STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Bellingham Field Office • 1440 10th Street, Ste 102 • Bellingham, WA 98225
(360) 715-5200 • FAX (360) 715-5225

October 22, 2014

Mr. Rob Roberts
SoundEarth Strategies, Inc.
2811 Fairview Avenue East, Suite 2000
Seattle, WA 98102

Re: Opinion on Proposed Cleanup of a Property associated with a Site:

- **Site Name:** Avtech Corp
- **Site Address:** 3400 Wallingford Ave. N., Seattle, WA
- **Facility/Site No.:** 71755531
- **VCP Project No.:** NW2739
- **CSID No.:** 12131

Dear Mr. Roberts:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your proposed independent cleanup of a Property associated with the Avtech Corp facility (Site). This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

Issues Presented and Opinion

1. Upon completion of the proposed cleanup, will further remedial action likely be necessary at the Property to clean up contamination associated with the Site?

   NO. Ecology has determined that no further remedial action will likely be necessary at the Property to clean up contamination associated with the Site.

2. Upon completion of the proposed cleanup, will further remedial action likely still be necessary elsewhere at the Site?

   YES. Ecology has determined that further remedial action will likely still be necessary elsewhere at the Site.

This opinion is based on an analysis of whether the remedial action meets the substantive requirements of MTCA, Chapter 70.105D RCW, and it's implementing regulations, Chapter 173-340 WAC (collectively "substantive requirements of MTCA"). The analysis is provided below.

Description of the Property and the Site

This opinion applies only to the Property and the Site described below. This opinion does not apply to any other sites that may affect the Property. Any such sites, if known, are identified separately below.

1. Description of the Property.

The Property includes the following three tax parcels in King County, which were affected by the Site and will be addressed by your cleanup:

- 4083306695 – 3422
- 4083306660 – 3421
- 4083306670 – 3400

Enclosure A includes a legal description of the Property. **Enclosure B** includes a diagram of the Site that illustrates the location of the Property within the Site.

2. Description of the Site.

The Site is defined by the nature and extent of contamination associated with the following releases:

- Tetrachloroethylene (PCE) and trichloroethene (TCE) into soil.
- TCE into ground water.

These releases have affected more than one parcel of real property, including the parcels identified above.

Basis for the Opinion

This opinion is based on the information contained in the following documents:

1. SoundEarth Strategies Inc., *RI/FS/CAP Addendum, Avtech Corporation Property,*

1. SoundEarth Strategies Inc., *RI/FS/CAP Addendum, Avtech Corporation Property, 3400 Wallingford Avenue North, Seattle, WA*, August 6, 2014.

2. SoundEarth Strategies, Inc., *Draft Cleanup Action Plan, Avtech Corporation Property, 3400 Wallingford Avenue North, Seattle, WA*, March 14, 2014.

3. SoundEarth Strategies, Inc., *Groundwater Monitoring Report – Fourth Quarter 2013, Avtech Wallingford Property, 3400 Wallingford Avenue North, Seattle, WA*, January 8, 2014.

4. SoundEarth Strategies, Inc., *Draft Remedial Investigation and Feasibility Study Report, Avtech Wallingford Property, 3400 Wallingford Avenue North, Seattle, WA*, January 10, 2014.

5. SoundEarth Strategies, Inc., *In Situ Chemical Oxidation Pilot Test, Avtech Wallingford Property, 3400 Wallingford Avenue North, Seattle, WA*, August 20, 2013.

6. SoundEarth Strategies, Inc., *Supplemental Subsurface Soil Assessment – Loading Dock Area, Avtech Wallingford Property, 3400 Wallingford Avenue North, Seattle, WA*, August 14, 2013.

7. SoundEarth Strategies, Inc., *Groundwater Monitoring Report – Third Quarter 2013, Avtech Wallingford Property, 3400 Wallingford Avenue North, Seattle, WA*, August 13, 2013.

8. SoundEarth Strategies, Inc., *Phase II Environmental Site Assessment, Avtech Wallingford Property, 3400 Wallingford Avenue North, Seattle, WA*, May 22, 2012.

Those documents are kept in the Central Files of the Northwest Regional Office of Ecology (NWRO) for review by appointment only. Appointments can be made by calling the NWRO resource contact at (425) 649-7235 or sending an email to nwro_public_request@ecy.wa.

This opinion is void if any of the information contained in those documents is materially false or misleading.

Analysis of the Cleanup

1. Cleanup of the Property located within the Site.

Ecology has concluded that, upon completion of your proposed cleanup, **no further**

remedial action will likely be necessary at the Property to clean up contamination associated with the Site. That conclusion is based on the following analysis:

a. Characterization of the Site.

Ecology has determined your characterization of the Site is sufficient to establish cleanup standards for the Site and select a cleanup for the Property. The Site is described above and in **Enclosure A**.

b. Establishment of cleanup standards for the Site.

i. Cleanup levels.

Soil:

The Site is located in a mixed residential and commercial area so cleanup levels for unrestricted land use are appropriate. The MTCA Method A soil cleanup levels for soil have been selected which are protective of human health through direct contact and protective of ground water. The MTCA Method A soil cleanup levels for TCE and PCE are 0.03 and 0.05 milligrams per kilogram (mg/kg), respectively.

Soil cleanup levels protective of terrestrial species are also potentially applicable. However, they are deemed not applicable for this Site based on the exclusion relating to proximity of undeveloped land in accordance with WAC 173-34-7491(1)(c)(i). There are less than 1.5 contiguous acres of undeveloped land on or within 500 feet of the Site.

It should be noted that a vapor intrusion threat may exist at the Site. An evaluation of the soil to vapor pathway is therefore required. MTCA and Ecology's current guidance on soil vapor intrusion do not provide an explicit method for establishing soil cleanup levels protective of indoor air, and instead rely on empirical demonstrations of air quality or modeling. Proof that soil contamination is not causing an exceedence of air cleanup standards will therefore be the basis for establishing that soils are protective of indoor air.

Ground Water:

Cleanup levels were selected for ground water based on its use as a potential drinking water source. The MTCA Method A ground water cleanup levels

are appropriate for this purpose, and were selected as the cleanup levels for this Site. The MTCA Method A ground water cleanup level for both TCE and PCE is 5 milligrams per liter (µg/L).

Air:

The MTCA standard Method B air cleanup levels are appropriate for protection for human health and the environment at the Site. Ecology recommends confirmation air samples be collected in the building that is constructed following remediation and analyzed for volatile organic compounds via the TO-15/APH method.

ii. Points of Compliance.

Soil:

The point of compliance for protection of human health (direct contact) and ground water is throughout the Site.

Ground Water:

The point of compliance for groundwater is throughout the Site from the uppermost level of the unsaturated zone extending vertically to the lowest most depth which could potentially be affected by the Site.

Air:

The standard point of compliance for air is in the ambient air throughout the Site.

c. Selection of cleanup for the Property.

Ecology has determined the cleanup you proposed for the Property meets the substantive requirements of MTCA. Your proposed cleanup meets minimum cleanup requirements and will not exacerbate conditions or preclude reasonable cleanup alternatives elsewhere at the Site. The proposed timeframe for achieving the ground water cleanup standards is estimated to be two years. Based on the results of the 2013 ground water treatment pilot study, Ecology has determined that this timeframe is reasonable and meets the restoration time requirements under 173-340-360(4) WAC.

The selected cleanup action includes:

- Soil excavation, removal from the Property and appropriate disposal: All contaminated soils within the Property will be excavated and sampled in accordance with the Cleanup Action Plan (CAP). Achieving the MTCA Method A soil cleanup levels at the maximum excavation depth will be confirmed by soil sampling and analysis. The excavations in these areas should be expanded laterally until bottom and sidewall confirmation samples indicate COC concentrations below the MTCA Method A soil cleanup levels. On February 4, 2014, Ecology approved a Contained-In Determination for an estimated 5,600 tons of contaminated soil in addition to 103 drums of contaminated soil generated as investigation derived waste.

- Ground water treatment: After removal and disposal of TCE-contaminated soil, ground water treatment will be implemented by constructing an in situ chemical oxidation with permanganate treatment system. Ground water treatment will consist of injecting potassium permanganate into the ground water at approximately 59 strategically located injection wells. The potassium permanganate is expected to chemically oxidize the TCE to non-toxic end products. A second contingency injection is proposed if COCs in the ground water compliance monitoring wells at the southern Property boundary do not meet the cleanup levels after 2 years, the anticipated restoration time period.

- Ground water monitoring: The ground water Point of Compliance is throughout the Site (or Property for this opinion). After the soil excavation is completed and the in situ ground water treatment is initiated, ground water monitoring will be conducted as necessary to determine the effectiveness of the ground water treatment. A minimum of four consecutive quarters of ground water monitoring events is necessary to demonstrate compliance with the MTCA Method A ground water cleanup levels.

- If results from confirmation soil sampling indicate that soil containing PCE and its byproducts above the MTCA Method A soil cleanup levels

remain on the Property, additional ground water wells and data may be needed to determine potential impacts to ground water on the Property.

2. Cleanup of the Site as a whole.

Ecology has concluded that **further remedial action** will still be necessary elsewhere at the Site upon completion of your proposed cleanup. In other words, while your proposed cleanup may constitute the final action for the Property, it will constitute only an **"interim action"** for the Site as a whole.

Limitations of the Opinion

1. Opinion does not settle liability with the state.

Liable persons are strictly liable, jointly and severally, for all remedial action costs and for all natural resource damages resulting from the release or releases of hazardous substances at the Site. This opinion **does not**:

- Change the boundaries of the Site.
- Resolve or alter a person's liability to the state.
- Protect liable persons from contribution claims by third parties.

To settle liability with the state and obtain protection from contribution claims, a person must enter into a consent decree with Ecology under RCW 70.105D.040(4).

2. Opinion does not constitute a determination of substantial equivalence.

To recover remedial action costs from other liable persons under MTCA, one must demonstrate that the action is the substantial equivalent of an Ecology-conducted or Ecology-supervised action. This opinion does not determine whether the action you proposed will be substantially equivalent. Courts make that determination. *See* RCW 70.105D.080 and WAC 173-340-545.

3. Opinion is limited to proposed cleanup.

This letter does not provide an opinion on whether further remedial action will actually be necessary at the Property upon completion of your proposed cleanup. To obtain such an opinion, you must submit a report to Ecology upon completion of your cleanup and request an opinion under the VCP.

4. State is immune from liability.

The state, Ecology, and its officers and employees are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing this opinion. *See* RCW 70.105D.030(1)(i).

Contact Information

Thank you for choosing to clean up your Property under the Voluntary Cleanup Program (VCP). As you conduct your cleanup, please do not hesitate to request additional services. We look forward to working with you.
For more information about the VCP and the cleanup process, please visit our web site: www. ecy.wa.gov/programs/tcp/vcp/vcpmain.htm. If you have any questions about this opinion, please contact me by phone at (360) 715-5213 or by e-mail at john.guenther@ecy.wa.gov.

Sincerely,

John Guenther, LHG
Site Manager, NWRO Toxics Cleanup Program

Enclosures (2): A – Legal Description of the Property
B – Description and Diagrams of the Site (including the Property)

cc: Sonia Fernandez, VCP Coordinator, Ecology

Enclosure A

Legal Description of the Property:

408330-6660 (3421 Burke Avenue North):

LAKE UNION ADD, Plat Block 68, Plat Lot 3.

408330-6670 (3400 Wallingford Avenue North):

LAKE UNION ADD, Plat Block 68, Plat Lot 4 THRU 9.

408330-6695 (3422 Wallingford Avenue North):

LAKE UNION ADD, Plat Block 68, Plat Lot 10.

Enclosure B

Description and Diagrams of the Site (including the Property)

Site Description

This section provides Ecology's understanding and interpretation of Site conditions, and is the basis for the opinions expressed in the body of the letter.

Site Definition
The Site is defined by the nature and extent of tetrachloroethylene (PCE) and trichloroethene (TCE) in soil and TCE in ground water. No other PCE degradation by-product constituents have been detected in soil or ground water above their media-specific MTCA Method A cleanup levels. The Property that includes the source area for the Site and addressed in this opinion letter is located at 3400 Wallingford Avenue North in Seattle, Washington. Contaminated soil on the Site is within the Property boundaries. Contaminated ground water on the Site extends beneath the adjacent City of Seattle right-of-way and properties to the south of the Property. Results of remedial investigation activities have identified TCE as being the only remaining contaminant of concern (COC) for soil on the the Property and ground water on the Site that extends beyond the Property.

Area/Property Description
The Property addressed in this opinion letter consists of the following King County tax parcels and addresses:

- 408330-6660 (3421 Burke Avenue North)
- 408330-6670 (3400 Wallingford Avenue North)
- 408330-6695 (3422 Wallingford Avenue North)

The Property covers 1.26 acres of land that is bounded by North 34th Street to the south, Wallingford Avenue North to the west, Burke Avenue North to the east and residential apartment buildings to the north. The Property is located approximately 1 mile north of downtown Seattle (City). The Property is located at elevations ranging from approximately 65 feet above mean sea level at the south to 95 feet above mean sea level at the north. The Property is currently occupied by an approximately 17,000-square foot two-story concrete structure and a 1,200-square foot two-story wooden single family residence. A neighborhood café (Varsity Inn) is located across 36th Street to the south.

The Property is located in the Wallingford neighborhood. Gas Works Park, a former industrial manufactured gas plant site, is located several hundred feet south of the Property. The Property vicinity is a historic mix of primarily residential and commercial with some industrial land uses located primarily along Lake Union's northern shoreline east and west of Gas Works Park.

Property History and Current Use
Historical use of the Property was researched by reviewing of King County archived records, Sanborn Fire insurance maps and City archived building permit files. The Property was initially developed by the early 1900s with four single-family residences. The two-story concrete factory building was constructed in 1909. This building contained a shoe manufacturer from 1909 to the 1940s and Grandmas Cookies in the 1950s and 1960s. Avtech Corporation (Avtech), a manufacturer of aviation electronics equipment, occupied this building from 1974 to 2011. The existing structures are currently vacant with chain-link security fencing around the paved portions of the Property not occupied by buildings.

Contaminant Source and History
A 1989 letter from Avtech to the City land use office includes a detailed list of all chemicals transported to Avtech, as well as their estimated use frequency and total volume annually used. The letter also detailed that Avtech's liquid chemical wastes were removed from the Property every 90 days by a hazardous waste transportation company, that chromate waste from the chromate plating room was discharged to the sanitary sewer to be received by Metro and that an industrial waste discharge permit was held by Avtech for this purpose. Chemical wastes included tetrachloroethylene, trichloroethene, acetone, toluene, ammonium hydroxide, xylenes, methyl isobutyl ketone, varnish, nitric acid, paint etcher, Freon, ethanol, and hydraulic oil. A 1989 annual Dangerous Waste Report submitted to Ecology identified 3,000 pounds of waste TCE generated by Avtech. Other wastes included paint thinning solvents and ammonium hydroxide.

The source of TCE contamination detected in soil and ground water is presumed to be from solvent use, storage and on-site disposal at various locations within the structures on the north side of North 34th Street. These locations include the chemical storage area, machine shop and potentially to leaking floor-drains and sanitary sewer piping.

Physiographic Setting
The Site is located within the Puget Sound Lowland Physiographic Province, a north-south trending structural and topographic depression which is bordered on its west side by the Olympic Mountains, and to the east by the Cascade Mountain foothills. The Puget Sound Lowland is underlain by Tertiary volcanic and sedimentary bedrock, and has been filled to the present day land surface with Pleistocene glacial and non-glacial sediments.

Repeated advances and retreats of the continental glaciers that flowed through the area out of Canada more than 10,000 years ago created the low undulating plains that are characteristic of the Puget Sound Lowland. Current land surfaces reflect the most recent changes that are directly related to glacial events occurring between 13,000 and 20,000 years ago.

The Property is within the northern portion of the Lake Union Depression between Queen Anne and the University of Washington. The Property is located on southeast-facing hill side, with elevations ranging between 65 feet at the south to 97 feet at the north. Lake

Union is located to the south, with the closest location of the lake approximately 650 feet to the southeast.

Ecological Setting

The Site is located within a densely-developed, urban area of the City. The ecological setting consists of mostly impervious surfaces (streets and sidewalks), commercial and residential structures, landscape features and scattered patches of natural vegetation. Gas Works Park and Lake Union, located several hundred feet to the south of the Site, provides some limited habitat for a variety of terrestrial species.

Geology

Soil beneath the Site consists primarily of local near-surface anthropogenic fill overlying Vashon-age glacial till which overlies Vashon-age advance outwash deposits. Anthropogenic fill or disturbed native soils consisting of loose sands to silty sands were encountered locally in some of the Property borings to depths of up to about 7 feet below ground surface (bgs). It is likely that fill soils are associated with backfilled walls, under building foundations, and utility corridors that were not encountered in the soil borings. The near surface fill soils, where present, are underlain by Vashon glacial till deposits that were encountered in all of Site soil borings that extended through the upper fill soils. In general, these deposits consist of dry-damp to moist, very dense silty sand with variable gravel and cobbles, and local thin sand-rich and silt-rich horizons. The glacial till is often cemented. Glacial till deposits extended to depths ranging from approximately 25 feet bgs (boring B09) to approximately 40 feet bgs (boring B16) across the Site. Vashon-age Advance outwash deposits were encountered beneath the till in nearly all of the borings throughout the Site that were in excess of 35 feet deep. In general, these deposits consisted of damp to wet, very dense sand to sand with some silt with variable gravel and local silty sand and silt-rich horizons. The hard silt-rich interbeds are typical of the transition zone between the Advance outwash sand and the overlying glacial till, and may act as aquitards to ground water flow. The Advance outwash sand deposits are first encountered at depths of approximately 25 feet bgs (boring B09) to about 40 feet bgs (boring B16), and appear to extend up to the maximum depth explored in all of the deeper Site borings (55 feet bgs).

Ground Water

Near-surface perched ground water conditions were not encountered in the Site explorations. The near surface water-bearing zone below the Property was encountered at depths of approximately 25 feet near the lower contact of the overlying glacial till with the underlying glacial outwash sand. Boring logs for five of the fifteen monitoring wells showed a moist, non-saturated fine grained soil stratum at or near the bottom of the borings, while the ten other borings converted into wells were terminated in saturated conditions. Ground water depths in the wells in 2013 have ranged from 21.49 feet to 44.74 below the tops of well casings, corresponding to elevations ranging from 31.27 feet to 64.01 feet North American Vertical Datum of 1988 (NAVD 88). The ground water migration direction has been consistently toward the south to south-southeast, with a gradient ranging from 0.142 feet/foot to 0.147 feet/foot between wells MW10 and MW11 for the 2013

depth-to ground water events.

Slug tests were conducted on wells MW09, MW12, and MW13 in July of 2013 to estimate hydraulic conductivities of the water table aquifer encountered beneath and down gradient of the Property. At least one set of both falling head and rising head slug tests were completed and analyzed in each of the wells. Average hydraulic conductivity estimates for each of the wells ranged from about 0.52 to 1.11 feet per day. Ground water velocities were calculated for each well based on the average hydraulic conductivity of the rising head test for the given well. A porosity of 0.2 was assumed for calculations. The hydraulic gradient was calculated based on ground water elevations taken on April 24 to 26, 2013. Hydraulic gradients ranged from 0.07 to 0.12 feet per foot and ground water velocities averaged from 0.31 to 0.66 feet per day.

A 1908-vintage hand-dug, 132-inch outer-diameter sewer line is located at a depth of approximately 50 feet bgs (invert elevation 26 feet NAVD 88), aligned along the center of North 34th Street, adjacent to and south of the Property. Subsequent studies completed by the City of Seattle Engineering Department indicate that voids were present under the North 34th Street right-of-way, possibly owing to settlement associated with installing and backfilling the sewer line. It is not known what effects the sewer line and associated voids have on ground water gradient and movement.

Surface Water
Lake Union is located approximately 650 feet southeast of the Site. Other than urban stormwater, no other surface water features are known to occur near the Site. Stormwater is managed as part of the City's stormwater management and treatment infrastructure.

Ecological Setting
The Site is currently covered with and surrounded by impervious concrete surfaces including sidewalks, curbs and gutters, and associated stormwater management infrastructure.

Water Use/Water Supply
The City, through Seattle Public Utilities, provides potable water for approximately 1,400,000 people in the greater Seattle area either through direct service or the sale of water to 27 other water utilities. The Property's water supply is served by the South Fork Tolt River portion of the Seattle Public Utilities water source. The South Fork Tolt River watershed is approximately 12,500 acres in size, can provide up to 100 million gallons of drinking water per day, ranges from 760 feet in elevation at the regulating basin to 5,535 feet at McLain Peak and receives between 90 and 160 inches of precipitation a year. According to Ecology's Water Well Logs database, no water supply wells are present within approximately 2 miles of the Site. There are no designated aquifer recharge or wellhead protection areas within several miles of the Site.

Release and Extent of Contamination – Soil
Subsurface investigations identified the nature and extent of PCE and TCE in soil at the

Site. Subsurface investigation soil sample analytical results eliminated petroleum hydrocarbons, metals, PCBs, and other chlorinated solvents, with the exception of TCE (and one positive PCE result), as potential COCs because their concentrations in soil were below the MTCA Method A soil cleanup levels (CULs). Results from the investigations did identify concentrations of TCE in subsurface soil with concentrations above the MTCA CUL near the loading dock and shipping and receiving room at Building 2. In the unsaturated zone, TCE-contaminated soil ranged in depth from 9 to 20 feet bgs. In the saturated zone, trace levels of TCE were detected in B06 (0.046 mg/kg at 35 feet bgs) and B18 (0.032 mg/kg at 35 feet bgs). The TCE concentrations detected in the saturated soil samples was likely due to the TCE detected in ground water collected from wells installed in those borings (MW04 and MW13). TCE-contaminated soil appears to be confined to the vadose zone, which is composed of gradations of silt and silty fine sand. Soil samples collected below 20 feet bgs in the vadose zone did not contain concentrations of TCE above the MTCA CUL.

Soil is likely impacted by TCE at other depths, as indicated by the presence of TCE in ground water. Localized areas of surface soil containing lead near the Building 1 house (likely from lead paint) and polycyclic aromatic hydrocarbons at the south end of the Property (likely from the former gasworks to the south) exceeding the MTCA Method A soil CULs are also present.

Release and Extent of Contamination – Ground Water

Ground water containing TCE concentrations exceeding the MTCA Method A ground water CUL is present beneath the southern half of the North Block and has migrated south, across North 34th Street to the South Block. Ground water contamination may also extend south and east of the South Block.

TCE has been detected at concentrations ranging from non-detectable to 290 micrograms per liter (µg/L) with the highest concentration (290 µg/L) detected in MW-04.

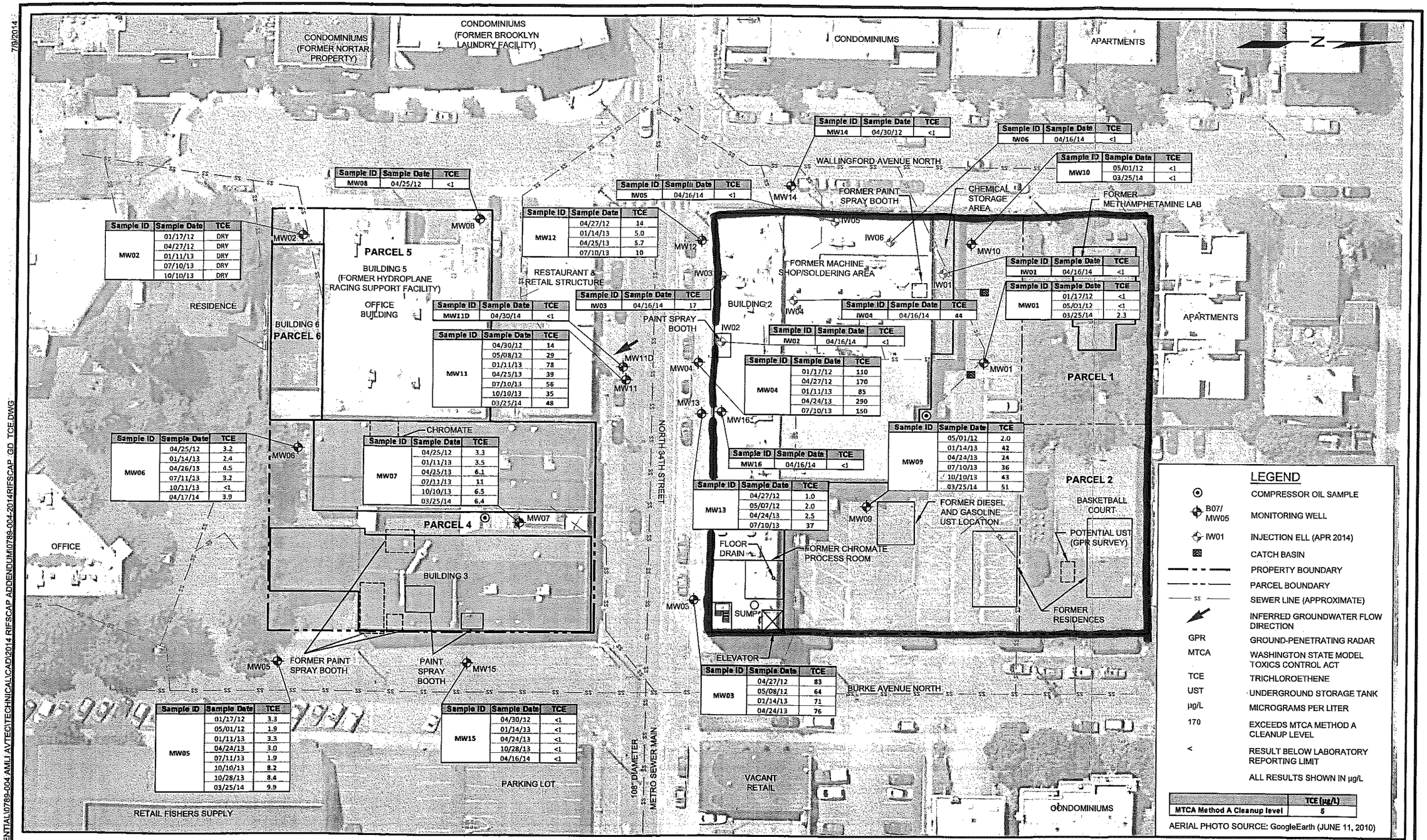
Based on the hydraulic conductivity obtained from slug testing conducted at the Site in 2013, and field data collected during the time of drilling, TCE-contaminated ground water occurs within a dense fine to medium sand with some silt. The ground water has an average seepage velocity of 0.5 feet per day, primarily due to the relatively steep gradients at the Site. The average gradient at the Site, based on ground water elevations measured in July 2013, is 0.07 feet per foot. Ground water contours from the July 2013, sampling event indicate the ground water is generally flowing south to southeast. The depth of ground water at the Site in July 2013, ranged from 22.63 (MW10) to 43.90 (MW11) feet below the top of the monitoring well casings. The extent and concentrations of TCE in ground water at the Site were delineated during the July 2013 ground water monitoring and sampling event. A TCE ground water plume that originates at or near the shipping and receiving room/loading dock area and extends approximately 230 feet down-gradient has been identified at the Site.

Release and Extent of Contamination – Soil Vapor

Indoor air containing VOCs has been retained as a potential concern based on the concentrations of TCE in soil and ground water beneath the Site. To date, no soil gas or indoor air sampling has been conducted to determine if there are impacts to indoor air quality at the Site. Ground water samples collected in April and July 2013 indicate that 9 out of 15 monitoring wells had concentrations of TCE exceeding the ground water screening level protective of indoor air as defined on Table B-1 in the draft *Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remediation* prepared by Ecology (October 2009) and updated in Ecology's cleanup levels and risk calculations (CLARC) database (September 2012). The 1.5 µg/L ground water screening level determined protective of indoor air of was calculated for TCE based on the MTCA Level B residential air screening levels and using Equation 1 from Ecology's guidance document. The future redevelopment of the Property will result in a lot-line to lot-line excavation of both the North and South Block to depths of 10 to 20 feet bgs and in situ treatment of residual ground water contamination. The future remediation of the affected soil and ground water beneath the Property would be expected to result in the elimination of soil vapor as a future medium of concern. However, there is one off-Property parcel (408330-7170) with a restaurant (Varsity Inn) located on it that is affected by the Site-wide ground water plume. In order to evaluate the off-Property vapor intrusion risk to indoor air from ground water contamination, the Johnson and Ettinger (JE) model was utilized to estimate the concentration of TCE in indoor air at the Varsity Inn. The model utilized Site specific parameters and the ground water concentrations detected in MW11, which is located along the northern restaurant property boundary, and MW12, which is located hydraulically up-gradient to the restaurant, to estimate indoor air concentrations. Based on the highest detected concentrations of TCE in ground water in MW11 and MW12, 78 µg/L and 14 µg/L, respectively, an indoor air concentration of 0.166 and 0.031 micrograms per cubic meter (µg/m3), respectively, was estimated using the model. The JE estimated indoor air concentrations are below the MTCA Method B indoor air screening level of 0.37 µg/L. The ground water TCE concentrations in MW11 and MW12 would be expected to decrease once the source of the TCE in soil is excavated and the in situ ground water treatment is implemented.

In addition, a preliminary engineered vapor mitigation system has been designed and will be finalized to be constructed within the future development. A preliminary design of this vapor mitigation system is included in the Site Diagrams.

Site Diagrams



SoundEarth Strategies
WWW.SOUNDEARTHINC.COM

DATE: 07/09/14
DRAWN BY: JQC/BLR
CHECKED BY: CER
CAD FILE: 0789-004_2013_Q4GD_TCE

PROJECT NAME: AVTECH PROPERTY
PROJECT NUMBER: 0789-004
STREET ADDRESS: 3400 WALLINGFORD AVENUE NORTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 25 50 100
APPROXIMATE SCALE IN FEET

FIGURE 2
GROUNDWATER TCE RESULTS

P:\0789 AMLI RESIDENTIAL\0789-004 AMLI AVTECH\TECHNICAL\CAD\2014 RIFSCAP ADDENDUM\0789-004-2014RIFSCAP_GD_TCE.DWG
7/9/2014

7/9/2014

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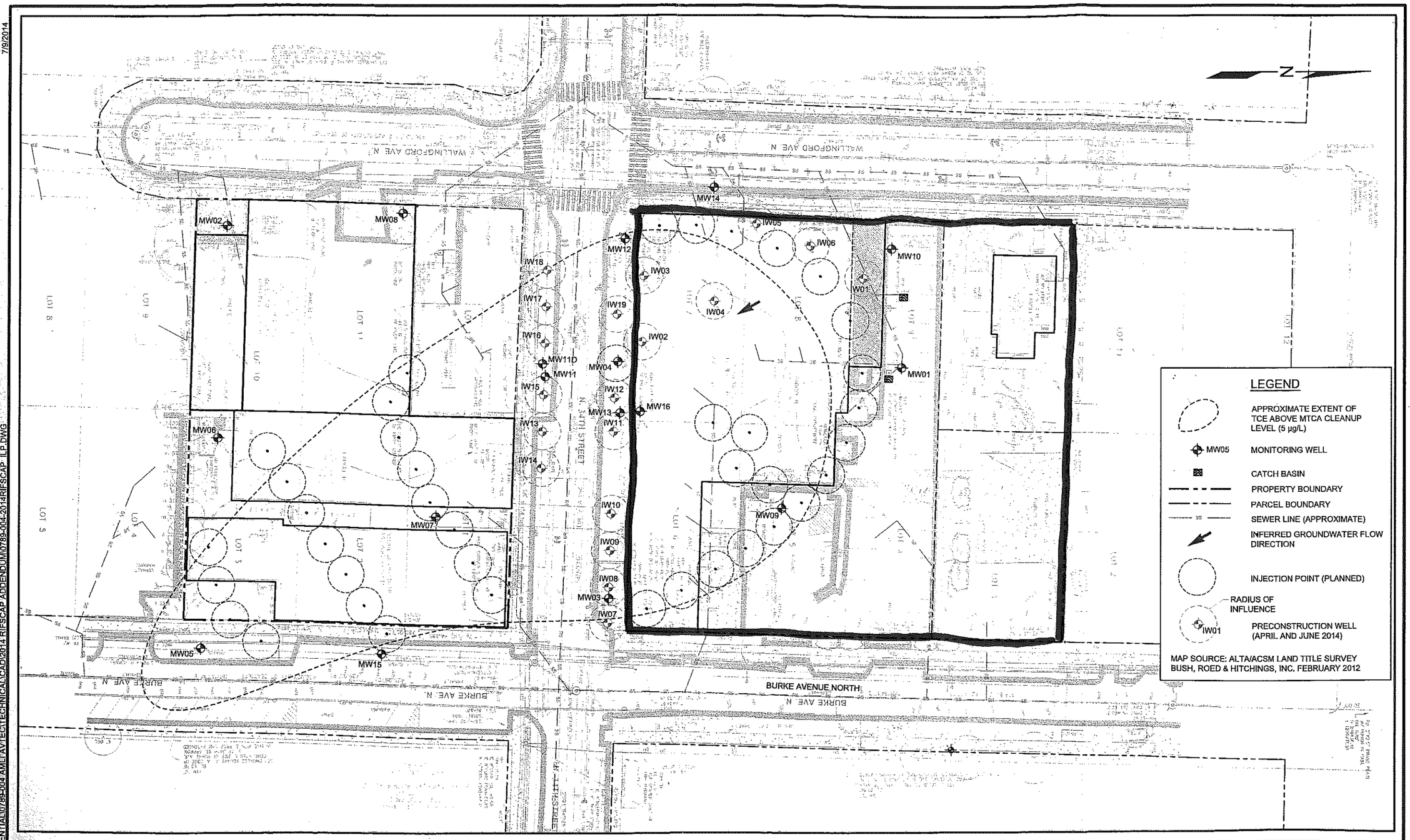


SoundEarth Strategies
WWW.SOUNDEARTHINC.COM

DATE:	07/09/14
DRAWN BY:	JQC/BLR
CHECKED BY:	CER
CAD FILE:	0789-004_2014PRECONFIG1A

PROJECT NAME:	AVTECH PROPERTY
PROJECT NUMBER:	0789-004
STREET ADDRESS:	3400 WALLINGFORD AVENUE NORTH
CITY, STATE:	SEATTLE, WASHINGTON

REGION:

0 25 50 100
APPROXIMATE SCALE IN FEET

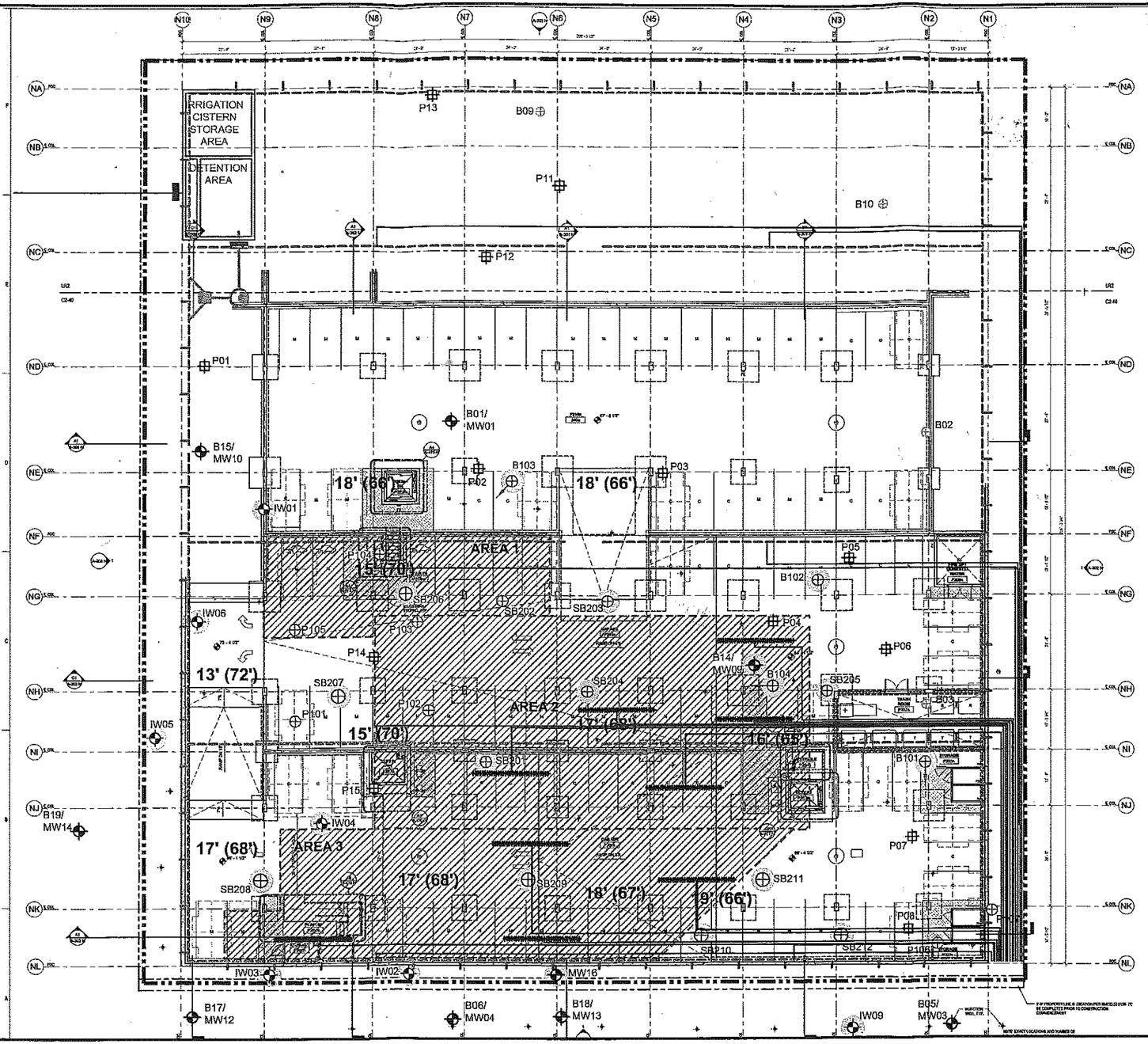
FIGURE 6
INJECTION WELL LOCATION PLAN

WWW.SOUNDEARTHINC.COM

LEGEND

	TCE NOT DETECTED IN SOIL TO AT LEAST 20' BGS
	TCE DETECTED IN SOIL IN UPPER 20' BGS
SB212	MINI-TRACK AUGER BORING (JUL 2013), (APRIL - MAY 2014)
B07/ MW05	MONITORING WELL
B10	SOIL BORING
P13	PUSH-PROBE BORING
P101	PUSH PROBE BORING (DEC 2012)
B102	HSA BORING (JAN 2013)
B101	HSA 30-DEGREE ANGLE BORING (JAN 2013)
IW01	INJECTION WELL
17' (68')	APPROXIMATE DEPTH OF DEVELOPMENT EXCAVATION (AND ELEVATION NAVD 88)
	CATCH BASIN
	PROPOSED EXCAVATION EXTENTS
	STRUCTURAL COLUMNS
	STRUCTURAL FEATURES
	FOOTING DRAINS
	HORIZONTAL SVE PIPING
	SOLID 2-INCH PVC PIPING
	PROPERTY BOUNDARY
UST	UNDERGROUND STORAGE TANK

REFERENCE FIGURES:
2014 GRADING & UTILITY PLAN SHEET C5
2014 UNDERDRAIN PLAN SHEET C4
2014 NORTH BLDG LEVEL P2 PLAN SHEET S-120 N
2014 NORTH BLDG LEVEL P2 SHEET A-120 N



SoundEarth Strategies WWW.SOUNDEARTHINC.COM	DATE: 07/09/14 DRAWN BY: BLR CHECKED BY: CER CAD FILE: 0789-004_2014_VI-C100	PROJECT NAME: AVTECH PROPERTY PROJECT NUMBER: 0789-004 STREET ADDRESS: 3400 WALLINGFORD AVENUE NORTH CITY, STATE: SEATTLE, WASHINGTON	REGION:	0 15 30 60 APPROXIMATE SCALE IN FEET	FIGURE 6 LAYOUT OF VAPOR MITIGATION SYSTEM PIPING