Arsenic	2.23
Selenium	<1
Silver	<1
Cadmium	<1
Barium	59.1
Lead	13.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	ES-54	Client:	Associated Earth Sciences, Inc.
Date Received:	05/17/07	Project:	KE070183A, F&BI 705220
Date Extracted:	05/18/07	Lab ID:	705220-03
Date Analyzed:	05/18/07	Data File:	705220-03.025
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	94	60	125
Indium	90	60	125
Bismuth	107	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	9.76
Arsenic	3.33
Selenium	<1
Silver	<1
Cadmium	<1
Barium	70.7
Lead	63.4

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Associated Earth Sciences, Inc.
Date Received:	NA	Project:	KE070183A, F&BI 705220
Date Extracted:	05/18/07	Lab ID:	I7-183 mb
Date Analyzed:	05/18/07	Data File:	I7-183 mb.010
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	86	60	125
Indium	86	60	125
Bismuth	103	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	<1
Arsenic	<1
Selenium	<1
Silver	<1
Cadmium	<1
Barium	<1
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/30/07
Date Received: 05/17/07
Project: Lakeview Building/KE070183A, F&BI 705220
Date Extracted: 05/18/07
Date Analyzed: 05/22/07

RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
FOR TOTAL MERCURY

USING EPA METHOD 1631E

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
ES-52 705220-01	<0.2
ES-53 705220-02	<0.2
ES-54 705220-03	<0.2
Method Blank	<0.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	ES-52	Client:	Associated Earth Sciences, Inc.
Date Received:	05/17/07	Project:	KE070183A, F&BI 705220
Date Extracted:	05/17/07	Lab ID:	705220-01 1/10
Date Analyzed:	05/18/07	Data File:	051815.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	80	50	150
Phenol-d6	64	50	150
2,4,6-Tribromophenol	66	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<1,000

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	ES-53	Client:	Associated Earth Sciences, Inc.
Date Received:	05/17/07	Project:	KE070183A, F&BI 705220
Date Extracted:	05/17/07	Lab ID:	705220-02
Date Analyzed:	05/18/07	Data File:	051809.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	66	50	150
Phenol-d6	70	50	150
2,4,6-Tribromophenol	67	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	ES-54	Client:	Associated Earth Sciences, Inc.
Date Received:	05/17/07	Project:	KE070183A, F&BI 705220
Date Extracted:	05/17/07	Lab ID:	705220-03 1/10
Date Analyzed:	05/18/07	Data File:	051816.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	70	50	150
Phenol-d6	66	50	150
2,4,6-Tribromophenol	70	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<1,000

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	Method Blank	Client:	Associated Earth Sciences, Inc.
Date Received:	Not Applicable	Project:	KE070183A, F&BI 705220
Date Extracted:	05/17/07	Lab ID:	07727mb
Date Analyzed:	05/18/07	Data File:	051807.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	77	50	150
Phenol-d6	77	50	150
2,4,6-Tribromophenol	68	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/30/07

Date Received: 05/17/07

Project: Lakeview Building/KE070183A, F&BI 705220

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 705220-02 (Matrix Spike) Silica Gel

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	2,500	<25	96	101	71-137	5

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	2,500	92	70-129

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/30/07

Date Received: 05/17/07

Project: Lakeview Building/KE070183A, F&BI 705220

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 705223-05 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Chromium	mg/kg (ppm)	97.9	104	6	0-20
Arsenic	mg/kg (ppm)	<1	<1	nm	0-20
Selenium	mg/kg (ppm)	<1	<1	nm	0-20
Silver	mg/kg (ppm)	<1	<1	nm	0-20
Cadmium	mg/kg (ppm)	<1	<1	nm	0-20
Barium	mg/kg (ppm)	4.78	5.04	5	0-20
Lead	mg/kg (ppm)	9.40	10.5	11	0-20

Laboratory Code: 705223-05 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Chromium	mg/kg (ppm)	50	97.9	190 b	50-150
Arsenic	mg/kg (ppm)	10	<1	103	50-150
Selenium	mg/kg (ppm)	5	<1	101	50-150
Silver	mg/kg (ppm)	10	<1	118	50-150
Cadmium	mg/kg (ppm)	10	<1	102	50-150
Barium	mg/kg (ppm)	50	4.78	109	50-150
Lead	mg/kg (ppm)	50	9.40	96	50-150

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/30/07

Date Received: 05/17/07

Project: Lakeview Building/KE070183A, F&BI 705220

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Chromium	mg/kg (ppm)	50	96	70-130
Arsenic	mg/kg (ppm)	10	98	70-130
Selenium	mg/kg (ppm)	5	100	70-130
Silver	mg/kg (ppm)	10	115	70-130
Cadmium	mg/kg (ppm)	10	100	70-130
Barium	mg/kg (ppm)	50	102	70-130
Lead	mg/kg (ppm)	50	95	70-130

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/30/07

Date Received: 05/17/07

Project: Lakeview Building/KE070183A, F&BI 705220

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES FOR
TOTAL MERCURY
USING EPA METHOD 1631E

Laboratory Code: 705223-05 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference (Limit 20)
Mercury	mg/kg (ppm)	<0.2	<0.2	nm

Laboratory Code: 705223-05 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Mercury	mg/kg (ppm)	0.125	<0.2	108	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	mg/kg (ppm)	0.125	75	70-130

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/30/07

Date Received: 05/17/07

Project: Lakeview Building/KE070183A, F&BI 705220

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL
SAMPLES FOR PNA'S BY EPA METHOD 8270C SIM

Laboratory Code: 705220-02 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference (Limit 20)
Pentachlorophenol	ug/kg (ppb)	<100	<100	nm

Laboratory Code: : 705220-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Pentachlorophenol	ug/kg (ppb)	250	<100	95	14-132

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Pentachlorophenol	ug/kg (ppb)	250	81	79	41-122	3

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

MAY 29 2007

May 22, 2007

Scott Kindred, Project Manager
Associated Earth Sciences, Inc.
911 5th Avenue, Suite 100
Kirkland, WA 98033

Dear Mr. Kindred:

Included are the results from the testing of material submitted on May 18, 2007 from the KE070183 Lakeview Building, F&BI 705229 project. There are 2 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
AE10522R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/22/07

Date Received: 05/18/07

Project: KE070183 Lakeview Building, F&BI 705229

Date Extracted: 05/18/07

Date Analyzed: 05/18/07

**RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-D_x
Sample Extracts Passed Through a
Silica Gel Column Prior to Analysis
Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> (% Recovery) (Limit 53-144)
ES57/Stockpile 705229-03	<50	<125	114
ES58/Stockpile 705229-04	<50	<125	102
ES59/Stockpile 705229-05	<50	<125	100
Method Blank	<50	<125	103

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/22/07

Date Received: 05/18/07

Project: KE070183 Lakeview Building, F&BI 705229

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 705220-02 Silica Gel (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	2,500	<50	96	101	71-137	5

Laboratory Code: Laboratory Control Sample Silica Gel
Percent Recovery

Analyte	Reporting Units	Spike Level	Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	2,500	92	70-129

705 289

SAMPLE CHAIN OF CUSTODY

ME 05-18-07

801

Send Report To Scott Kinney

Company Associated Earth Sciences

Address 911 5th Avenue Suite 100

City, State, ZIP Kirkland WA 98115

Phone # 425 827 7701 Fax #

Page # 1 of 1

TURNAROUND TIME

Standard (2 Weeks)

RUSH 24 hrs

Rush charges authorized by:

SAMPLE DISPOSAL

Dispose after 30 days

Return samples

Will call with instructions

SAMPLES (signature)	PO #
PROJECT NAME/NO.	
REMARKS	

Sample ID	Lab ID	Date	Time	Sample Type	# of containers	ANALYSES REQUESTED					Notes	
						TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270		HFS
ES 55 / Elev 17'	01	5-18-07		Soil	1							Hold
ES 56 / Elev 15'	02	5-18-07		Soil	1							Hold
ES 57 / Stockpile	03	5-18-07	13:00	Soil	1	X						
ES 58 / Stockpile	04	5-18-07	13:15	Soil	1	X						
ES 59 / Stockpile	05	5-18-07	13:30	Soil	1	X						

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282
 Fax (206) 283-5044

SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
Relinquished by:		Charles Hemphill	AESE	5-18-07	2:00		
Received by:		Fair Young	FBI	5/18/07	2:00		
Relinquished by:							
Received by:							

Sample received at 2:00 PM

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

JUN - 4 2007

June 1, 2007

Frank Mocker and Scott Kindred, Project Managers
Associated Earth Sciences, Inc.
911 5th Avenue, Suite 100
Kirkland, WA 98033

Dear Mr. Mocker and Mr. Kindred:

Included are the results from the testing of material submitted on May 21, 2007 from the Lakeview Building/KE070183A, F&BI 705244 project. There are 21 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
AE10601R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/01/07
Date Received: 05/21/07
Project: Lakeview Building/KE070183A, F&BI 705244
Date Extracted: 05/21/07
Date Analyzed: 05/23/07

**RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx
Sample Extracts Passed Through a
Silica Gel Column Prior to Analysis
Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 67-127)
ES-60 705244-01	<50	490	100
ES-61 705244-02	130	390	95
ES-62 705244-03	<50	<125	105
ES-63 705244-04	380	420	98
ES-64 705244-05	<50	<125	103
ES-65 705244-06	<50	<125	105
Method Blank	<50	<125	86

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	ES-60	Client:	Associated Earth Sciences, Inc.
Date Received:	05/21/07	Project:	KE070183A, F&BI 705244
Date Extracted:	05/21/07	Lab ID:	705244-01
Date Analyzed:	05/21/07	Data File:	705244-01.082
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	97	60	125
Indium	81	60	125
Bismuth	91	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	13.0
Arsenic	3.30
Selenium	<1
Silver	<1
Cadmium	<1
Barium	63.1
Lead	17.3

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	ES-61	Client:	Associated Earth Sciences, Inc.
Date Received:	05/21/07	Project:	KE070183A, F&BI 705244
Date Extracted:	05/21/07	Lab ID:	705244-02
Date Analyzed:	05/21/07	Data File:	705244-02.083
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	92	60	125
Indium	78	60	125
Bismuth	89	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	6.96
Arsenic	7.91
Selenium	<1
Silver	<1
Cadmium	<1
Barium	163
Lead	118

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	ES-62	Client:	Associated Earth Sciences, Inc.
Date Received:	05/21/07	Project:	KE070183A, F&BI 705244
Date Extracted:	05/21/07	Lab ID:	705244-03
Date Analyzed:	05/21/07	Data File:	705244-03.084
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	100	60	125
Indium	86	60	125
Bismuth	95	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	7.63
Arsenic	<1
Selenium	<1
Silver	<1
Cadmium	<1
Barium	16.2
Lead	1.28

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	ES-63	Client:	Associated Earth Sciences, Inc.
Date Received:	05/21/07	Project:	KE070183A, F&BI 705244
Date Extracted:	05/21/07	Lab ID:	705244-04
Date Analyzed:	05/21/07	Data File:	705244-04.087
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	99	60	125
Indium	84	60	125
Bismuth	93	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	14.3
Arsenic	4.92
Selenium	<1
Silver	<1
Cadmium	<1
Barium	58.1
Lead	23.9

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	ES-64	Client:	Associated Earth Sciences, Inc.
Date Received:	05/21/07	Project:	KE070183A, F&BI 705244
Date Extracted:	05/21/07	Lab ID:	705244-05
Date Analyzed:	05/21/07	Data File:	705244-05.088
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	97	60	125
Indium	82	60	125
Bismuth	92	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	9.07
Arsenic	1.02
Selenium	<1
Silver	<1
Cadmium	<1
Barium	21.7
Lead	3.77

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	ES-65	Client:	Associated Earth Sciences, Inc.
Date Received:	05/21/07	Project:	KE070183A, F&BI 705244
Date Extracted:	05/21/07	Lab ID:	705244-06
Date Analyzed:	05/21/07	Data File:	705244-06.089
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	101	60	125
Indium	86	60	125
Bismuth	96	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	9.61
Arsenic	1.85
Selenium	<1
Silver	<1
Cadmium	<1
Barium	21.0
Lead	2.40

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Associated Earth Sciences, Inc.
Date Received:	NA	Project:	KE070183A, F&BI 705244
Date Extracted:	05/21/07	Lab ID:	I7-187 mb
Date Analyzed:	05/21/07	Data File:	I7-187 mb.080
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	HR

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	92	60	125
Indium	79	60	125
Bismuth	87	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	<1
Arsenic	<1
Selenium	<1
Silver	<1
Cadmium	<1
Barium	<1
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/01/07

Date Received: 05/21/07

Project: Lakeview Building/KE070183A, F&BI 705244

Date Extracted: 05/21/07

Date Analyzed: 05/22/07

**RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES
FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
ES-60 705244-01	<0.2
ES-61 705244-02	<0.2
ES-62 705244-03	<0.2
ES-63 705244-04	<0.2
ES-64 705244-05	<0.2
ES-65 705244-06	<0.2
Method Blank	<0.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	ES-60	Client:	Associated Earth Sciences, Inc.
Date Received:	05/21/07	Project:	KE070183A, F&BI 705244
Date Extracted:	05/22/07	Lab ID:	705244-01 1/10
Date Analyzed:	05/22/07	Data File:	052213.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	72	50	150
Phenol-d6	68	50	150
2,4,6-Tribromophenol	52	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<1,000

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	ES-61	Client:	Associated Earth Sciences, Inc.
Date Received:	05/21/07	Project:	KE070183A, F&BI 705244
Date Extracted:	05/22/07	Lab ID:	705244-02 1/10
Date Analyzed:	05/22/07	Data File:	052214.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	69	50	150
Phenol-d6	67	50	150
2,4,6-Tribromophenol	67	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<1,000

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	ES-62	Client:	Associated Earth Sciences, Inc.
Date Received:	05/21/07	Project:	KE070183A, F&BI 705244
Date Extracted:	05/22/07	Lab ID:	705244-03
Date Analyzed:	05/22/07	Data File:	052211.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	73	50	150
Phenol-d6	74	50	150
2,4,6-Tribromophenol	59	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	ES-63	Client:	Associated Earth Sciences, Inc.
Date Received:	05/21/07	Project:	KE070183A, F&BI 705244
Date Extracted:	05/22/07	Lab ID:	705244-04 1/10
Date Analyzed:	05/22/07	Data File:	052215.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	77	50	150
Phenol-d6	129	50	150
2,4,6-Tribromophenol	68	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<1,000

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	ES-64	Client:	Associated Earth Sciences, Inc.
Date Received:	05/21/07	Project:	KE070183A, F&BI 705244
Date Extracted:	05/22/07	Lab ID:	705244-05
Date Analyzed:	05/22/07	Data File:	052208.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	77	50	150
Phenol-d6	80	50	150
2,4,6-Tribromophenol	69	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	ES-65	Client:	Associated Earth Sciences, Inc.
Date Received:	05/21/07	Project:	KE070183A, F&BI 705244
Date Extracted:	05/22/07	Lab ID:	705244-06
Date Analyzed:	05/22/07	Data File:	052212.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	72	50	150
Phenol-d6	72	50	150
2,4,6-Tribromophenol	59	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds Phenols By EPA Method 8270C SIM

Client Sample ID:	Method Blank	Client:	Associated Earth Sciences, Inc.
Date Received:	Not Applicable	Project:	KE070183A, F&BI 705244
Date Extracted:	05/22/07	Lab ID:	07736mb
Date Analyzed:	05/22/07	Data File:	052207.D
Matrix:	Soil	Instrument:	GCMS3
Units:	ug/kg (ppb)	Operator:	ya

Surrogates:	% Recovery	Lower Limit	Upper Limit
2-Fluorophenol	62	50	150
Phenol-d6	63	50	150
2,4,6-Tribromophenol	53	50	150

Compounds:	Concentration ug/kg (ppb)
Pentachlorophenol	<100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/01/07

Date Received: 05/21/07

Project: Lakeview Building/KE070183A, F&BI 705244

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 705244-06 Silica Gel(Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	2,500	<25	103	104	69-125	1

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	2,500	102	70-127

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/01/07

Date Received: 05/21/07

Project: Lakeview Building/KE070183A, F&BI 705244

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8**

Laboratory Code: 705244-03 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Chromium	mg/kg (ppm)	7.63	6.95	9	0-20
Arsenic	mg/kg (ppm)	<1	<1	nm	0-20
Selenium	mg/kg (ppm)	<1	<1	nm	0-20
Silver	mg/kg (ppm)	<1	<1	nm	0-20
Cadmium	mg/kg (ppm)	<1	<1	nm	0-20
Barium	mg/kg (ppm)	16.2	15.4	5	0-20
Lead	mg/kg (ppm)	1.28	1.15	11	0-20

Laboratory Code: 705244-03 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Chromium	mg/kg (ppm)	50	7.63	69	50-150
Arsenic	mg/kg (ppm)	10	<1	79	50-150
Selenium	mg/kg (ppm)	5	<1	79	50-150
Silver	mg/kg (ppm)	10	<1	113	50-150
Cadmium	mg/kg (ppm)	10	<1	78	50-150
Barium	mg/kg (ppm)	50	16.2	78 b	50-150
Lead	mg/kg (ppm)	50	1.28	82	50-150

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/01/07

Date Received: 05/21/07

Project: Lakeview Building/KE070183A, F&BI 705244

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 200.8**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Chromium	mg/kg (ppm)	50	87	70-130
Arsenic	mg/kg (ppm)	10	104	70-130
Selenium	mg/kg (ppm)	5	103	70-130
Silver	mg/kg (ppm)	10	142 vo	70-130
Cadmium	mg/kg (ppm)	10	101	70-130
Barium	mg/kg (ppm)	50	105	70-130
Lead	mg/kg (ppm)	50	103	70-130

vo - The value reported fell outside the control limits established for this analyte.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/01/07

Date Received: 05/21/07

Project: Lakeview Building/KE070183A, F&BI 705244

QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES FOR
TOTAL MERCURY
USING EPA METHOD 1631E

Laboratory Code: 705244-03 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	mg/kg (ppm)	0.125	<0.2	114	107	50-150	6

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	mg/kg (ppm)	0.125	116	70-130

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/01/07

Date Received: 05/21/07

Project: Lakeview Building/KE070183A, F&BI 705244

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL
SAMPLES FOR PNA'S BY EPA METHOD 8270C SIM

Laboratory Code: 705244-05 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference (Limit 20)
Pentachlorophenol	ug/kg (ppb)	<100	<100	nm

Laboratory Code: 705244-05 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Pentachlorophenol	ug/kg (ppb)	250	<100	63	14-132

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Pentachlorophenol	ug/kg (ppb)	250	89	85	41-122	5

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

705244

SAMPLE CHAIN OF CUSTODY

ME 05/21/07

Send Report To Frank Mader/Kraft/Indus
 Company Associated Environmental Sciences Inc
 Address 911 5th Avenue Ste 100
 City, State, ZIP Cleveland, OH 44115
 Phone # 425 8277701 Fax # 425 8275424

SAMPLERS (signature) [Signature]
 PROJECT NAME/NO. Lawrence Building / 160701834
 PO # _____
 REMARKS _____

Page # _____ of _____
 TURNOURND TIME
 Standard (2 Weeks)
 RUSH
 Rush charges authorized by: _____
 SAMPLE DISPOSAL
 Dispose after 30 days
 Return samples
 Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	ANALYSES REQUESTED						Notes	
						TPH-Diesel D _x	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS		PCP
ES-60	01	5/21/07	0930	Soil	1	X	X	X	X	X	X	X	
ES-61	02	5/21/07	1100	Soil	1	X	X	X	X	X	X	X	
ES-62	03	5/21/07	1105		1	X	X	X	X	X	X	X	
ES-63	04	5/21/07	1130		1	X	X	X	X	X	X	X	
ES-64	05	5/21/07	1245	Soil	1	X	X	X	X	X	X	X	
ES-65	06	5/21/07	1300		1	X	X	X	X	X	X	X	
													Samples received at _____ °C

Friedman & Bryna, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282
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SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
Relinquished by: <u>[Signature]</u>		Frank Mader		TEST		5/21/07	1410
Received by: <u>[Signature]</u>		EVANS		TR		5/21/07	1410
Relinquished by:							
Received by:							