PACIFIC CREST ENVIRONMENTAL
1531 BENDIGO BOULEVARD NORTH PO BOX 952 NORTH BEND, WA 98045
T 425.888.4990 F 425.888.4994

July 9, 2015

Ms. Heather Vick
Toxics Cleanup Program
Washington State Department of Ecology
Northwest Regional Office
3190 160th Avenue Southeast
Bellevue, Washington 98008

RE: Former Penthouse Drapery and Belshaw Site
1752 Rainier Avenue South
Seattle, Washington
VCP I.D. No. NW2278
Facility/Site No. 23408
Pacific Crest No. 105-003

Dear Ms. Vick:

Enclosed for your review is one original and one copy of the *Draft for Ecology Review Cleanup Action Plan – Site Area 1* (dCAP) prepared by Pacific Crest Environmental, LLC (Pacific Crest) and AECOM for the Former Penthouse Drapery and Belshaw Site on behalf of:

Mr. Colin Tsuchikawa and Penthouse Drapery
c/o Mr. Carl Forsberg
Forsberg & Umlauf, P.S.
901 Fifth Avenue, Suite 1400
Seattle, Washington 98101

Enodis Corporation
c/o Ms. Patricia Thompson
Thompson Law Group
1201 Third Avenue, Suite 2200
Seattle, Washington 98101

Belshaw Brothers, Inc.
c/o Mr. John Houlihan
Houlihan Law
3401 Evanston Avenue, N., Suite C
Seattle, Washington 98103

The dCAP is being submitted to Ecology's Voluntary Cleanup Program (VCP) for the purpose of obtaining an opinion letter.

Please feel free to contact the undersigned at (425) 888-4990 if you have questions or comments regarding the information provided herein.

Sincerely,

PACIFIC CREST ENVIRONMENTAL, LLC

William Carroll, L.G., L.H.G.
Principal Hydrogeologist

AECOM

David Raubvogel
Senior Geologist; L.H.G., P.G.

Attachment: *Request for Opinion Form*
Draft for Ecology Review Cleanup Action Plan – Site Area 1 dated July 7, 2015

cc: Mr. Carl Forsberg – Forsberg & Umlauf, P.S.
Mr. Jack Zahner – Foster Pepper
Ms. Patricia Thompson – Thompson Environmental Law, PLLC
Mr. Andy Zabel – Houlihan Law
Mr. and Mrs. Todd Sulivan – Seattle Collision Center
Mr. Todd Biesold – Merlino Foods
Mr. Donald B. Scaramastra – Garvey Schubert Barer
Mr. Rory Galloway – G-Logics, Inc.

Voluntary Cleanup Program

Washington State Department of Ecology
Toxics Cleanup Program

REQUEST FOR OPINION FORM

Use this form to request a written opinion on your planned or completed independent remedial action under the Voluntary Cleanup Program (VCP). Attach to this form the plans or reports documenting the remedial action. Please submit only one form for each request.

Step 1: IDENTIFY HAZARDOUS WASTE SITE

Please identify below the hazardous waste site for which you are requesting a written opinion under the VCP. This information may be found on the VCP Agreement.

Facility/Site Name: Former Penthouse Drapery and Belshaw Site

Facility/Site Address: 1752 Rainier Avenue South, Seattle, Washington

Facility/Site No: 23408	VCP Project No.: NW2278

Step 2: REQUEST WRITTEN OPINION ON PLAN OR REPORT

What type of independent remedial action plan or report are you submitting to Ecology for review under the VCP? Please check all that apply.

- ☐ Remedial investigation plan
- ☐ Remedial investigation report
- ☐ Feasibility study report
- ☐ Property cleanup* plan (* cleanup of one or more parcels located within the Site)
- ☐ Property cleanup* report
- ☒ Site cleanup plan
- ☐ Site cleanup report
- ☐ Other – please specify:

Do you want Ecology to provide you with a written opinion on the planned or completed independent remedial action?

☒ Yes ☐ No

Please note that Ecology's opinion will be limited to:

- Whether the planned or completed remedial action at the site meets the substantive requirements of the Model Toxics Control Act (MTCA), and/or
- Whether further remedial action is necessary at the site under MTCA.

Step 3: REPRESENTATIONS AND SIGNATURE

The undersigned representative of the Customer hereby certifies that he or she is fully authorized to request services from Ecology under the Agreement for this VCP Project.

Name: William Carroll	Title: Principal Hydrogeologist	
Signature: William Carroll	Date: 7/9/15	
Organization: Pacific Crest Environmental, LLC		
Mailing address: PO Box 952		
City: North Bend	State: WA	Zip code: 98045
Phone: 425-888-4990	Fax: 425-888-4994	E-mail: wcarroll@arrowenv.com

Step 4: SUBMITTAL

Please mail your completed form and the independent remedial action plan or report that you are requesting Ecology review to the site manager Ecology assigned to your Site. If a site manager has not yet been assigned, please mail your completed form to the Ecology regional office for the County in which your Site is located.

Northwest Region: Attn: VCP Coordinator 3190 160th Ave. SE Bellevue, WA 98008-5452	**Central Region:** Attn: VCP Coordinator 15 W. Yakima Ave., Suite 200 Yakima, WA 98902
Southwest Region: Attn: VCP Coordinator P.O. Box 47775 Olympia, WA 98504-7775	**Eastern Region:** Attn: VCP Coordinator N. 4601 Monroe Spokane WA 99205-1295

If you need this publication in an alternate format, please call the Toxics Cleanup Program at 360-407-7170. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

PACIFIC CREST ENVIRONMENTAL
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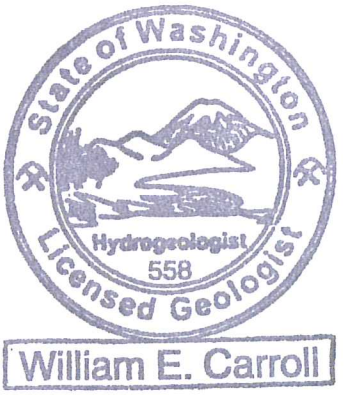
DRAFT FOR ECOLOGY REVIEW
CLEANUP ACTION PLAN – SITE AREA 1

FORMER PENTHOUSE DRAPERY AND BELSHAW SITE
1752 RAINIER AVENUE SOUTH
SEATTLE, WASHINGTON
SITE ID NO. 23408
VCP NO. NW2278
CLEANUP SITE ID NO. 3184

Submitted by:

Pacific Crest Environmental, LLC
1531 Bendigo Boulevard North
North Bend, Washington 98045
Pacific Crest PN: 105-003

AECOM
1501 4th Avenue, Suite 1400
Seattle, Washington 98101

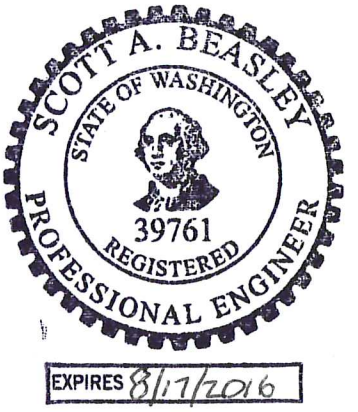


Prepared by:

William Carroll, LG, LHG
Principal Hydrogeologist

Reviewed by:

Scott Beasley, P.E.
Principal Engineer



July 7, 2015

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APPENDICES

1.0 INTRODUCTION

Pacific Crest Environmental, LLC (Pacific Crest) has prepared this Draft for Ecology Review Cleanup Action Plan (dCAP) for submittal to the Washington State Department of Ecology (Ecology) for Site Area 1 (SA-1) of the Former Penthouse Drapery and Belshaw Site (the Site) located in Seattle, Washington. The Site[1] consists of properties affected by a co-mingled contamination associated with releases that occurred at: the current location of Seattle Collision Center, Inc. (SCC), formerly owned by the Penthouse Drapery Cleaners and Manufacturers, Inc. (Penthouse Drapery), at 1752 Rainier Avenue South (Former Penthouse Drapery Property); adjacent properties immediately south of the Former Penthouse Drapery Property formerly owned by Belshaw Brothers, Inc. (Belshaw - a former subsidiary of Enodis Corporation [Enodis] and current subsidiary of AGA Foodservice), (Former Belshaw Property); and other adjacent properties owned by third parties as described in Section 2.1 of the Remedial Investigation (RI)/Feasibility Study (FS) Report dated July 25, 2014. The Site location is illustrated on Figure 1.

The contaminants of potential concern (COPCs) for the Site consist of: chlorinated volatile organic compounds (CVOCs) associated with releases of dry cleaning solvent - tetrachloroethene (PCE) - that occurred on the Former Penthouse Drapery Property and releases of metal cleaning solvents that occurred on Former Belshaw Property; 1,4-dioxane, a solvent stabilizer, that is associated with releases of the CVOC 1,1,1-trichloroethane (1,1,1-TCA) that occurred on the Former Belshaw Property; and petroleum hydrocarbons that are associated with gasoline releases from a former underground storage tank (UST) system located on the Former Belshaw Property. The contaminants of concern (COCs) are the COPCs in the media of concern that exceed their Model Toxics Control Act (MTCA) Cleanup Regulation (Chapter 173-340 of the Washington Administrative Code [WAC 173-340] as amended November 2007) cleanup levels presented in the RI/FS Report and approved by Ecology in the Opinion Letter dated October 27, 2014. Subsurface investigations at SA-1 have detected concentrations of PCE and one or more of its CVOC degradation compounds (trichloroethene [TCE], cis-1,2-dichloroethene [cis-1,2-DCE], trans-1,2-dichloroethene [t-1,2-DCE] and vinyl chloride [VC]) at concentrations in soil and/or groundwater that exceed their cleanup levels. Cleanup of the Site is required because concentrations of the COCs in soil and groundwater exceed their respective cleanup standards. The Site has been assigned Facility/Site No. 23408 and Voluntary Cleanup Program (VCP) Project No. NW2278 by Ecology.

For the purpose of selecting and implementing cleanup alternative, the Site was divided into three sub-areas (SA-1, Site Area 2 [SA-2], and Site Area 3 [SA-3]) where cleanup actions will be implemented. The three site area boundaries are illustrated on Figure 2. The sub-areas generally conform to areas affected by the release of PCE (SA-1), the release of gasoline from the former UST (SA-2), and the co-mingled plume of low concentrations of CVOCs (PCE, TCE, 1,1,1-TCA) and 1,4-dioxane (SA-3).This dCAP does not address cleanup in SA-2 or SA-3; cleanup of those areas will be addressed in Cleanup Action Plan(s) under separate cover.

[1] A "Site" is defined as the areal and vertical extent of the contaminants of concern (COCs) in the media of concern at concentrations that exceed the applicable cleanup levels.

1.1 PURPOSE

This dCAP describes the activities that are proposed to reduce the COCs in the media of concern located on SA-1 that are associated with the release of PCE that occurred at the Former Penthouse Drapery Property. The purpose of the dCAP is to provide sufficient information for review and approval of the activities proposed herein. The purpose of the remedial design is to ensure that the cleanup action is designed, constructed, and operated in a manner consistent with the dCAP, accepted engineering practices, and the requirements specified in WAC 173-340-360. The Site has been enrolled in Ecology's VCP to obtain Opinion Letters from Ecology regarding the status of the cleanup action at the Site. The cleanup action will be conducted in accordance with the applicable regulations.

1.2 REMEDIAL ACTION RESPONSIBILITIES

Cleanup actions at the Site are being conducted under the direction of the former property owners and potentially liable persons (PLPs):

Mr. Colin Tsuchikawa and Penthouse Drapery
c/o Mr. Carl Forsberg
Forsberg & Umlauf, P.S.
901 Fifth Avenue, Suite 1400
Seattle, Washington 98101

Enodis Corporation
c/o Ms. Patricia Thompson
Thompson Law Group
1201 Third Avenue, Suite 2200
Seattle, Washington 98101

Belshaw Brothers, Inc.
c/o Mr. John Houlihan
Houlihan Law
3401 Evanston Avenue, N., Suite C
Seattle, Washington 98103

The environmental consultant for the PCE-related CVOC cleanup action in areas SA-1 and SA-3 is:

Pacific Crest Environmental, LLC
c/o Mr. William Carroll, L.G., L.H.G.
P.O. Box 952
1531 Bendigo Boulevard North
North Bend, Washington 98045

The current property owner is:

Mr. Todd Sullivan
Seattle Collision Center, Inc.
1752 Rainier Avenue South

Seattle, Washington 98144
King County Parcel No. 754830-1155

Implementation of electric resistive heating will be conducted by:

TRS Group, Inc.
P.O. Box 737
Longview, Washington 98632

1.3 ORGANIZATION

The dCAP has been organized into the following sections:

- **Section 2 – Background:** Section 2 provides background information, including location, description, and history of the Former Penthouse Drapery Property; the geologic and hydrogeologic setting; Remedial Investigation results; the Site Conceptual Model; cleanup levels; and Feasibility Study information related to SA-1.
- **Section 3 – Cleanup Action Plan:** Section 3 provides a summary of the technical elements of the SA-1 cleanup action; and restoration timeframe.
- **Section 4 –Cleanup Action Design and Implementation:** Section 4 presents the anticipated implementation schedule; a detailed description of the SA-1 cleanup action; compliance monitoring requirements; waste management activities; and documentation requirements.
- **Section 5 – References:** The documents cited in this dCAP are presented in Section 5.

2.0 BACKGROUND

The following subsections provide a description of the Former Penthouse Drapery Property, relevant Site characterization information, and prior investigation activities completed at the Site by Pacific Crest and others. This section also presents Site-specific FS cleanup levels (CULs), and a summary of the FS.

2.1 FORMER PENTHOUSE DRAPERY DESCRIPTION

The Former Penthouse Drapery Property consists of a 0.11-acre parcel of land (Parcel 754830-1155) located in Seattle, Washington. Improvements to the Former Penthouse Drapery Property include one 4,790 square-foot commercial building (the SCC Building), reportedly constructed in 1947. Mr. Todd Sullivan currently owns the Former Penthouse Drapery Property, and SCC conducts automobile body repair activities inside the SCC Building.

The Former Penthouse Drapery Property is bounded to the north by South State Street and beyond by Allied Furniture Clinic; to the east and south by vacant parcels of land currently owned by Brunzer, LLC, Sleepy Koala LLC, Snarf LLC, and Centoli Improvement, LLC, and formerly part of the Former Belshaw Property; and to the west by Rainier Avenue South and beyond by Stewart Lumber and Hardware. The Former Penthouse Drapery Property is zoned commercial (C1-65). Residential properties are located northeast of the Former Penthouse Drapery Property.

A chronologic summary of historic operations at the Former Penthouse Drapery Property that is based on Sanborn Fire Insurance maps and Polk street directories is presented below:

- Commercial and industrial operations have apparently been conducted on the Former Penthouse Drapery Property at least since 1947;
- Between 1951 and 1970, Associated Industries Fabricators, Inc. occupied the SCC Building and conducted aircraft parts manufacturing;
- In 1970, American Pool Supply is listed as occupying the SCC Building;
- In 1975, Northwest Pool and Patio Supply is listed as occupying the SCC Building;
- In 1980, Atlas Equipment Pumps is listed as occupying the SCC Building;
- Between 1984 and 1990, Penthouse Drapery occupied the SCC Building. Penthouse Drapery operations included the operation of dry cleaning equipment which used PCE as the primary cleaning solvent. No additional operational information was provided to Pacific Crest by the former owner/operator of the dry cleaning operation regarding the use, storage, and waste management related to PCE by Penthouse Drapery. The dry cleaning equipment was presumed to be located in the southeastern portion of the SCC Building;
- In 1994, Don-Vinn Company (restaurant equipment and supplies) is listed as occupying the SCC Building; and
- Mr. Todd Sullivan currently owns the Former Penthouse Drapery Property, and SCC has been operating an auto body repair facility in the SCC Building since 1998.

2.2 NATURAL CONDITIONS

2.2.1 Physiographic Setting

The Site is located in the Rainier Valley, southeast of downtown Seattle. The Site is located near the centerline of the Rainier Valley, with moderately sloped valley sidewalls to the east and west. The surface elevation is approximately 70 feet above mean sea level (AMSL), and the general direction of the topographic slope near the Site is to the southwest.

2.2.2 Terrestrial Habitat Setting

Land use within the vicinity of the Site consists of a combination of urban commercial and residential property and does not contain undisturbed terrestrial habitat for wildlife. Contiguous undeveloped land with an area greater than 1.5 acres is not present either on the Site or within 500 feet of the Site. Due to the size of the undeveloped contiguous land located on or within a 500 foot radius of the Site (less than 1.5 acres) and the COCs present, the Site qualifies for an exemption under WAC 173-340-7491(1)(c). A copy of the Terrestrial Ecological Evaluation Exclusion Form is included in Appendix A.

2.2.3 Geologic Setting

The Puget Sound region is underlain by Quaternary sediments deposited by several glacial episodes (Galster and Laprade 1991). The regional subsurface conditions were generated by deposition occurring through a series of glacial advances and retreats. The regional sediments consist primarily of interbedded and/or sequential deposits of alluvial clays, silts, and sands, typically situated over deposits of glacial till consisting of silty sand to sandy silt with gravel. Outwash sediments consisting of stratified sands, silts, clays, and gravels were deposited by rivers, streams, and post-glacial lakes during the glacial retreats. With the exception of the most recent recessional deposits, sediments have been compacted by the historical overriding ice sheets.

Surficial geology in the immediate vicinity of the Site is identified in the United States Geologic Survey (USGS) Geologic Map of Seattle (Troost et al. 2005) as Quaternary age recessional lacustrian and outwash deposits (Qvrl and Qvr) of the Vashon Stade during the Frasier Glaciation. The Vashon Stade of the Fraser Glaciation occurred approximately 15,000–13,000 years ago, and consisted of a portion of the Cordilleran Ice Sheet occupying the Puget lowland area of western Washington. Glacial melt-water drained southwest to the Pacific Ocean due to the dam created by the glacial toe. Qrvl is laminated silt and clay with low to high plasticity, localized sand layers, peat, and other organic sediment deposited in slow moving water and ephemeral lakes. In the Rainier Valley, Qvrl can be up to 60 feet in thickness. Recessional outwash (Qvr) consists of sand, silty sand, and gravel deposited by streams from the retreating ice sheet. Vashon till (Qvt), consisting of a compact mixture of silt, sandy silt, and gravel, underlies Qvrl and Qvr and Vashon advance outwash (Qva), consisting of sand, silty sand and gravel deposited by streams from the advancing ice sheet, underlies Qvt.

The Site is located in the Seattle Fault Zone (Troost et al. 2005), which consists of a 4-mile wide east-to-west trending zone of faults extending from the foothills of the Cascade Range on the east through Mercer Island and extending to Hood Canal on the west. The most recent and largest known earthquake occurred within the Seattle Fault zone approximately 1,000 years ago. As a result of its location within the Seattle Fault Zone and the nature of the unconsolidated geologic material present in the subsurface, the Site is also within an area identified by the City of Seattle

as subject to liquefaction during earthquakes. During strong earthquakes, liquefaction of soil can occur when the grains of water-saturated sands and silts rearrange and the sediment loses strength. When liquefaction occurs, the liquefied soil can flow as sand boils or cause lateral spreading of overlying layers.

In SA-1, near the SCC Building, the upper 40-feet of soil consists of silt, clay, sand, and silty sand layers interpreted to be a mixture of shallow anthropogenic fill, recessional lacustrine and outwash deposits (Qvrl and Qvr) and till (Qvt) that have been modified by liquefaction during historic earthquakes. The material between approximately 40 feet bgs and 70 feet bgs consists of dense silt and sandy silt containing trace amounts of gravel, interpreted to be till (Qvt). The material between approximately 70 feet bgs and 110 feet bgs (maximum depth explored) consists sand and silty sand that grades with depth to silty sand and sandy silt interpreted to be advance outwash (Qva).

2.2.4 Hydrogeology

Groundwater aquifers in the Puget Sound region generally occur in recent alluvial deposits of sands and gravel, which are stratigraphically delimited by aquitards (low permeability units) consisting of glacial till deposits. Discontinuous perched shallow groundwater zones may be seasonally or locally present above the glacial till deposits (Galster and Laprade 1991).

In SA-1, shallow unconfined groundwater is first encountered in discontinuous sandy layers at depths ranging from between approximately 12 feet bgs and 20 feet bgs and partially confined discontinuous saturated zones are encountered to 60 feet bgs (Shallow Zone). The material between the saturated zones (generally silt and sandy silt) was described as moist or slightly moist and did not produce sufficient groundwater to sample. Saturated zones in the Shallow Zone are generally located between 12 feet bgs and 25 feet bgs (Shallow-Shallow), 25 feet bgs to 40 feet bgs (Shallow-Intermediate), and 40 feet bgs to 59 feet bgs (Shallow-Deep). Groundwater encountered in the sand and silty sand located between 60 feet bgs and 100 feet bgs (Deep Zone) appears to be partially confined by the silt located between 40 feet bgs and 65 feet bgs. The aquifer material in the Deep Zone (sand and silty sand) is more homogeneous than the material in the Shallow Zone (interbedded sands and silts). During the investigation activities conducted between 2005 and 2010, well clusters (CMT Wells MW-18, MW-19, and MW-20, and wells clusters MW-24, MW-25, MW-26, MW-27, MW-28, MW-30, MW-31, and MW-32) were installed with screened intervals within the saturated zones in the Shallow-Shallow, Shallow-Intermediate, Shallow-Deep and Deep Zones.

The hydraulic gradient of groundwater is the driving force for groundwater flow. Pacific Crest calculated downward vertical hydraulic gradients of between 0.003 feet per foot (ft/ft) to 0.122 ft/ft for the potentiometric surface elevation data collected on July 23, 2012, for the wells in well clusters MW-25, MW-26, MW-27, MW-30, MW-31, and MW-32. An upward vertical gradient between MW-28-S and MW-28-I was calculated to be –0.08 ft/ft. With the exception of MW-28, the positive vertical gradients calculated between the nested wells in the Shallow Zone and Deep Zone indicate consistent downward vertical gradient from the Shallow-Shallow Zone to the Deep Zone. These results are consistent with the analytical data that indicates vertical contaminant migration. The variability in the vertical gradients indicates that vertical groundwater flow is not consistent across the Site.

Potentiometric surface elevations in the Shallow Zone generally indicate a west-southwest groundwater flow direction. However, attempts to generate potentiometric surface elevation

contour maps using water level elevations measured in wells installed in the Shallow Zone (Shallow-Shallow, Shallow-Intermediate and Shallow-Deep) produced anomalous results. Pacific Crest interprets the anomalous potentiometric surface elevation contours as the result of the vertical groundwater gradients between zones and the spatial heterogeneity of the saturated zones.

The direction of groundwater flow based on potentiometric surface elevations measured in wells installed in the Deep Zone (Wells MW-30-D, MW-31-D, and MW-32-D) was easterly in 2010 and westerly in 2011.

2.3 INVESTIGATION ACTIVITIES

The Site investigation area (Investigation Area) includes: the Former Penthouse Drapery and Belshaw properties; the public right-of-ways adjacent to the properties; and the topographically up- and down-gradient areas in the immediate vicinity of the Former Penthouse Drapery and Belshaw properties.

Between 1995 and 2010, Phase I ESAs and subsurface investigation activities were conducted in the Investigation Area by Dames & Moore (D&M), Pricewaterhouse Coopers, LLP (PWC), Aaron and Wright Technical Services, Inc. (A&W), URS, G-Logics, Inc. (G-Logics), and Pacific Crest. The objectives of these investigations included satisfying property transaction due-diligence requirements and characterizing the nature and extent of contamination located on-site. Subsurface investigation activities included: advancing soil borings; installing groundwater monitoring wells; collecting soil, groundwater and soil vapor samples for laboratory analysis; and conducting in-situ hydraulic conductivity testing. The locations of soil borings and monitoring wells installed during the previous investigation activities at SA-1 are illustrated on Figure 2. The previous historic investigation activities performed in the Investigation Area are summarized in the previous draft RI/FS Report (Pacific Crest 2011).

Further characterization activities were conducted by Pacific Crest on behalf of Penthouse Drapery and by URS on behalf of Enodis between November 2011 and January 2013 to address data gaps identified by Ecology and included: advancing additional soil borings; and collecting soil and groundwater samples for laboratory analysis. The investigation results for SA-1 are summarized in the RI/FS Report (Pacific Crest & URS 2014).

PCE, TCE, and c-DCE were detected in soil, groundwater, and/or sub-slab soil vapor at SA-1 at concentrations exceeding their respective screening levels. The areal extents of soil and groundwater with concentrations of COCs that exceed the Site-specific FS CULs are presented on Figures 4 and 5. The estimated areal extent of PCE as dense non-aqueous phase liquid (DNAPL) is presented on Figure 6.

2.4 CONCEPTUAL SITE MODEL

A conceptual site model (CSM) has been developed for the Site that is based upon data collected during the RI activities conducted at the Site by Pacific Crest and others. The CSM identifies plausible exposure pathways for human receptors. The CSM elements are discussed in the RI/FS Report (Pacific Crest & URS 2014) and elements relevant to SA-1 are presented below:

- Contaminant releases identified within the SA-1 boundaries include: PCE based dry cleaning solvent on the Former Penthouse Drapery Property. On the basis of the dry cleaning operation dates, the release of PCE appears to have occurred between 1980 and 1990.
- On the basis of the elevated concentrations of PCE in groundwater samples collected from boring PH-SB-4 and wells SCC-2, MW-29, and MW-14, DNAPL "ganglia" are suspected in a fraction of the soil pore spaces in the Shallow Zone beneath and adjacent to the southeast corner of the SCC Building. The horizontal and vertical extent of concentrations of PCE and its degradation compounds in groundwater is defined by samples collected to date. The inferred western boundary of CVOC contamination is based on the results of samples collected from wells completed west of Rainier Avenue (well cluster MW-30), the distribution of contaminants east of Rainier Avenue and the direction of groundwater flow. Drilling within the Rainier Avenue right-of-way is not feasible due to numerous overhead and underground utilities.
- The media of concern within the Investigation Area consist of: soil, groundwater, soil vapor, and air. The laboratory analytical results for soil samples collected from within the saturated zone will be used for qualitative evaluation and not for quantitative comparison to cleanup levels.
- The media of concern where concentrations of COPCs have been detected include: soil, groundwater, and sub-slab soil vapor. The applicable preliminary screening levels (PSLs) for the COPCs in soil, groundwater, and air are the applicable MTCA Method A or Method B values which are presented in Tables 1, 2, and 3.
- The applicable transport mechanisms for the migration of COCs include: direct release to soil; migration to subsurface soil; migration/leaching to groundwater; volatilization from soil and groundwater to air; and transport by groundwater flow (advection). Future receptors exposed to contaminants in soil at the Site primarily consist of construction workers for the ingestion and dermal exposure pathways during site redevelopment.
- Inhalation was identified as the only current potentially complete exposure pathway for commercial and industrial workers. The current zoning (C1-65) is described by the City of Seattle as: "An auto-oriented, primarily retail/service commercial area that serves surrounding neighborhoods as well as a citywide or regional clientele, such as large supermarkets, building supplies and household goods, and auto sales and repairs. Building types are a variety of commercial structures with extensive surface parking, and multi-story office or residential buildings. There is no size limit for most uses; 25,000-40,000 square feet for warehouse and wholesale showroom uses; 35,000 square feet or size of lot, whichever is greater, for offices uses." Based on the zoning classification, future receptors exposed to contaminants in air at the Site include: residents and commercial and construction workers.
- MTCA requires an evaluation of the potential impact for the constituents of concern on terrestrial ecological receptors in accordance with the procedures outlined in WAC 173-340-7490. However, due to the size of the undeveloped contiguous land located on or within a 500 foot radius of the Site (less than 1.5 acres) and the COCs present, the Site qualifies for an exemption under WAC 173-340-7491 (b) and (c)(i); therefore, no further ecological evaluation was conducted.

- Future receptors exposed to contaminants in soil at the Site include residents, commercial/industrial workers and construction workers for the ingestion and dermal exposure pathways.
- Though the Shallow Zone may not meet the definition of potable (WAC 173-340-720(2)), there is connection with the potable Deep Zone; therefore the Site-specific FS CUL for Shallow Zone groundwater is 5 micrograms per liter (µg/L). Groundwater in the vicinity of the Site is not currently used as a drinking water source.

2.5 CLEANUP STANDARDS

Proposed Site-specific FS CULs were developed as part of the RI/FS Report (Pacific Crest & URS 2014) in accordance with WAC 173-340-700 through WAC 173-340-760. The resulting cleanup levels for soil, groundwater, and indoor air/soil vapor are presented in Table 1 through Table 3, respectively.

The point of compliance is defined in WAC 173-340-200 as the point where cleanup levels shall be attained. Once the cleanup levels are attained at the point of compliance, the concentrations of COCs have achieved the regulatory requirements established under MTCA. The media specific points of compliance are summarized below:

- The point of compliance for soil is defined as Site soil from ground surface to the uppermost level of the saturated zone, not to exceed 15 feet below ground surface (bgs). Confirmation sampling of soil will be conducted at the completion of the remedial action to confirm the effectiveness of the remedial action.
- The point of compliance for groundwater is defined as groundwater throughout the Site, from the uppermost level of the saturated zone extending vertically to the lowest depth that is affected by COCs. Performance monitoring of groundwater will be conducted during the cleanup action to monitor the attenuation of concentrations of COCs in groundwater.
- The point of compliance for indoor air is defined as indoor air throughout the Site where analytical results of soil and groundwater samples have detected concentrations of COCs that, when used to predict indoor air concentrations, exceed Site-specific FS CULs. Confirmation sampling of soil and groundwater will be conducted at the completion of the remedial action to confirm the effectiveness of the remedial action.

2.6 FEASIBILITY STUDY

The purpose of a FS is to develop and evaluate cleanup action alternatives to facilitate the selection of a final cleanup action in accordance with WAC 173-340-350(8) and WAC 173-340-360. The FS presented in the RI/FS Report (Pacific Crest 2013) included: an evaluation of regulatory requirements applicable to the cleanup action; evaluation of remediation technologies; and selection of a cleanup action approach for each Site Area in accordance with MTCA. The preferred Cleanup Action Alternative selected for SA-1 under the FS methodology was electric resistive heating (ERH) with enhanced in-situ anaerobic bioremediation and monitored natural attenuation of the COCs in groundwater (FS Alternative No. 4 for SA-1).

2.7 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Cleanup activities at the Site will be conducted under Ecology's VCP. Although Ecology will be the lead agency, the cleanup action effort will be conducted in accordance with all applicable local regulations and permitting requirements. The remedial alternatives will comply with the ARARs, including state and federal laws, in accordance with WAC 173-340-350 and WAC 173-340-710. ARARs are often identified as constituent-specific, location-specific, or remedial action-specific. A number of regulations include requirements in more than one of these three categories.

The primary ARARs for SA-1 include:

- MTCA (WAC 173-340);
- Water Quality Standards for Groundwater (WAC 173-200); and
- Hazardous Waste Management Act (Chapter 70.105 of the Revised Code of Washington [RCW 70.105]).

These primary ARARs are anticipated to be the most applicable requirements, since they include the framework for the cleanup action, including applicable and relevant regulatory guidelines, cleanup standards, waste disposal criteria, references for additional ARARs, and standards for documentation.

Additional ARARs for the Site include:

- The Occupational Safety and Health Act (Part 1910 of Title 29 of the Code of Federal Regulations [29 CFR 1910]);
- The State Environmental Policy Act (RCW 43.21);
- General occupational health standards (WAC 296-62);
- Hazardous Waste Operations (WAC 296-843)
- Minimum Standards for Construction and Maintenance of Wells (WAC 173-160); and
- Accreditation of Environmental Laboratories (WAC 174-50).

3.0 CLEANUP ACTION PLAN

This section presents a description of the proposed cleanup action at SA-1 and summarizes the restoration timeframe.

3.1 CONCEPTUAL SITE MODEL AND REMEDIATION OBJECTIVE

As described in Section 1.0 and illustrated on Figure 2, SA-1 consists of the area in the vicinity of the SCC Building that is affected by the release of PCE. The conceptual site model and remediation objective for SA-1 includes the following:

- Concentrations of PCE in soil and soil vapor and PCE, TCE, and c-DCE in groundwater have exceeded their respective cleanup levels. On the basis of the concentrations of PCE in groundwater, DNAPL ganglia is suspected in the area below and adjacent to the southeast corner of the SCC Building at depths of between 30 and 45 feet bgs. The vertical extent of PCE concentrations in groundwater that exceed the applicable cleanup level is defined at approximately 100 feet bgs. Petroleum hydrocarbons, 1,1,1-TCA, and 1,4-dioxane are not present in SA-1 at concentrations above their applicable cleanup levels.
- The presence of the SCC Building and SCC's business activities and underground utilities in the right-of-way of Rainier Avenue presents constraints on the practicability of remedial alternatives.
- Reductive dechlorination of CVOCs in groundwater appears to be occurring to a limited extent.

3.2 CLEANUP ACTION DESCRIPTION

Pacific Crest has developed the proposed cleanup action for remediation of SA-1 where concentrations of PCE and CVOC degradation products in soil and groundwater exceed the Site-specific FS CULs. ERH combined with enhanced in-situ anaerobic bioremediation and monitored natural attenuation of the COCs in groundwater (FS Alternative No. 4 for SA-1) was identified in the FS as the most practicable and feasible alternative to achieve cleanup standards at SA-1 within an acceptable restoration timeframe.

The overall objectives of the selected cleanup action activities are to:

- Protect human health and the environment;
- Reduce the concentrations of PCE and CVOC degradation products in soil and groundwater on SA-1 to below Site-specific FS CULs;
- Comply with applicable state and federal laws; and
- Provide for compliance monitoring at SA-1.

In order to achieve the cleanup action objectives, the cleanup action approach consists of implementation of the following elements:

- **Soil and Groundwater Remediation** – ERH is the primary technology for remediation of soil and groundwater in SA-1 with concentrations of CVOCs above the applicable Site-

specific Remediation Levels. Although volatilization is the primary removal mechanism, a significant fraction of CVOCs will be degraded in place by other in-situ processes. These in-situ processes include biodegradation, hydrolysis, and reductive dehalogenation by zero-valent iron (included within ERH electrode backfill). The active ERH system will be implemented at SA-1 in the approximate area where the existing data indicate that the SA-1 COCs exceed Site-specific Remediation Levels (MTCA Method B Screening Levels for Groundwater - Vapor Intrusion – Commercial – Table 2). The objective of ERH is to reduce the concentrations of CVOCs located within SA-1 in soil to below the MTCA Method A cleanup level and groundwater to below the applicable Remediation Level established for this technology. Reductive dechlorination of CVOCs has been demonstrated to be occurring in groundwater at the Site. Upon completion of the active use of ERH, if further enhancements are necessary to reduce concentrations of CVOCs to below the Site-specific FS CULs, injection of commercially available substrates (e.g., sodium lactate, molasses, Hydrogen Release Compound™ [HRC™], and emulsified oil substrate [EOS]) into groundwater through direct push borings will be conducted. Due to the presence of numerous underground utilities, the ERH system was not designed for a heating influence that extended into the Rainier Avenue right-of-way. A combination of monitored attenuation and, if appropriate, enhanced reductive dechlorination of residual contamination is considered the most practicable remedial alternatives for residual CVOC concentrations in the right-of-way of Rainier Avenue.

- **Compliance Monitoring** – Protection, performance, and confirmation monitoring will be conducted during the implementation of the cleanup action. The implementation procedures for protection, performance, and confirmation monitoring are described in Section 4 of this dCAP.

3.3 RESTORATION TIMEFRAME

Cleanups should be completed within a reasonable time frame in accordance with WAC 173-340-360(2)(b)(ii) as determined by site-specific criteria in WAC 173-340-360(4)(b). Operation of the ERH system is anticipated for a period of 165 days to remediate soil and groundwater with concentrations of CVOCs above the applicable MTCA Method A cleanup level for soil and Site-specific Remediation Level for groundwater. The delivery of electron receptor substrates to groundwater may also be conducted after active ERH is terminated. The estimated timeframe to remediate SA-1 is 1 to 5 years.

4.0 CLEANUP ACTION DESIGN AND IMPLEMENTATION

This section provides a detailed description and the specific implementation details of the cleanup action alternative for soil and groundwater.

4.1 SCHEDULE

The critical tasks for implementation of the cleanup action are:

- ERH System Final Design and Permitting;
- Preparation and submittal of an Engineering Design Report (EDR) and Compliance Monitoring Sampling and Analysis Plan (SAP) to Ecology;
- ERH Material Procurement;
- Existing Well Abandonment and New Well Installation;
- Utility Improvement;
- ERH Electrode Installation;
- Pre-ERH Baseline Sampling;
- System Installation;
- Start-up;
- ERH Operation, Maintenance, and Monitoring;
- Demobilization;
- Post-ERH Performance Sampling and Progress Reporting;
- Post-ERH Enhanced In-Situ Bioremediation (*to be determined*);
- Post-ERH Confirmation Sampling; and
- Closure Report

The implementation schedule will be presented in the EDR.

4.2 ELECTRIC RESISTIVE HEATING ENGINEERING DESIGN

ERH is an in-situ treatment of contaminated soil and groundwater in which electrical current is applied to the subsurface via electrodes. The electrodes are placed in the subsurface and activated so that electrical current passes through the area of contamination. The resistance of the soil to the electric current heats the soil which, in turn, heats the groundwater to a target temperature approaching 100 degrees Celsius to generate steam. The resulting steam, which serves as a carrier gas to remove CVOCs from the subsurface, is recovered from extraction wells by a vacuum extraction blower and cooled. After the recovered air is cooled and the steam is condensed, the VOC vapors are treated using conventional methods before being discharged to the atmosphere. The site soil and groundwater become progressively cleaner as concentrations of CVOCs are extracted.

Penthouse Drapery has retained TRS Group, Inc. (TRS) to implement ERH in the target treatment area in SA-1, located in the southern portion of the SCC Building as well as a portion of the lot immediately south of the SCC Building. The total treatment area covers 4,636 square feet (ft^2), and treatment will extend from between 5 feet and 100 feet bgs for a total treatment volume of approximately 9,000 cubic yards (yd^3). TRS will prepare a Health and Safety Plan (HASP) and implement appropriate health and safety measures during installation and operation of ERH.

The above grade portions of the ERH system will include: necessary electrical wiring; a control panel; above-ground piping for the soil vapor extraction (SVE) wells; a condensate tank; 10-horsepower (HP) blower for vapor recovery; and vessels containing granular activate carbon (GAC) for vapor treatment. Below grade ERH system components include: a monitoring well network; and an ERH well network including soil vapor extraction (SVE) wells and temperature monitoring points (TMPs). The individual components of the system are described in further detail in the following sections and will be described in detail in the EDR that will be prepared upon receipt of an Opinion Letter from Ecology that the dCAP meets the substantive requirements of MTCA. The components of the ERH system are illustrated in Figure 7. The well locations and heating zones are illustrated in cross-section in Figures 8 and 9.

4.2.1 System Components and Construction

4.2.1.1 Existing Monitoring Well Abandonment

Polyvinyl chloride (PVC) monitoring wells cannot withstand the temperatures that ERH will apply. For this reason, the existing PVC wells (Wells SCC-2, MW-14, MW-18, MW-24S, MW-24D, MW-25S, MW-25I, MW-25D, and MW-29) within the ERH treatment area must be abandoned prior to startup of the ERH system. Penthouse Drapery will retain a licensed Washington State well driller to conduct the well decommissioning activities in accordance with *Minimum Standards for Construction and Maintenance of Wells*, WAC 173-160. Wells SCC-2, MW-14, MW-24S, MW-24D, MW-25S, MW-25I, MW-25D, and MW-29 will be decommissioned in place by removing the monuments, filling the well casings with bentonite chips, and hydrating the bentonite. The well monuments will be removed from the Site for disposal. Well MW-18 is constructed using the Solinst Continuous Multi-channel Tubing (CMT) with multi-level sample ports. Ecology has indicated that CMT wells are not constructed in accordance with the *Minimum Standards for Construction and Maintenance of Wells*, WAC 173-160, and must be over-drilled. Well MW-18 will be over-drilled using a drilling rig equipped with hollow stem augers. The resulting borehole will be grouted with bentonite from the bottom of the borehole to ground surface using a tremie pipe.

4.2.1.2 Monitoring Well Replacement

A total of nine borings will be advanced on the east side of Rainier Avenue South with hollow stem auger drilling equipment for completion as replacement wells. Three borings (MW-33-S, MW-33-I, and MW-33-D) will be advanced between MW-25 well cluster and MW-24 well cluster; three borings (MW-34-S, MW-34-I, and MW-34-D) will be advanced south adjacent to the former location of well MW-14; and three borings (MW-35-S, MW-35-I, and MW-35-D) will be advanced to the east of the SCC Building. The borings will be converted into nine groundwater monitoring wells (MW-33-S, MW-33-I, MW-33-D, MW-34-S, MW-34-I, MW-34-D, MW-35-S, MW-35-I, and MW-35-D). The locations of the proposed wells are illustrated on Figure 10. The exact locations of the wells will be based upon utility locations, permitting requirements, or other conditions as determined in the field.

Before beginning soil boring advancement, subsurface utilities will be located using both public One-Call locating service and a private utility locate contractor in the vicinity of the proposed drilling locations.

The borings for the wells will be advanced using a hollow stem auger drilling rig with 8.25-inch diameter augers. Borings MW-33-D, MW-34-D, and MW-35-D will be advanced to approximately 100 feet bgs. Borings MW-33-S, MW-34-S and MW-35-S; and MW-33-I, MW-34-I, and MW-35-I will be advanced to approximately 20 feet bgs and 45 feet bgs, respectively, with the actual depths of these borings determined based on observed occurrences of groundwater in borings MW-33-D, MW-34-D, and MW-35-D.

Upon completion of each soil boring, a well will be constructed in the annulus of the boring in accordance with the *Minimum Standards for Construction and Maintenance of Wells*, WAC 173-160. The surface completion of the wells will include flush-mount, traffic rated monuments. The nine monitoring wells (MW-33-S, MW-33-I, MW-33-D, MW-34-S, MW-34-I, MW-34-D, MW-35-S, MW-35-I, and MW-35-D) will be constructed using 2-inch inner diameter carbon-steel casing, flush-threaded to 5 feet of 0.010-inch slotted stainless steel well screen.

Following installation, the monitoring wells will be developed by purging a minimum of five submerged casing volumes of groundwater, or until the water becomes visually clear to the unaided eye. The elevation at the top of the well casing will be surveyed to an accuracy of 0.01-foot, and will be tied into the vertical survey datum used for existing monitoring wells.

The wells will be decommissioned in accordance with *Minimum Standards for Construction and Maintenance of Wells*, WAC 173-160 when the Site cleanup is complete and a Site-specific No Further Action (NFA) determination has been provided.

Soil sampling will be conducted during installation of the wells in accordance with the procedures presented in a Compliance Monitoring SAP that will be submitted to Ecology concurrent with the EDR.

4.2.1.3 Electrode/Vapor Recovery Wells

A total of twenty (20) combination electrode/SVE wells will be installed within the same borehole. Each electrode/SVE well will be installed using 8.25-inch inner diameter hollow stem auger to produce a nominal 13-inch outer diameter borehole. Within each boring location two screens will be placed: one will contain the electrode for the ERH system and the other screen will be utilized for the SVE system. The ERH system will be installed without soil sampling. These wells are spaced on a grid with approximately 16.5 feet centers in the affected area located east of Rainier Avenue South and will extend an average of 50 feet bgs in the western portion of SA-1 and 85 feet bgs in the eastern portions of SA-1. The electrode/SVE well depths were selected on the basis of the subsurface investigation results. Electrodes will have conductive intervals beginning approximately 5 feet below grade, with the exception of three electrodes (C8, D7, and D8) which will have conductive intervals beginning 40 feet below grade. The steam condensate recovered during extraction will be stored on-site and discharged to the sanitary sewer under a continuous discharge permit. The recovered vapors and groundwater will be treated using GAC and then discharged to the atmosphere. The components of the ERH system are illustrated in Figure 7. The well locations and heating zones are illustrated in cross-section in Figures 8 and 9. Design drawings for the wells are provided in Appendix B.

Two deep electrode/SVE wells will be installed inside the SCC Building, and three angled electrode/SVE wells will be installed under the SCC Building from locations south adjacent to the SCC Building. To limit the impacts of the ERH treatment on the SCC Building occupant, electrode installation inside of the SCC Building will be installed with below grade completions. Placement and angle of electrodes will be determined during drilling by the location of the SCC Building foundation. Grade changes at the Site will require some adjustments to electrode depth on an individual basis. These changes should be 4 feet or less in total drilling depth on a small number of electrodes.

The wells will be decommissioned in accordance with *Minimum Standards for Construction and Maintenance of Wells*, WAC 173-160, when the cleanup is complete and will not be removed until compliance monitoring demonstrates no need for further operation of these components.

4.2.1.4 Temperature Monitoring Probe

Five TMPs are proposed, each constructed of 1.5-inch chlorinated polyvinyl chloride (CPVC) pipe. Each TMP will include thermocouples on an approximate vertical spacing of 5 feet throughout the treatment depth. Design drawings for the TMPs are provided in Appendix B.

The TMPs will be decommissioned in accordance with *Minimum Standards for Construction and Maintenance of Wells*, WAC 173-160, when the cleanup is complete and will not be removed until compliance monitoring demonstrates no need for further operation of these components.

4.2.1.5 Conveyance Piping

The SVE wells will be connected together into a common SVE-type manifold with CPVC piping. A trenching contractor will be utilized to install trenching adjacent to the two electrodes installed inside the SCC Building. The trench will extend to approximately 2 feet in depth and will be backfilled with approximately 18 inches of pea gravel or coarse sand. A layer of polyethylene sheeting will be placed over the pea gravel or sand to minimize potential short-circuiting during SVE, and the trench will be filled to grade with 6 inches of concrete. The trench will be completed to match existing grade, and will tie the new concrete back to the existing floor with dowels. Construction activities will be conducted inside the SCC Building during weekends to minimize the potential business disruption to SCC.

The trench will include: SVE piping from the electrodes; tubing for supplying drip-water (potable water) to keep the conductivity between the electrodes at optimal resistance; slotted horizontal CPVC piping; and electrical cables. The CPVC piping, drip tubes, and electrical cables will extend above grade immediately after exiting the south side of the SCC Building. TRS will supply all of the piping, conduits, drip lines, and cables required to connect to the above grade electrodes and the electrodes in the trenches installed by Penthouse Drapery. The remainder of the conveyance piping will be completed above grade. Design drawings for the conveyance piping are provided in Appendix B.

The conveyance piping will be decommissioned when post-ERH performance sampling is complete and will not be removed until these results demonstrate no need for further operation of this ERH component.

4.2.1.6 System Enclosure

A chain link fence and security system will be installed around the system to minimize the potential for equipment damage due to severe weather conditions or vandalism. A sound-proof enclosure will house the blower to prevent noise pollution. Design drawings for the system enclosure are provided in Appendix B.

4.2.1.7 Mechanical and Electrical Equipment

The ERH mechanical and electrical system components include: a SVE blower, steam condenser unit, and a control panel. The details of the equipment are presented below:

- The vacuum to the ERH SVE system will be applied using a 10-HP motor connected to a vacuum blower. The vacuum blower is estimated to produce a flow of up to 370 standard cubic feet per minute (scfm).
- The ERH system will be equipped with a steam condenser unit located on the vacuum side of the blower to cool and capture the air and vapor drawn from the SVE wells. The steam condenser unit will be equipped with a built in vacuum relief valve and a high-level sensor connected to the control panel. The CVOC concentrations in the condensate water will be treated using GAC, and the water (less than 1.8 gallons per minute) will be stored on-site and discharged to the sanitary sewer under a continuous discharge permit.
- A control panel with automatic system shut-off switches and alarms will be installed within the equipment compound. Automatic shut-off will occur in the event of high water in the water knockout tank, a loss of vacuum, motor overload, or a site perimeter security breach.

Details of the equipment configuration are provided in the design drawing in Appendix B.

4.2.1.8 Emission Controls

The recovered vapors and groundwater will be treated using GAC. The treated vapor will be discharged to the atmosphere, and treated groundwater will be discharged to the sanitary sewer. TRS has estimated that 2,000 pounds (lbs) of GAC will be used during operation of the ERH system. Soil vapor will be discharged through a 3-inch diameter stack extending above the SCC Building roof-line.

4.2.1.9 Utilities

TRS will obtain a 1,000-amp, 480-volt service to power the TRS 700-kW power control unit. TRS will hire a local electrician to establish electrical service from the new service to the input disconnects of the 700-kW power control unit (PCU). TRS has estimated that 1,840,000 kWh will be required to achieve cleanup objectives. Buried utilities will be identified within the treatment zone, including depth of the utility and material of construction. Power to the system will be provided through an individual service meter.

4.2.1.10 Permitting

Final determination of permit requirements will be based on consultation with the relevant permit-issuing bodies. Compliance with the following permits may be required for the cleanup action at the Site:

- City of Seattle Wastewater Batch Discharge Permit – A batch discharge permit has been obtained from the City of Seattle for discharge of purge water generated during groundwater sampling. This permit will be modified to accommodate continuous discharge of the additional water generated during operation of the ERH system.
- General Notice of Construction for New Source Review, Air Operating Permit – The Puget Sound Clean Air Agency (PSCAA) may require this permit for operation of the ERH system. If required, a State Environmental Policy Act (SEPA) Checklist would also be completed as a component of the permit application.
- Building Permit – This permit may be required to modify Site facilities and the electrical system to meet the requirements for operation of the ERH system.

4.2.1.11 System Construction

Following approval and receipt of the applicable permits, the system construction will be conducted in accordance with industry standards and the applicable permit requirements. Construction activities associated with the ERH system include: abandonment of existing PVC wells in the treatment area; installation of new monitoring wells in the treatment area; installation of the electrode/vapor recovery wells; installation of the conveyance piping; acquisition of the ERH electrical and mechanical components; completion of the electrical power requirements; and installation of the ERH system components in the equipment enclosure.

4.2.2 System Implementation

4.2.2.1 System Startup

Following the construction of the ERH system, TRS will initiate system startup procedures. System startup will consist of initial testing of the system components; measurement of system air flow; and measurement of CVOC concentrations in system influent and effluent. The system startup procedures will be documented in the EDR.

4.2.2.2 System Operation and Maintenance

Following system start-up, TRS will monitor the system remotely on a daily basis and by local Site visits on a weekly to biweekly basis. As a means of monitoring the ERH process, TRS equipment will be able to provide continuous monitoring of the subsurface temperature. Temperature data will be automatically recorded at least daily from the five TMPs. Additional parameters that will be monitored during the system operation include: voltage, current, and power use; energy input; CVOC concentrations in the vapor influent and effluent; applied vacuum; total vapor recovery system air flow; current to individual electrodes; and general equipment condition. Maintenance and repair of the ERH system equipment will be conducted by TRS on an as-needed basis or in accordance with the manufacturer's maintenance schedules. The system startup procedures will be documented in the EDR.

Once system start-up and testing is complete, power application to the affected area will be continuous except for system adjustments, routine maintenance, and any scheduled soil sampling events. TRS will continue operation until TRS has input the design remediation energy of 1,790,000 kWh.

4.2.2.3 System Shut-down

A decision to terminate active operation of the ERH system will be made when the post-ERH performance sampling indicates that the concentrations of CVOCs at SA-1 are below the applicable MTCA Method A cleanup levels in soil and below the Site-specific Remediation Levels in groundwater. The milestones for system shut-down will be based on performance monitoring activities and will be documented in the EDR and Compliance Monitoring SAP.

4.2.2.4 System Decommissioning

The ERH system components will be decommissioned when the cleanup is complete and will not be removed until post-ERH performance sampling demonstrates no need for further operation.

4.3 ENHANCED IN-SITU ANAEROBIC BIOREMEDIATION

Although volatilization is usually the primary removal mechanism for CVOCs from ERH, a significant fraction of the CVOCs will be degraded in place by biodegradation, hydrolysis, and reductive dehalogenation by zero-valent iron. A discussion of these in-situ mechanisms is provided below:

- **Bioremediation** - Heat accelerates most chemical reactions, both the breakdown of the site contaminants and the breakdown of naturally occurring materials such as soil humus. PCE is the principal COC at SA-1, and PCE is degraded by anaerobic microbes through the pathway:

  $$\text{PCE} \rightarrow \text{TCE} \rightarrow \text{cis 1,2-DCE} \rightarrow \text{VC} \rightarrow \text{ethane}$$

  Thermophilic (heat-loving) bacteria are an important contributor to the first step in the above chain. For this reason, we may see some slight increases in TCE during the remediation; however, the TCE increases would be insignificant in comparison to the PCE decreases. In the months and years after ERH treatment is complete, the heat will slowly spread away from the treatment region into the surrounding soil and increase the rate of bioremediation in these surrounding regions.

- **Hydrolysis** - Hydrolysis is a chemical substitution reaction in which water reacts with organic molecules, replacing chlorine atoms. Oxidizing conditions or available oxygen is not required for hydrolysis. Hydrolysis can be a significant degrader of some CVOCs at room temperature; especially halogenated alkanes. The rate of hydrolysis increases with temperature and clay soil types tend to accelerate hydrolysis. However, hydrolysis will not be a significant mechanism for the destruction of the CVOCs at SA-1.

- **Reductive Dechlorination** - The reductive dehalogenation process that takes place at the electrode backfill is the same as that produced by an iron-filing remediation wall. The zero-valent iron interacts with the CVOC contamination to produce conductive chloride ions and reduce the local resistance. This process begins immediately after installing the electrodes and conductive ions have time to diffuse outward from the electrodes during the interval between electrode installation and start-up. This diffusion occurs in all soil types, regardless of permeability.

If rebound in concentrations of CVOCs in groundwater occurs or if concentrations of CVOCs in groundwater are below the remediation level for ERH but above the applicable cleanup level, commercially available substrates will be added to the subsurface to enhance anaerobic

bioremediation. Enhanced anaerobic bioremediation using electron receptor substrates (e.g., sodium lactate, molasses, HRC™, and EOS) results in reductions in the concentrations of the CVOCs in groundwater by stimulating the existing populations of dehalococcoides. Implementation of this technology is conducted by injecting a solution of water and a substrate compound into groundwater through vertical borings or wells. If additional enhancements are required to achieve the cleanup standards for groundwater, an addendum to this dCAP will be prepared and submitted to Ecology for review.

4.4 COMPLIANCE MONITORING

Protection, performance, and confirmation monitoring will be conducted during the implementation of the cleanup action.

- **Protection Monitoring** - The purpose of protection monitoring is to confirm that human health and the environment are adequately protected during the construction and operation and maintenance period of the cleanup action. Protection monitoring will be conducted by collecting indoor air samples and by using a PID to monitor breathing zone vapors during ERH system construction and operation to ensure protection of workers and other potentially affected parties. Breathing zone air monitoring and field documentation requirements will be detailed in the SA-1 specific HASP that will be included as an appendix to the EDR.
- **Performance Monitoring** - The purpose of performance monitoring is to monitor the progress of the cleanup action and demonstrate that the cleanup action has attained the cleanup standards. The media sampled during performance monitoring will include: indoor and ambient air; groundwater from monitoring wells; and effluent air and condensate water from the vapor recovery (VR) components of the ERH system.
    - **Indoor and Ambient Air** – Air sampling will be conducted before, during and after implementation of ERH. The indoor air samples (two per sampling event) will be collected over an eight-hour period from commercial suites located inside the SCC Building using evacuated 6-liter SUMMA® canisters. One outdoor (ambient background) air sample will be collected concurrent with collection of the indoor air samples. The outdoor sample will also be collected using a 6-liter SUMMA® canister, from a minimum height of two meters above ground surface. An effort will be made to locate the outdoor air sample upwind of the SCC Building. Weather conditions (temperature, wind speed, wind direction, and barometric pressure) as reported at the King County International Airport (KCIA) before, during, and at the conclusion of the sampling event will be recorded. The air samples will be analyzed for the SA-1 COCs. A baseline sampling event will be conducted one month prior to system construction. A second sampling event will be conducted during system construction. A third sampling event will be conducted during the first month of ERH operation. A fourth sampling event will be conducted during the third month of ERH operation. A post-ERH sampling event will be conducted within one month of system shutdown. Additional events will be evaluated on the basis of the sampling event results. Indoor air sampling will be conducted in general conformance with the Pacific Crest's SOP for Indoor Air Sampling and the procedures presented in the Compliance Monitoring SAP.
    - **Groundwater** – Groundwater sampling will be conducted before, during and after implementation of ERH. Groundwater performance monitoring will include the

evaluation of groundwater conditions to assess the rate of attenuation of the groundwater plume, whether due to ERH, enhanced in-situ anaerobic bioremediation, or from natural processes such as biodegradation, dispersion, dilution, sorption, volatilization, or other geochemical reactions (e.g., hydrolysis). The groundwater sampling frequency and locations, procedures for sample collection and handling, analytical testing methods, are presented below.

- Prior to implementing ERH and shortly after the new monitoring wells have been installed, one round of groundwater sampling will occur. The first monitoring round will be considered to be the "pre-ERH concentration".
- Confirmatory groundwater sampling will be scheduled based on energy input, subsurface temperatures, and the concentrations of COCs in recovered soil vapor. Groundwater samples will be collected at approximately 50%, 70%, 90%, and 100% of ERH energy application. Groundwater sampling will be performed on a quarterly basis after shutdown of the ERH system. Groundwater performance monitoring will be conducted until the data indicate that the applicable Site-specific FS CULs for the COCs have been attained at the points of compliance, for two consecutive quarters.
- Groundwater samples will be collected from wells located within the boundaries of SA-1. Sample collection procedures will be documented in the Compliance Monitoring SAP. The groundwater samples will be submitted to an independent laboratory for analysis of the SA-1 COCs by SW-846 Method 8260.

o **Soil** – Initial performance monitoring will be conducted for soil at 70% of ERH energy application. The soil samples will be collected by advancing six soil borings in SA-1 to a depth of between 40 and 100 feet bgs to demonstrate the source area has been mitigated at depth. The performance soil samples will be analyzed for the SA-1 COCs to document the concentrations of CVOCs in the soil. The proposed soil sample locations are illustrated on Figure 10. Additional soil sampling will be conducted at 100% of ERH energy application at those locations where concentrations of SA-1 COCs in soil exceeded their CULs during the first event. Soil field screening techniques, soil sampling frequency and location, procedures for sample collection and handling, analytical testing methods, and QA/QC sampling for soil compliance monitoring will be presented in the Compliance Monitoring SAP.

o **ERH System Effluent (Air and Water)** – Progress sampling of ERH system air and water effluent will be conducted in accordance with the schedules required in the applicable discharge permits.

- **Confirmation Monitoring** - Confirmation monitoring will be conducted to confirm the long term effectiveness of the cleanup action after performance monitoring. Once performance monitoring results demonstrate that the concentration of CVOCs in performance samples are below the applicable Site-specific FS CULs for two consecutive sampling events, confirmation monitoring will begin. Four consecutive quarters of confirmation groundwater monitoring will then be conducted at the Site to confirm that concentrations of CVOCs in groundwater remain below the FS CULs. The groundwater sampling locations, procedures for sample collection and handling, and analytical testing methods for

groundwater confirmation monitoring are identical to those presented above for groundwater performance monitoring.

The implementation procedures for protection, performance, and confirmation monitoring will be presented in detail in the Compliance Monitoring SAP.

4.5 WASTE MANAGEMENT

Based on the historic operations on the Site and data collected during previous investigations (Pacific Crest 2014), the only hazardous waste anticipated to be present in investigation derived waste is waste code F002, spent halogenated solvents, primarily PCE. Management of investigation derived waste (IDW) materials generated by the remedial action or as a result of surface or subsurface investigative activities, installation of ERH system components, or other project activities is addressed in this section. Generated wastes will include:

- Waste soil, cement, and associated debris generated during the ERH system installation. All waste soil and debris generated by activities described herein will be temporarily stored on the Site in Department of Transportation (DOT)-approved containers or in roll-off bins. All waste characterization activities will be performed in accordance with the Dangerous Waste Regulations as stipulated in WAC 173-303.
- Wastewater generated by decontamination of equipment during the cleanup action or generated by monitoring well purging activities. Groundwater, decontamination fluids, and soil cuttings generated during sampling activities will be placed into DOT-approved containers and transported off-site for disposal in accordance with the applicable regulatory requirements.
- Used personal protective equipment (PPE) and disposable equipment will be double bagged and placed in a municipal refuse dumpster. Those wastes are not considered hazardous and may be sent to a municipal landfill. Any PPE and disposable equipment that is to be disposed of which can still be reused will be rendered inoperable before disposal in a refuse dumpster.
- Condensate water generated during operation of the ERH system.

4.6 DOCUMENTATION REQUIREMENTS

Documentation of the cleanup action will meet MTCA requirements. Upon client review and approval, all applicable and relevant documentation generated for the cleanup action will be submitted to Ecology. Document copies will be retained in Pacific Crest files for a minimum of three years after completion of the project.

4.6.1 Data Management

An established document control system will be implemented during the cleanup action, which includes the following, as appropriate: field documentation which includes well purging and sampling documentation; chain-of-custody documentation; waste inventory documentation; and waste management labels. Disposal manifests and/or bills-of-lading for the wastes generated at and disposed from the Site will also be maintained and submitted with the project documentation.

4.6.2 Public Notice

The cleanup action at SA-1 will be conducted after adequate public notice has been provided, as presented under MTCA 173-340-545. Public notice will include providing the following entities with notice of startup of the cleanup action at the Site a minimum of 15 days prior to implementation:

- Ecology
- Local jurisdictional health department (King County Department of Health); and
- The City of Seattle.

The written notification will include a statement describing the releases being remedied; the cleanup actions expected to be conducted; and the schedule for the cleanup action.

4.6.3 Health and Safety

A HASP is required for all cleanup actions (WAC 173-340-810 and WAC 296-62). The HASP must comply with the requirements of the Occupational Safety and Health Act of 1970 and the Washington Industrial Safety and Health Act (RCW 49.17). A copy of the HASP will be included as an appendix to the EDR.

4.6.4 Progress Reports

4.6.4.1 ERH Operation and Maintenance Reports

During ERH operation, TRS will provide weekly updates to Penthouse Drapery via electronic letter reports. These reports will describe the general operation of the ERH system, work performed during the previous week, and any anticipated upcoming work. The reports will also contain data on the subsurface temperature profile, power applied by the entire remediation system, and energy input to the subsurface.

4.6.4.2 Annual Progress Reports

Annual progress reports will be prepared following the annual groundwater monitoring events. The progress reports will document the cleanup action progress; groundwater conditions; and attenuation of PCE and other HVOC breakdown product concentrations at the Site. At a minimum, the annual progress report will include:

- A Site background;
- Geologic and hydrologic description of the Site;
- A narrative of the field activities;
- The performance groundwater monitoring results; and
- A discussion including deviations from the dCAP and recommendations for future work at the Site.

4.6.4.3 Closure Report

Once concentrations of CVOCs are demonstrated to be below the Site-specific FS CULs in soil and groundwater at the Site, and following four quarters of confirmation groundwater monitoring

demonstrating that contamination is below applicable cleanup levels, a closure report will be prepared documenting the cleanup action. At a minimum this report will include:

- A Site background;
- Geologic and hydrologic description of the Site;
- A narrative of the field activities describing the monitoring procedures;
- All compliance monitoring results; and
- A discussion including deviations from the dCAP.

A Property or Site-Specific NFA determination will be requested from Ecology upon completion of cleanup activities at the Site.

5.0 REFERENCES

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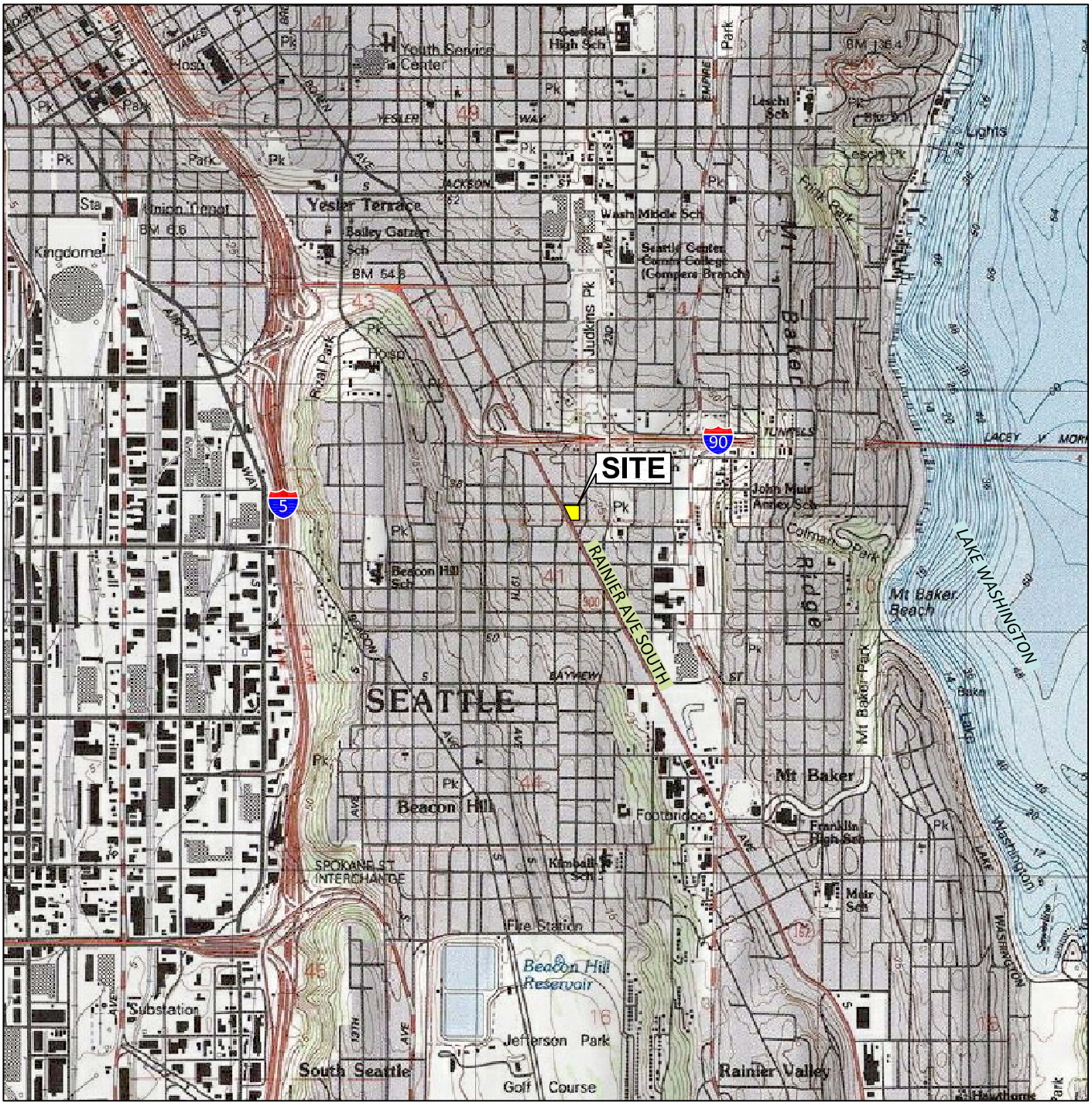
FIGURES

DRAFT FOR ECOLOGY REVIEW
CLEANUP ACTION PLAN – SITE AREA 1

FORMER PENTHOUSE DRAPERY AND BELSHAW SITE
1752 RAINIER AVENUE SOUTH
SEATTLE, WASHINGTON

PACIFIC CREST PN: 105-003



Source: TOPO! 2007

N

0 2000

Approximate Scale in Feet

PACIFIC CREST ENVIRONMENTAL
WWW.PCENV.COM 425-888-4990

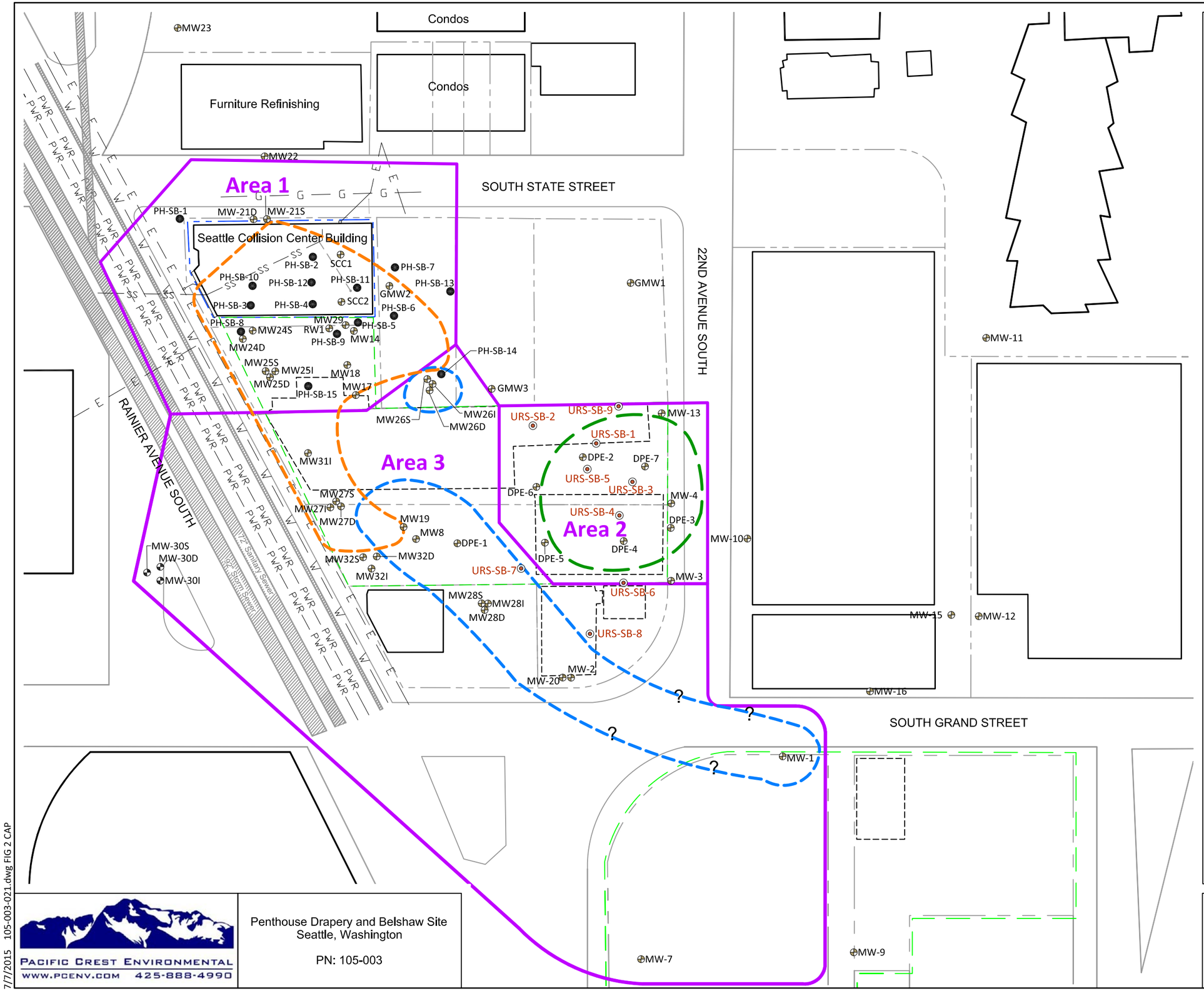
Penthouse Drapery and Belshaw Site
Seattle, Washington

PN: 105-003

Figure 1

Site Location Map

7/7/2015 105-003-012.dwg FIG 1



PACIFIC CREST ENVIRONMENTAL
www.pcenv.com 425-888-4990

Penthouse Drapery and Belshaw Site
Seattle, Washington

PN: 105-003

Figure 2

Site Area Plan

7/7/2015 105-003-021.dwg FIG 2 CAP

SOUTH STATE STREET

RAINIER AVENUE SOUTH

Seattle Collision Center Building

PH-SB-1
MW-21D
MW-21S
PH-SB-2
SCC1
PH-SB-7
PH-SB-10
PH-SB-12
PH-SB-11
GMW2
PH-SB-13
PH-SB-3
PH-SB-4
SCC2
PH-SB-6
MW29
PH-SB-5
PH-SB-8
MW24S
RW1
MW14
PH-SB-9
MW24D
MW25S
MW25I
MW18
PH-SB-14
MW25D
MW26S
MW26I
PH-SB-15
MW17
MW26D

Legend

- Existing Monitoring Well
- Soil Boring
- PCE & related CVOCs
- Site Area 1 Boundary
- Belshaw Property
- Penthouse/SCC Property
- Parcel Boundary
- Building
- Former Building Area
- PCE Tetrachloroethene
- CVOCs Chlorinated Volatile Organic Compounds
- Sanitary Sewer
- Power
- Water
- Gas
- Overhead Bus Power Line
- Abandoned Gas
- Abandoned Drain Line

N

0 20

Approximate Scale in Feet

105-003-036.dwg FIG 3 CAP 7/7/2015

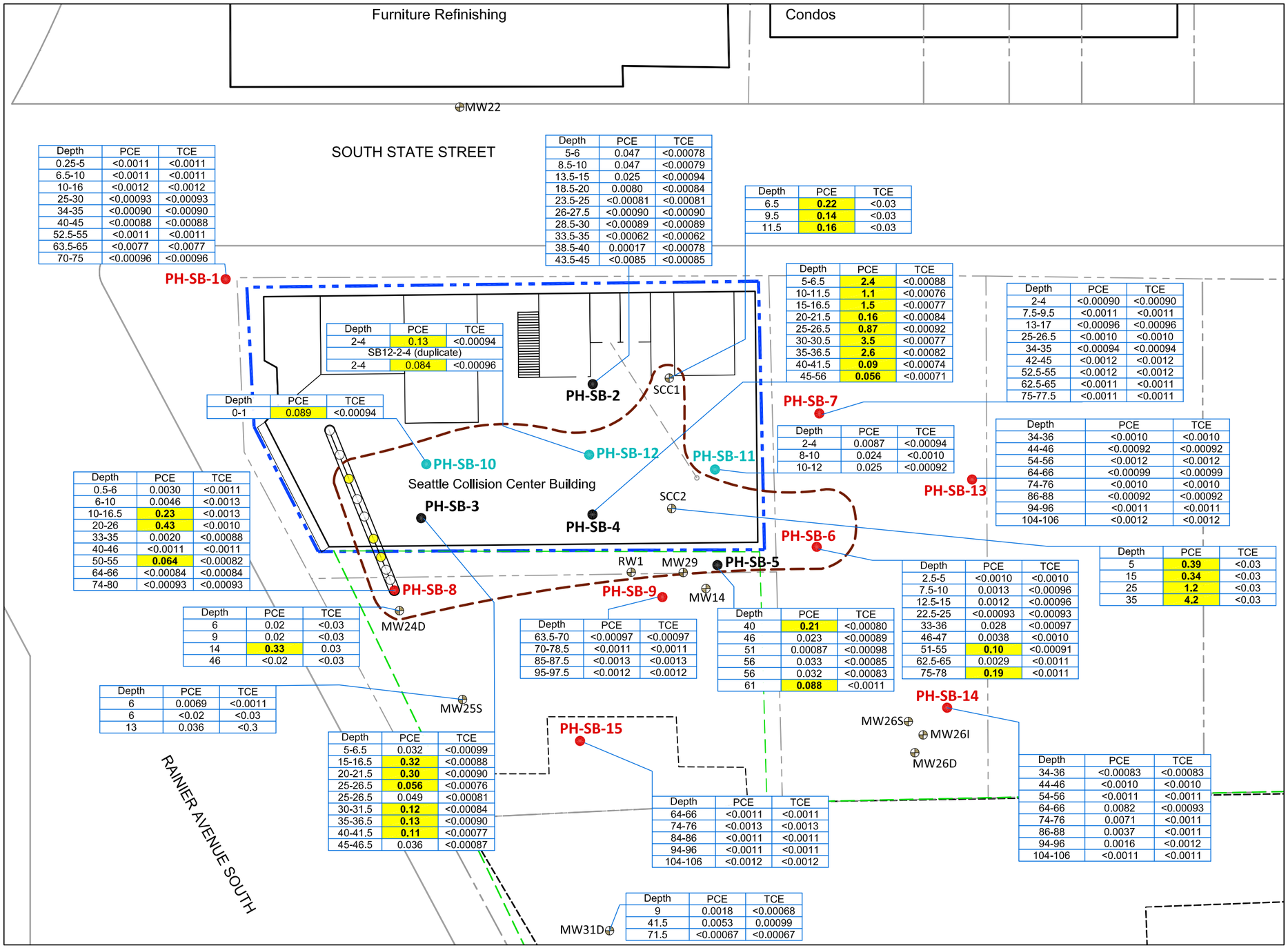
PACIFIC CREST ENVIRONMENTAL
WWW.PCENV.COM 425-888-4990

Penthouse Drapery and Belshaw Site
Seattle, Washington

PN: 105-003

Figure 3

Site Area 1 Plan



Depth	PCE	TCE
0.25-5	<0.0011	<0.0011
6.5-10	<0.0011	<0.0011
10-16	<0.0012	<0.0012
25-30	<0.00093	<0.00093
34-35	<0.00090	<0.00090
40-45	<0.00088	<0.00088
52.5-55	<0.0011	<0.0011
63.5-65	<0.0077	<0.0077
70-75	<0.00096	<0.00096

Depth	PCE	TCE
5-6	0.047	<0.00078
8.5-10	0.047	<0.00079
13.5-15	0.025	<0.00094
18.5-20	0.0080	<0.00084
23.5-25	<0.00081	<0.00081
26-27.5	<0.00090	<0.00090
28.5-30	<0.00089	<0.00089
33.5-35	<0.00062	<0.00062
38.5-40	0.00017	<0.00078
43.5-45	<0.0085	<0.00085

Depth	PCE	TCE
6.5	**0.22**	<0.03
9.5	**0.14**	<0.03
11.5	**0.16**	<0.03

Depth	PCE	TCE
2-4	0.13	<0.00094
SB12-2-4 (duplicate)		
2-4	0.084	<0.00096

Depth	PCE	TCE
0-1	0.089	<0.00094

Depth	PCE	TCE
5-6.5	**2.4**	<0.00088
10-11.5	**1.1**	<0.00076
15-16.5	**1.5**	<0.00077
20-21.5	**0.16**	<0.00084
25-26.5	**0.87**	<0.00092
30-30.5	**3.5**	<0.00077
35-36.5	**2.6**	<0.00082
40-41.5	**0.09**	<0.00074
45-56	**0.056**	<0.00071

Depth	PCE	TCE
2-4	<0.00090	<0.00090
7.5-9.5	<0.0011	<0.0011
13-17	<0.00096	<0.00096
25-26.5	<0.0010	<0.0010
34-35	<0.00094	<0.00094
42-45	<0.0012	<0.0012
52.5-55	<0.0012	<0.0012
62.5-65	<0.0011	<0.0011
75-77.5	<0.0011	<0.0011

Depth	PCE	TCE
2-4	0.0087	<0.00094
8-10	0.024	<0.0010
10-12	0.025	<0.00092

Depth	PCE	TCE
34-36	<0.0010	<0.0010
44-46	<0.00092	<0.00092
54-56	<0.0012	<0.0012
64-66	<0.00099	<0.00099
74-76	<0.0010	<0.0010
86-88	<0.00092	<0.00092
94-96	<0.0011	<0.0011
104-106	<0.0012	<0.0012

Depth	PCE	TCE
0.5-6	0.0030	<0.0011
6-10	0.0046	<0.0013
10-16.5	**0.23**	<0.0013
20-26	**0.43**	<0.0010
33-35	0.0020	<0.00088
40-46	<0.0011	<0.0011
50-55	**0.064**	<0.00082
64-66	<0.00084	<0.00084
74-80	<0.00093	<0.00093

Depth	PCE	TCE
6	0.02	<0.03
9	0.02	<0.03
14	**0.33**	0.03
46	<0.02	<0.03

Depth	PCE	TCE
63.5-70	<0.00097	<0.00097
70-78.5	<0.0011	<0.0011
85-87.5	<0.0013	<0.0013
95-97.5	<0.0012	<0.0012

Depth	PCE	TCE
40	**0.21**	<0.00080
46	0.023	<0.00089
51	0.00087	<0.00098
56	0.033	<0.00085
56	0.032	<0.00083
61	**0.088**	<0.0011

Depth	PCE	TCE
2.5-5	<0.0010	<0.0010
7.5-10	0.0013	<0.00096
12.5-15	0.0012	<0.00096
22.5-25	<0.00093	<0.00093
33-36	0.028	<0.00097
46-47	0.0038	<0.0010
51-55	**0.10**	<0.00091
62.5-65	0.0029	<0.0011
75-78	**0.19**	<0.0011

Depth	PCE	TCE
5	**0.39**	<0.03
15	**0.34**	<0.03
25	**1.2**	<0.03
35	**4.2**	<0.03

Depth	PCE	TCE
6	0.0069	<0.0011
6	<0.02	<0.03
13	0.036	<0.3

Depth	PCE	TCE
5-6.5	0.032	<0.00099
15-16.5	**0.32**	<0.00088
20-21.5	**0.30**	<0.00090
25-26.5	**0.056**	<0.00076
25-26.5	0.049	<0.00081
30-31.5	**0.12**	<0.00084
35-36.5	**0.13**	<0.00090
40-41.5	**0.11**	<0.00077
45-46.5	0.036	<0.00087

Depth	PCE	TCE
64-66	<0.0011	<0.0011
74-76	<0.0013	<0.0013
84-86	<0.0011	<0.0011
94-96	<0.0011	<0.0011
104-106	<0.0012	<0.0012

Depth	PCE	TCE
34-36	<0.00083	<0.00083
44-46	<0.0010	<0.0010
54-56	<0.0011	<0.0011
64-66	0.0082	<0.00093
74-76	0.0071	<0.0011
86-88	0.0037	<0.0011
94-96	0.0016	<0.0012
104-106	<0.0011	<0.0011

Depth	PCE	TCE
9	0.0018	<0.00068
41.5	0.0053	0.00099
71.5	<0.00067	<0.00067

Legend

- PH-SB-10 — Soil Boring (Shallow)
- PH-SB-6 — Soil Boring (Deep)
- Sample Location
- PH-SB-2 — Existing Soil Boring
- MW14 — Existing Monitoring Well
- Extent of PCE in Soil exceeding applicable proposed FS Cleanup Level
- PCE — Tetrachloroethene
- TCE — Trichloroethene
- mg/kg — milligrams per kilogram
- **Bold** — Concentration exceeding applicable proposed FS Cleanup Level
- FS — Feasibility Study
- < — Concentration below the laboratory practical quantitation limit
- bgs — below ground surface

Depth in Feet bgs | Results in mg/kg

	PCE	TCE
MTCA Method A Cleanup Level	**0.05**	**0.03**

- Belshaw Property
- Penthouse/SCC Property
- Parcel Boundary
- Building
- Former Building Area

N

0 20

Approximate Scale in Feet

7/7/2015 105-003-017.dwg FIG 4 cap

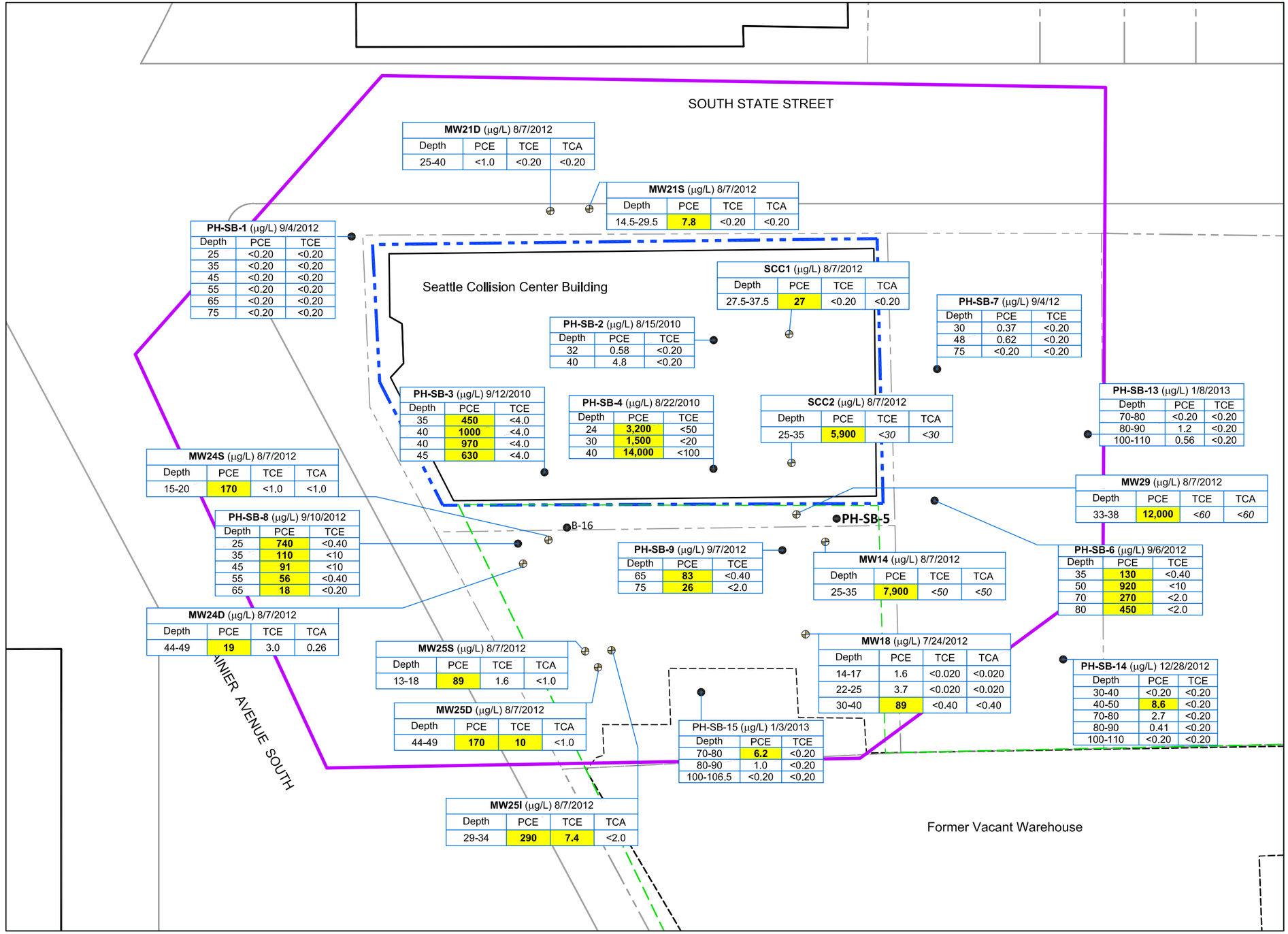
PACIFIC CREST ENVIRONMENTAL
WWW.PCENV.COM 425-888-4990

Penthouse Drapery and Belshaw Site
Seattle, Washington

PN: 105-003

Figure 4

Site Area 1 Plan with Analytical Results - PCE and TCE in Soil



7/7/2015 105-003-037.dwg FIG 5 CAP

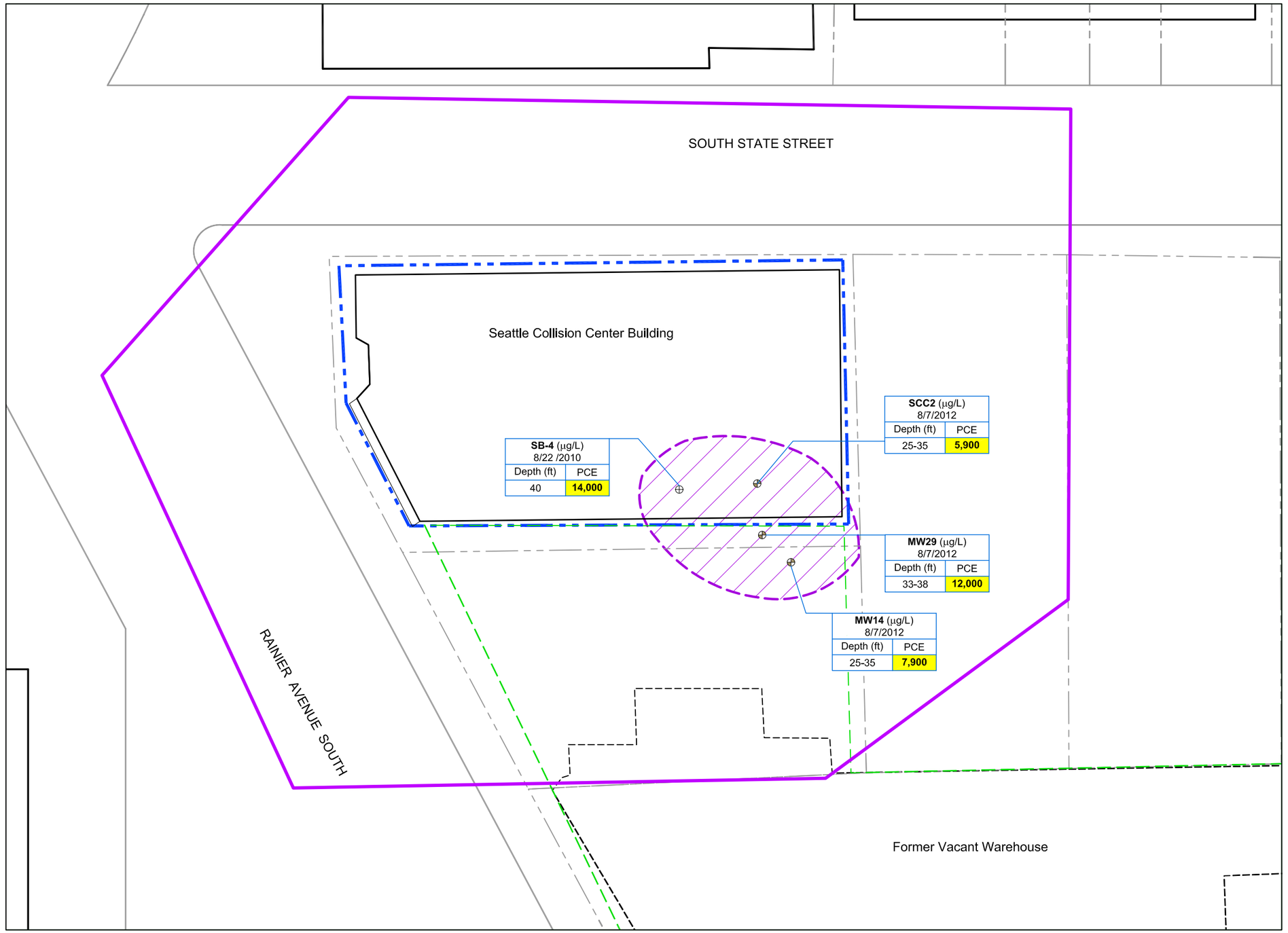
PACIFIC CREST ENVIRONMENTAL
WWW.PCENV.COM 425-888-4990

Penthouse Drapery and Belshaw Site
Seattle, Washington

PN: 105-003

Figure 5

Site Area 1 Plan with Analytical Results for Shallow Groundwater



Legend

- Approximate extent of DNAPL in groundwater
- MW29⊕ Existing Monitoring Well
- SB-4⊕ Soil Boring Advanced 2010
- PCE Tetrachloroethene
- Concentration exceeding applicable proposed FS Cleanup Level
- FS Feasibility Study
- DNAPL Dense non-aqueous phase liquid
- µg/L micrograms per liter
- Proposed FS Cleanup Level
  - PCE = 5 µg/L
- Well ID (µg/L) / Date / Depth | PCE
- Site Area 1 Boundary
- Belshaw Property
- Former Penthouse Drapery Property
- Parcel Boundary
- Building Area
- Former Building

N

0 20

Approximate Scale in Feet

7/7/2015 105-003-032.dwg FIG 6 CAP

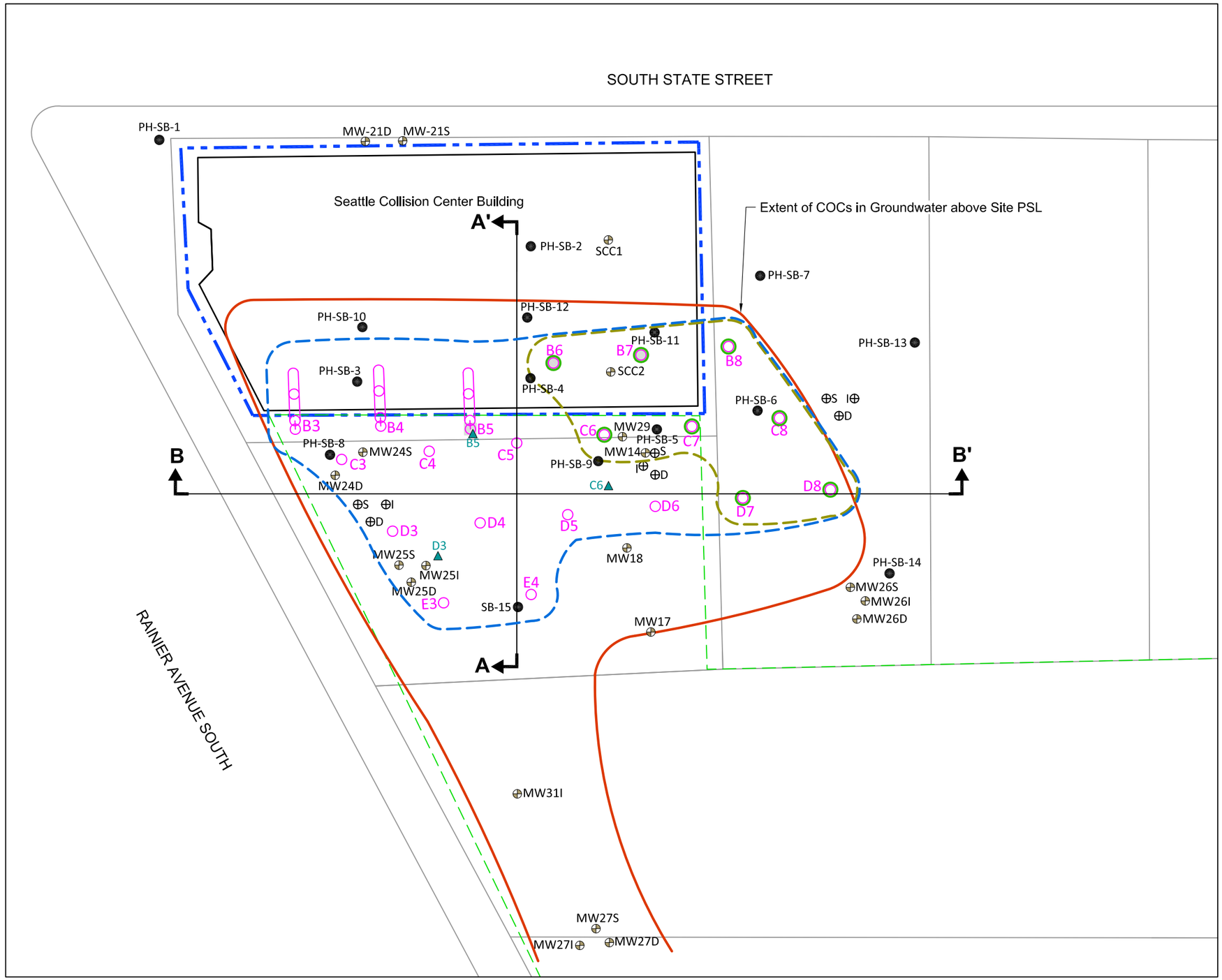
PACIFIC CREST ENVIRONMENTAL
WWW.PCENV.COM 425-888-4990

Penthouse Drapery and Belshaw Site
Seattle, Washington

PN: 105-003

Figure 6

Site Area 1 Plan with Extent of DNAPL



Legend

- C3 — ERH Electrode (shallow & deep) (total 20)
- Deep Electrode (85 feet bgs) (8)
- B4 — Angled Electrode (3)
- B5 — Below Grade Electrode (3)
- B5 — Temperature Monitoring Point (3)
- Proposed Confirmation Monitoring Well
- Existing Monitoring Well
- Soil Boring
- Extent of COCs in Groundwater above Proposed FS Cleanup Level
- Area of Heating Influence
- Area of Deep Heating Influence
- Belshaw Property
- Penthouse/SCC Property
- Building
- bgs — below ground surface
- FS — Feasibility Study
- COCs — Contaminants of Concern
- AA' — Cross-Section Location

N

0 20

Approximate Scale in Feet

PACIFIC CREST ENVIRONMENTAL
WWW.PCENV.COM 425-888-4990

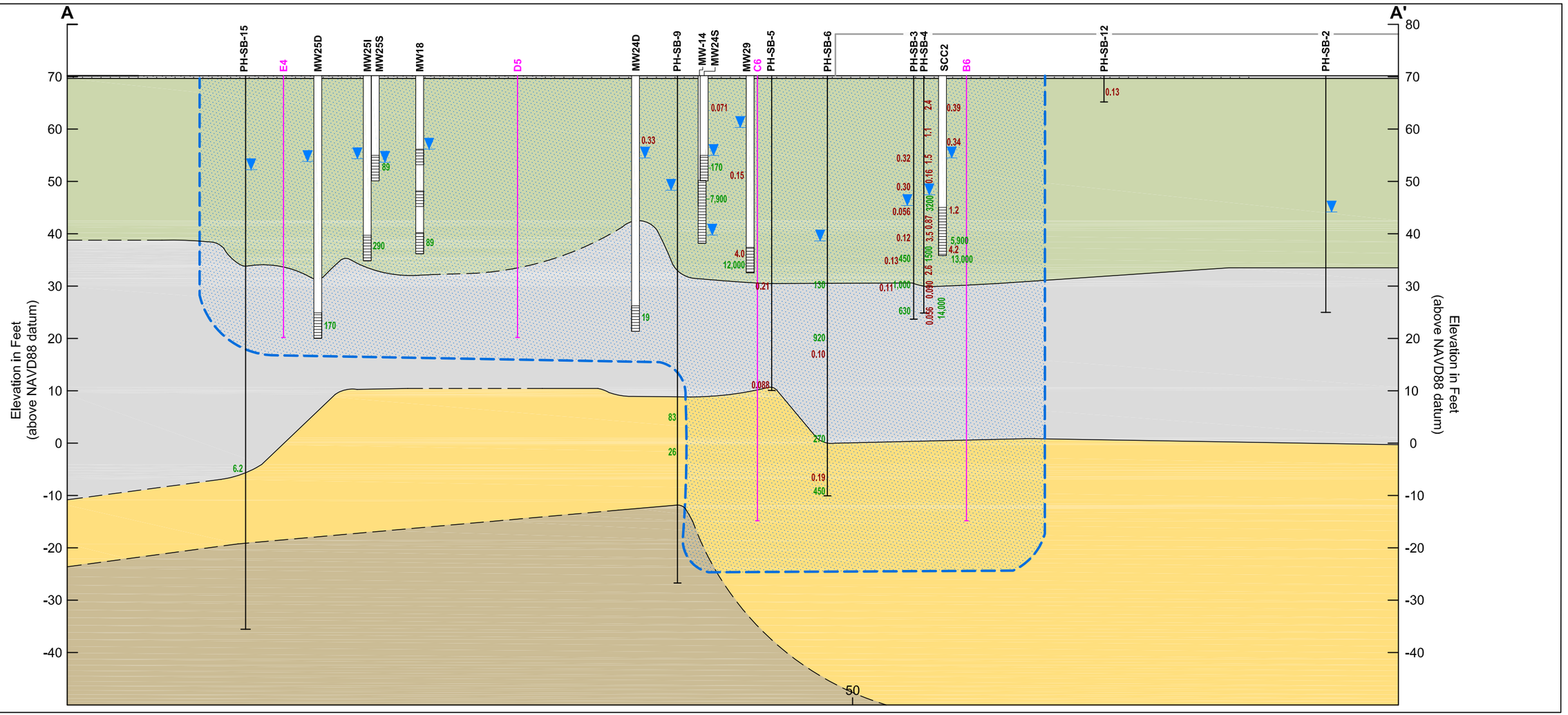
Penthouse Drapery and Belshaw Site
Seattle, Washington

PN: 105-003

Figure 7

Site Plan with Electrode Locations

7/7/2015 105-003-018.dwg FIG 7 CAP



Legend

- Asphalt / Fill
- Interbedded Silt/Sand
- Silt (ML)
- Sand or Sand and Gravel containing Silt (SM, SM-GM)
- Sandy Silt
- Contact between Sediment Types (dashed where inferred)
- Building

- 45 Concentration of PCE in Groundwater in µg/L that Exceeds Proposed FS Cleanup Level of 5 µg/L
- 1.5 Concentration of PCE in Soil in mg/kg that Exceeds Proposed FS Cleanup Level of 0.05 mg/kg
- Estimated Area of Heating Influence

MW-13 Boring ID

Boring

Electrode

- Well Location
- Screened Interval
- Potentiometric Elevation in Well/Boring
- Bottom of Boring

Notes:

Concentrations of PCE are displayed if they exceed the Proposed FS Cleanup Level.

PCE = tetrachloroethene
µg/L = micrograms per liter
mg/kg = miligrams per kilogram
FS = Feasibility Study

Approximate Horizontal Scale in Feet
Horizontal Exaggeration x 3
0 6.6
0 20
Approximate Vertical Scale in Feet

7/7/2015 105-003-038.dwg FIG 8 CAP

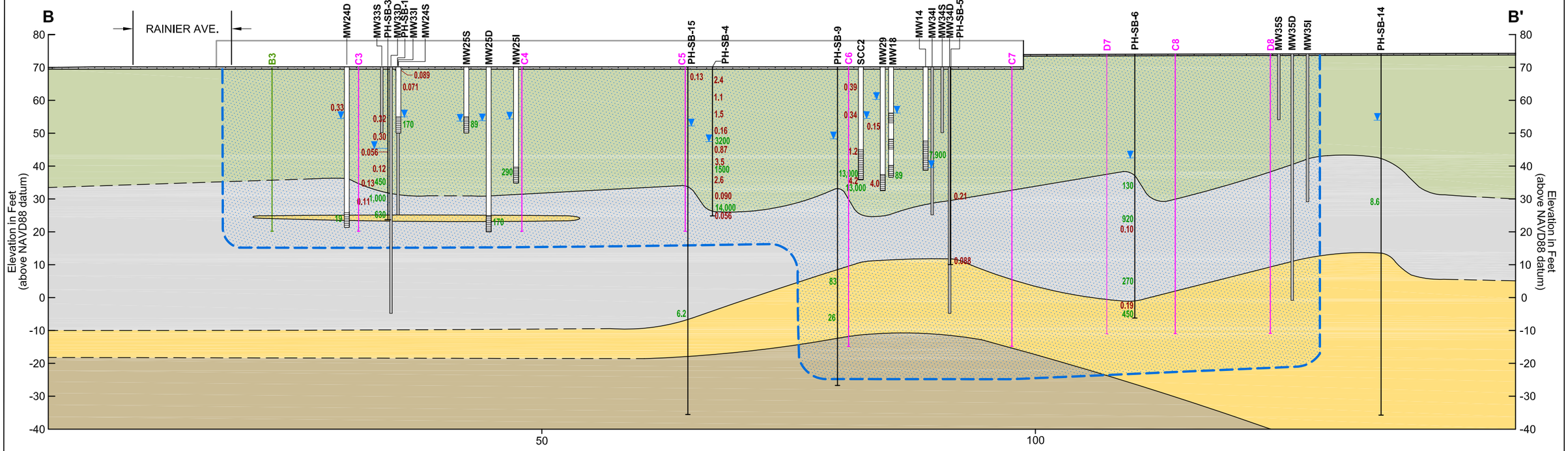
PACIFIC CREST ENVIRONMENTAL
WWW.PCENV.COM 425-888-4990

Penthouse Drapery and Belshaw Site
Seattle, Washington

PN: 105-003

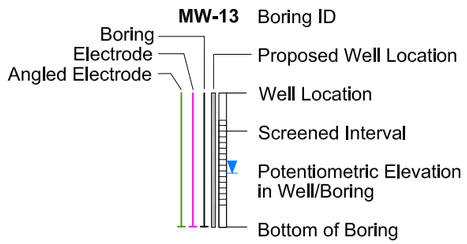
Figure 8

Cross Section A-A' with Electrodes



Legend

- Asphalt / Fill
- Interbedded Silt/Sand
- Silt (ML)
- Sand or Sand and Gravel containing Silt (SM, SM-GM)
- Sandy Silt
- Contact between Sediment Types (dashed where inferred)
- Building
- 45 Concentration of PCE in Groundwater in µg/L that Exceeds Proposed FS Cleanup Level of 5 µg/L
- 1.5 Concentration of PCE in Soil in mg/kg that Exceeds Proposed FS Cleanup Level of 0.05 mg/kg
- Estimated Area of Heating Influence



Notes:

Concentrations of PCE are displayed if they exceed the Proposed FS Cleanup Level.

PCE = tetrachloroethene
µg/L = micrograms per liter
mg/kg = miligrams per kilogram
FS = Feasibility Study

Approximate Horizontal Scale in Feet
Horizontal Exaggeration x 3
0 10
0 30
Approximate Vertical Scale in Feet

PACIFIC CREST ENVIRONMENTAL
WWW.PCENV.COM 425-888-4990

Penthouse Drapery and Belshaw Site
Seattle, Washington

PN: 105-003

Figure 9

Cross Section B-B' with Electrodes

7/7/2015 105-003-038.dwg FIG 9 CAP

SOUTH STATE STREET

RAINIER AVENUE SOUTH

Seattle Collision Center Building

PH-SB-1
MW-21D
MW-21S
CSB-6
SCC1
PH-SB-2
PH-SB-7
PH-SB-10
PH-SB-12
PH-SB-11
CSB-1
CSB-5
GMW2
PH-SB-13
PH-SB-3
PH-SB-4
SCC2
MW35S
MW35I
MW35D
PH-SB-6
MW29
PH-SB-5
RW1
MW14
MW34S
PH-SB-8
MW24S
PH-SB-9
MW34D
MW24D
CSB-2
CSB-4
MW34I
MW33S
MW33I
MW33D
MW25S
MW25I
CSB-3
MW18
PH-SB-14
MW25D
MW26S
MW26I
PH-SB-15
MW26D
MW17

Legend

- Existing Monitoring Well
- Soil Boring
- Proposed Confirmation Soil Boring
- Proposed Confirmation Monitoring Well
- PCE & related CVOCs
- Site Area 1 Boundary
- Belshaw Property
- Penthouse/SCC Property
- Parcel Boundary
- Building
- Former Building Area

PCE Tetrachloroethene

CVOCs Chlorinated Volatile Organic Compounds

- Sanitary Sewer
- Power
- Water
- Gas
- Overhead Bus Power Line
- Abandoned Gas
- Abandoned Drain Line

N

0 20

Approximate Scale in Feet

7/7/2015 105-003-039.dwg FIG 10 CAP

PACIFIC CREST ENVIRONMENTAL
WWW.PCENV.COM 425-888-4990

Penthouse Drapery and Belshaw Site
Seattle, Washington

PN: 105-003

Figure 10

Site Area 1 Plan with Proposed Borings and Wells Locations

TABLES

DRAFT FOR ECOLOGY REVIEW
CLEANUP ACTION PLAN – SITE AREA 1

FORMER PENTHOUSE DRAPERY AND BELSHAW SITE
1752 RAINIER AVENUE SOUTH
SEATTLE, WASHINGTON

PACIFIC CREST PN: 105-003

Table 1
Preliminary Screening Levels and Cleanup Levels - Soil
Penthouse Drapery and Belshaw Site
Seattle, Washington
Pacific Crest No: 105-003

	COPCs													
Screening Level Description	**Tetrachloroethene**	**Trichloroethene**	**cis-1,2-Dichloroethene**	**trans-1,2-Dichloroethene**	**Vinyl Chloride**	**1,1,1-Trichloroethane**	**1,4-Dioxane**	**Benzene**	**Toluene**	**Ethylbenzene**	**Total Xylenes**	**1,3,5-Trimethylbenzene**	**Lead**	**Gasoline Range Organics (GRO)**
MTCA Method A Cleanup Level	**0.05**	**0.03**	**--**	**--**	**--**	**2**	******	**0.03**	**7**	**6**	**9**	******	**250**	**30**
MTCA Method B, Carcinogen, Direct Contact (ingestion only) unrestricted	**480**	**11**	**--**	**--**	**1**	******	******	******	******	******	******	**800**	******	******
MTCA Method B, Non-Carcinogen, Direct Contact (ingestion only) unrestricted	**--**	**--**	**160**	**1,600**	**--**	******	******	******	******	******	******	******	******	******
MTCA Method B, Three-Phase Model, Soil Leaching to Groundwater	**--**	**0.03**	**0.4**	**1**	**0.00126**	******	******	******	******	******	******	******	******	******
Cleanup Level for COCs only	**0.05**	**0.03**	**0.4**	**--**	**--**	******	******	**0.03**	******	******	******	******	******	**30**

NOTE:
COPCs=Contaminants of Potential Concern
"--" = Not applicable or not calculated by Pacific Crest
"**" = Not applicable or not calculated by URS
COCs = Contaminants of concern
Screening Levels in milligrams per kilogram (mg/kg)

Table 2
Preliminary Screening Levels and Cleanup Levels - Groundwater
Penthouse Drapery and Belshaw Site
Seattle, Washington
Pacific Crest No: 105-003

Screening Level Description	COPCs																		
	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl Chloride	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethane	1,4-Dioxane	Benzene	Toluene	Ethylbenzene	Total Xylenes	Lead	Naphthalene	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene	Gasoline Range Organics[1]
MTCA Method A Cleanup Levels for Groundwater - Ingestion	5	5	--	--	0.2	200	**	**	5	**	5	1,000	700	1,000	15	160	**	**	800/1,000
MTCA Method B Cleanup Levels for Groundwater - Ingestion	21	4	16	160	--	**	**	**	**	0.438	**	**	**	**	**	**	80	**	**
MTCA Method B Screening Levels for Groundwater - Vapor Intrusion - Residential	24.5	1.5	160	130	0.35	**	**	**	**	**	**	**	**	**	**	**	**	**	**
MTCA Method B Screening Levels for Groundwater - Vapor Intrusion - Commercial	128.6	13.8	1,538	--	3.7	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Cleanup Level for COCs only	5	4	16	--	--	200	**	**	**	0.438	5	1,000	700	1,000	15	160	80	**	800/1,000

NOTE:
COCs=Contaminants of Concern
BOLD = Site-specific FS Remediation Level
"--" = Not applicable or not calculated by Pacific Crest
"**" = Not applicable or not calculated by URS
COCs = Contaminants of concern
Screening Levels in micrograms per liter (ug/L)
1. MTCA Method A 800 ug/l if benzene present. If benzene is not detected, groundwater cleanup level is 1,000 ug/l

Table 3
Preliminary Screening Levels and Cleanup Levels - Air and Soil Vapor
Penthouse Drapery and Belshaw Site
Seattle, Washington
Pacific Crest No: 105-003

	COPCs				
Screening Level Description	**Tetrachloroethene**	**Trichloroethene**	**cis-1,2-Dichloroethene**	**trans-1,2-Dichloroethene**	**Vinyl Chloride**
MTCA Method B Cleanup Level - Indoor Air - Residential	**9.6**	**0.37**	**16**	**27**	**0.28**
MTCA Method B Screening Level - Indoor Air - Commercial	**50.5**	**3.3**	**--**	**--**	**3.0**
MTCA Method B Screening Level - Shallow Soil Gas (vapor attenuation 0.1)	**96**	**3.7**	**160**	**270**	**2.8**
MTCA Method B Screening Level - Shallow Soil Gas (vapor attenuation 0.01)	**960**	**37**	**1600**	**2700**	**28**
Cleanup Levels for COCs only	**9.6**	**0.37**	**16**	**--**	**--**

NOTE:
COPCs=Contaminants of Potential Concern
"--" = Not applicable or not calculated
COCs = Contaminants of concern
Screening Levels in micrograms per cubic meter (ug/m^3)

APPENDIX A
TERRESTRIAL ECOLOGICAL EVALUATION EXCLUSION FORM

DRAFT FOR ECOLOGY REVIEW
CLEANUP ACTION PLAN – SITE AREA 1

FORMER PENTHOUSE DRAPERY AND BELSHAW SITE
1752 RAINIER AVENUE SOUTH
SEATTLE, WASHINGTON

PACIFIC CREST PN: 105-003

Voluntary Cleanup Program

Washington State Department of Ecology
Toxics Cleanup Program

TERRESTRIAL ECOLOGICAL EVALUATION FORM

Under the Model Toxics Control Act (MTCA), a terrestrial ecological evaluation is necessary if hazardous substances are released into the soils at a Site. In the event of such a release, you must take one of the following three actions as part of your investigation and cleanup of the Site:

1. Document an exclusion from further evaluation using the criteria in WAC 173-340-7491.
2. Conduct a simplified evaluation as set forth in WAC 173-340-7492.
3. Conduct a site-specific evaluation as set forth in WAC 173-340-7493.

When requesting a written opinion under the Voluntary Cleanup Program (VCP), you must complete this form and submit it to the Department of Ecology (Ecology). The form documents the type and results of your evaluation.

Completion of this form is not sufficient to document your evaluation. You still need to document your analysis and the basis for your conclusion in your cleanup plan or report.

If you have questions about how to conduct a terrestrial ecological evaluation, please contact the Ecology site manager assigned to your Site. For additional guidance, please refer to www.ecy.wa.gov/programs/tcp/policies/terrestrial/TEEHome.htm.

Step 1: IDENTIFY HAZARDOUS WASTE SITE	
Please identify below the hazardous waste site for which you are documenting an evaluation.	
Facility/Site Name: Former Penthouse Drapery and Belshaw Site	
Facility/Site Address: 1752 Rainier Avenue South	
Facility/Site No: 23408	VCP Project No.: NW2278

Step 2: IDENTIFY EVALUATOR			
Please identify below the person who conducted the evaluation and their contact information.			
Name: Mr. William Carroll, L.G., L.H.G.		Title: Principal Hydrogeologist	
Organization: Pacific Crest Environmental, LLC			
Mailing address: 1531 Bendigo Boulevard North			
City: North Bend		State: WA	Zip code: 98045
Phone: 425-888-4990	Fax: 425-888-4994	E-mail: wcarroll@arrowenv.com	

Step 3: DOCUMENT EVALUATION TYPE AND RESULTS

A. Exclusion from further evaluation.

1. Does the Site qualify for an exclusion from further evaluation?

☒ Yes *If you answered **"YES,"** then answer **Question 2**.*

☐ No or Unknown *If you answered **"NO" or "UKNOWN,"** then skip to **Step 3B** of this form.*

2. What is the basis for the exclusion? *Check all that apply. Then skip to **Step 4** of this form.*

Point of Compliance: WAC 173-340-7491(1)(a)

☐ All soil contamination is, or will be,* at least 15 feet below the surface.

☐ All soil contamination is, or will be,* at least 6 feet below the surface (or alternative depth if approved by Ecology), and institutional controls are used to manage remaining contamination.

Barriers to Exposure: WAC 173-340-7491(1)(b)

☐ All contaminated soil, is or will be,* covered by physical barriers (such as buildings or paved roads) that prevent exposure to plants and wildlife, and institutional controls are used to manage remaining contamination.

Undeveloped Land: WAC 173-340-7491(1)(c)

☐ There is less than 0.25 acres of contiguous[#] undeveloped[±] land on or within 500 feet of any area of the Site and any of the following chemicals is present: chlorinated dioxins or furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, heptachlor epoxide, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, or pentachlorobenzene.

☒ For sites not containing any of the chemicals mentioned above, there is less than 1.5 acres of contiguous[#] undeveloped[±] land on or within 500 feet of any area of the Site.

Background Concentrations: WAC 173-340-7491(1)(d)

☐ Concentrations of hazardous substances in soil do not exceed natural background levels as described in WAC 173-340-200 and 173-340-709.

* An exclusion based on future land use must have a completion date for future development that is acceptable to Ecology.

[±] "Undeveloped land" is land that is not covered by building, roads, paved areas, or other barriers that would prevent wildlife from feeding on plants, earthworms, insects, or other food in or on the soil.

[#] "Contiguous" undeveloped land is an area of undeveloped land that is not divided into smaller areas of highways, extensive paving, or similar structures that are likely to reduce the potential use of the overall area by wildlife.

B. Simplified evaluation.

1. Does the Site qualify for a simplified evaluation?

☐ Yes *If you answered **"YES,"** then answer **Question 2** below.*

☐ No or Unknown *If you answered **"NO"** or **"UNKNOWN,"** then skip to **Step 3C** of this form.*

2. Did you conduct a simplified evaluation?

☐ Yes *If you answered **"YES,"** then answer **Question 3** below.*

☐ No *If you answered **"NO,"** then skip to **Step 3C** of this form.*

3. Was further evaluation necessary?

☐ Yes *If you answered **"YES,"** then answer **Question 4** below.*

☐ No *If you answered **"NO,"** then answer **Question 5** below.*

4. If further evaluation was necessary, what did you do?

☐ Used the concentrations listed in Table 749-2 as cleanup levels. *If so, then skip to **Step 4** of this form.*

☐ Conducted a site-specific evaluation. *If so, then skip to **Step 3C** of this form.*

5. If no further evaluation was necessary, what was the reason? *Check all that apply. Then skip to **Step 4** of this form.*

Exposure Analysis: WAC 173-340-7492(2)(a)

☐ Area of soil contamination at the Site is not more than 350 square feet.

☐ Current or planned land use makes wildlife exposure unlikely. Used Table 749-1.

Pathway Analysis: WAC 173-340-7492(2)(b)

☐ No potential exposure pathways from soil contamination to ecological receptors.

Contaminant Analysis: WAC 173-340-7492(2)(c)

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations that exceed the values listed in Table 749-2.

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations that exceed the values listed in Table 749-2, and institutional controls are used to manage remaining contamination.

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays.

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays, and institutional controls are used to manage remaining contamination.

C. Site-specific evaluation. A site-specific evaluation process consists of two parts: (1) formulating the problem, and (2) selecting the methods for addressing the identified problem. Both steps require consultation with and approval by Ecology. *See* WAC 173-340-7493(1)(c).

1. Was there a problem? *See* WAC 173-340-7493(2).

☐ Yes *If you answered **"YES,"** then answer **Question 2** below.*

☐ No *If you answered **"NO,"** then identify the reason here and then skip to **Question 5** below:*

- ☐ No issues were identified during the problem formulation step.
- ☐ While issues were identified, those issues were addressed by the cleanup actions for protecting human health.

2. What did you do to resolve the problem? *See* WAC 173-340-7493(3).

☐ Used the concentrations listed in Table 749-3 as cleanup levels. *If so, then skip to **Question 5** below.*

☐ Used one or more of the methods listed in WAC 173-340-7493(3) to evaluate and address the identified problem. *If so, then answer **Questions 3 and 4** below.*

3. If you conducted further site-specific evaluations, what methods did you use?
Check all that apply. See WAC 173-340-7493(3).

- ☐ Literature surveys.
- ☐ Soil bioassays.
- ☐ Wildlife exposure model.
- ☐ Biomarkers.
- ☐ Site-specific field studies.
- ☐ Weight of evidence.
- ☐ Other methods approved by Ecology. If so, please specify:

4. What was the result of those evaluations?

- ☐ Confirmed there was no problem.
- ☐ Confirmed there was a problem and established site-specific cleanup levels.

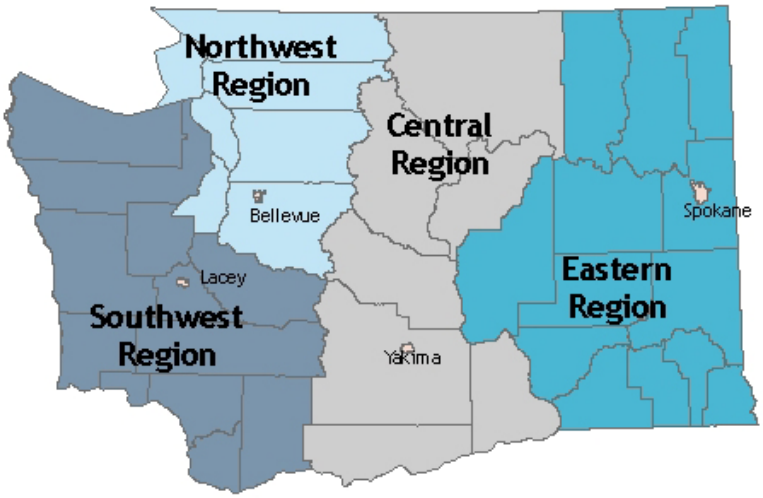
5. Have you already obtained Ecology's approval of both your problem formulation and problem resolution steps?

☐ Yes If so, please identify the Ecology staff who approved those steps:

☐ No

Step 4: SUBMITTAL

Please mail your completed form to the Ecology site manager assigned to your Site. If a site manager has not yet been assigned, please mail your completed form to the Ecology regional office for the County in which your Site is located.



Northwest Region: Attn: VCP Coordinator 3190 160th Ave. SE Bellevue, WA 98008-5452	**Central Region:** Attn: VCP Coordinator 15 W. Yakima Ave., Suite 200 Yakima, WA 98902
Southwest Region: Attn: VCP Coordinator P.O. Box 47775 Olympia, WA 98504-7775	**Eastern Region:** Attn: VCP Coordinator N. 4601 Monroe Spokane WA 99205-1295

APPENDIX B
ERH SYSTEM DESIGN DRAWINGS

DRAFT FOR ECOLOGY REVIEW
CLEANUP ACTION PLAN – SITE AREA 1

FORMER PENTHOUSE DRAPERY AND BELSHAW SITE
1752 RAINIER AVENUE SOUTH
SEATTLE, WASHINGTON

PACIFIC CREST PN: 105-003

ELECTRICAL RESISTANCE HEATING DESIGN PACKAGE

DRAFT

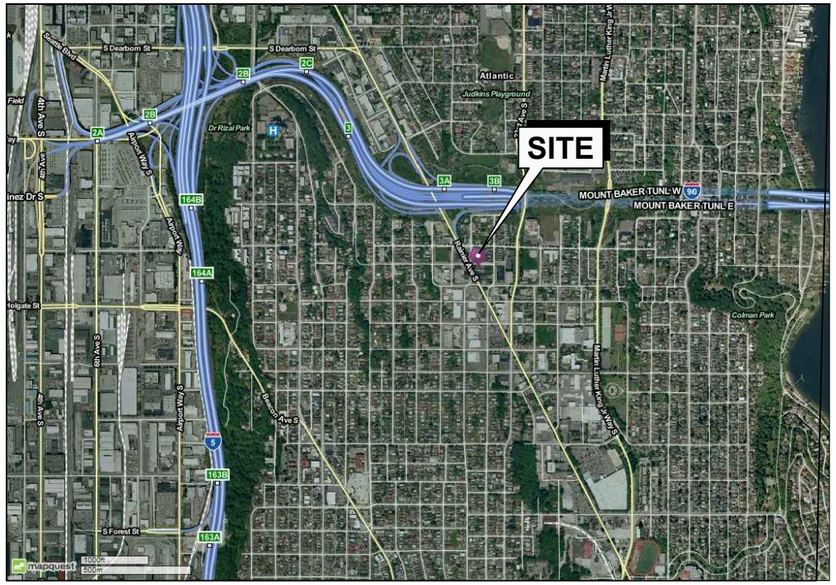
Not Approved for Construction

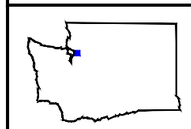
FORMER PENTHOUSE DRAPERIES
1752 RAINIER AVENUE SOUTH
SEATTLE, WASHINGTON

Prepared by:

TRS
Accelerating Value

MAY 2015



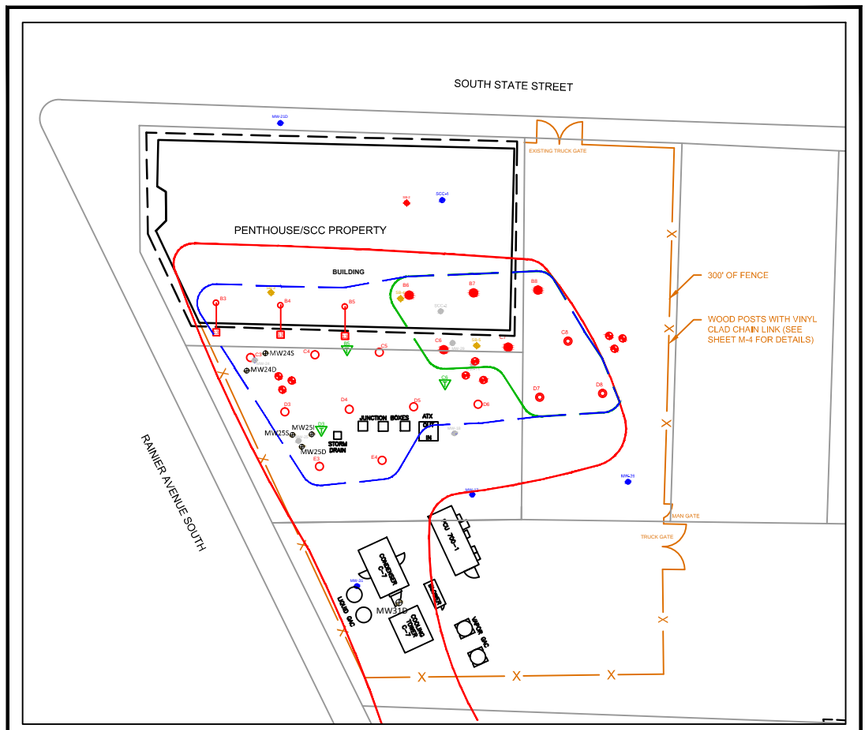


WASHINGTON

SITE LOCATION MAP

N

DRAWING NUMBER	TITLE AND DESCRIPTION
	SHEET INDEX
Y-1	SITE PLAN
Y-1A	SITE PLAN SOIL CONCENTRATIONS
Y-1B	SITE PLAN GROUND WATER CONCENTRATIONS
Y-1C	SITE PLAN ELECTRICAL SERVICE
Y-2	VAPOR RECOVERY PIPING PLAN
Y-3	EQUIPMENT PIPING PLAN
Y-4	CABLE PLAN
Y-5	FIELD BOX AND ETHERNET PLAN
P-1	LEGEND
P-2	VAPOR RECOVERY AND CONDENSING PROCESS FLOW DIAGRAM
P-3	PROCESS FLOW MASS BALANCE
P-4	FIELD PROCESS AND INSTRUMENTATION DIAGRAM
P-5	CONDENSER PROCESS AND INSTRUMENTATION DIAGRAM
P-6	COOLING TOWER PROCESS AND INSTRUMENTATION DIAGRAM
P-7	VAPOR TREATMENT PROCESS AND INSTRUMENTATION DIAGRAM
M-1	ELECTRODE DETAIL
M-2	BELOW GRADE ELECTRODE DETAIL
M-3	ELECTRODE DETAIL
M-4	ELECTRODE DETAIL
M-5	TMP COMPLETION DETAIL
E-1	ELECTRICAL ONE-LINE DIAGRAM



EXTENDED SITE PLAN

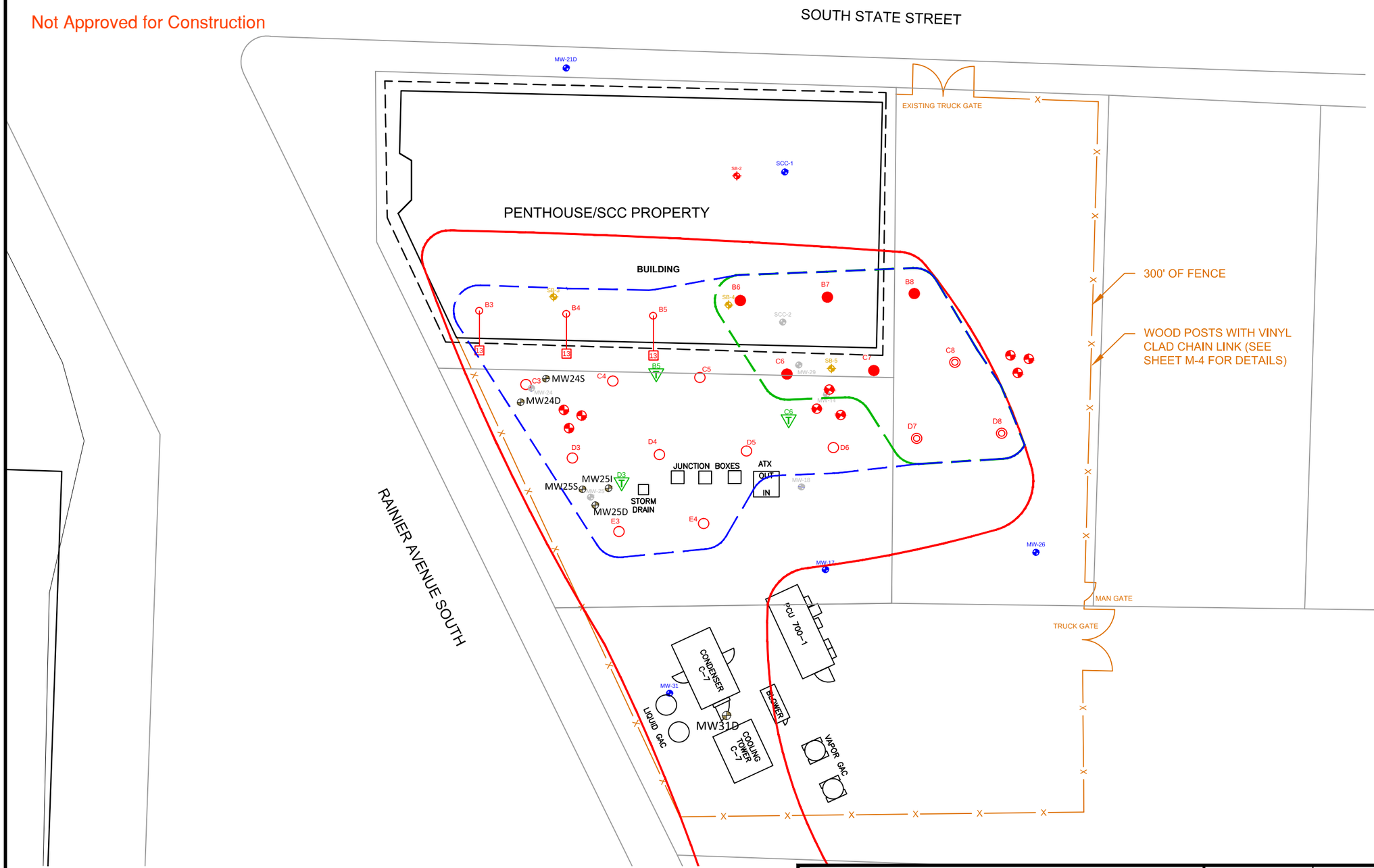
N

0 40

APPROXIMATE SCALE IN FEET

DRAFT

Not Approved for Construction



LEGEND

- SOIL BORING ADVANCED 2010
- MW-26 — EXISTING MONITORING WELL
- MW-26 — EXISTING MONITORING WELL TO BE ABANDONED
- E3 — ERH ELECTRODE (5'-50') (QTY. 9)
- C8 — ERH ELECTRODE (40'-85') (QTY. 3)
- B6 — ERH ELECTRODE (5'-85') (QTY. 5)
- B5 / 13 — ANGLED ELECTRODE (5'-50') (QTY. 3)
- C6 T — TEMPERATURE MONITORING POINT (QTY. 3)
- EXTENT OF COCS IN GROUNDWATER ABOVE SITE PSL
- CONFIRMATION MONITORING WELL (QTY. 9)
- AREA OF HEATING INFLUENCE
- AREA OF DEEP HEATING INFLUENCE

TRS Accelerating Value

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	TRS PERSONNEL
PROJECT MANAGER	J. LILLIE
APPROVED FOR IMPLEMENTATION	BY _____ FOR _____ DATE

FOR FORMER PENTHOUSE DRAPERY
SEATTLE, WASHINGTON

SITE PLAN

DATE	05/08/15
PROJECT	SEA12
SHEET	Y-1

Depth	PCE	TCE
5-6	0.047	<0.00078
8.5-10	0.047	<0.00079
13.5-15	0.025	<0.00094
18.5-20	0.0080	<0.00084
23.5-25	<0.00081	<0.00081
26-27.5	<0.00090	<0.00090
28.5-30	<0.00089	<0.00089
33.5-35	<0.00062	<0.00062
38.5-40	0.00017	<0.00078
43.5-45	<0.0085	<0.00085

Depth	PCE	TCE
2-4	0.13	<0.00094
SB12-2-4 (duplicate)		
2-4	0.084	<0.00096

Depth	PCE	TCE
0-1	0.089	<0.00094

Depth	PCE	TCE
5-6.5	0.032	<0.00099
15-16.5	**0.32**	<0.00088
20-21.5	**0.30**	<0.00090
25-26.5	**0.056**	<0.00076
25-26.5	0.049	<0.00081
30-31.5	**0.12**	<0.00084
35-36.5	**0.13**	<0.00090
40-41.5	**0.11**	<0.00077
45-46.5	0.036	<0.00087

Depth	PCE	TCE
0.5-6	0.0030	<0.0011
6-10	0.0046	<0.0013
10-16.5	**0.23**	<0.0013
20-26	**0.43**	<0.0010
33-35	0.0020	<0.00088
40-46	<0.0011	<0.0011
50-55	**0.064**	<0.00082
64-66	<0.00084	<0.00084
74-80	<0.00093	<0.00093

Depth	PCE	TCE
6	0.02	<0.03
9	0.02	<0.03
14	**0.33**	0.03
46	<0.02	<0.03

Depth	PCE	TCE
5-6.5	**2.4**	<0.00088
10-11.5	**1.1**	<0.00076
15-16.5	**1.5**	<0.00077
20-21.5	**0.16**	<0.00084
25-26.5	**0.87**	<0.00092
30-30.5	**3.5**	<0.00077
35-36.5	**2.6**	<0.00082
40-41.5	**0.09**	<0.00074
45-56	**0.056**	<0.00071

Depth	PCE	TCE
6	0.0069	<0.0011
6	<0.02	<0.03
13	0.036	<0.3

Depth	PCE	TCE
63.5-70	<0.00097	<0.00097
70-78.5	<0.0011	<0.0011
85-87.5	<0.0013	<0.0013
95-97.5	<0.0012	<0.0012

Depth	PCE	TCE
9	0.0018	<0.00068
41.5	0.0053	0.00099
71.5	<0.00067	<0.00067

Depth	PCE	TCE
6.5	**0.22**	<0.03
9.5	**0.14**	<0.03
11.5	**0.16**	<0.03

Depth	PCE	TCE
2-4	<0.00090	<0.00090
7.5-9.5	<0.0011	<0.0011
13-17	<0.00096	<0.00096
25-26.5	<0.0010	<0.0010
34-35	<0.00094	<0.00094
42-45	<0.0012	<0.0012
52.5-55	<0.0012	<0.0012
62.5-65	<0.0011	<0.0011
75-77.5	<0.0011	<0.0011

Depth	PCE	TCE
34-36	<0.0010	<0.0010
44-46	<0.00092	<0.00092
54-56	<0.0012	<0.0012
64-66	<0.00099	<0.00099
74-76	<0.0010	<0.0010
86-88	<0.00092	<0.00092
94-96	<0.0011	<0.0011
104-106	<0.0012	<0.0012

Depth	PCE	TCE
2-4	0.0087	<0.00094
8-10	0.024	<0.0010
10-12	0.025	<0.00092

Depth	PCE	TCE
2.5-5	<0.0010	<0.0010
7.5-10	0.0013	<0.00096
12.5-15	0.0012	<0.00096
22.5-25	<0.00093	<0.00093
33-36	0.028	<0.00097
46-47	0.0038	<0.0010
51-55	**0.10**	<0.00091
62.5-65	0.0029	<0.0011
75-78	**0.19**	<0.0011

Depth	PCE	TCE
34-36	<0.00083	<0.00083
44-46	<0.0010	<0.0010
54-56	<0.0011	<0.0011
64-66	0.0082	<0.00093
74-76	0.0071	<0.0011
86-88	0.0037	<0.0011
94-96	0.0016	<0.0012
104-106	<0.0011	<0.0011

Depth	PCE	TCE
40	**0.21**	<0.00080
46	0.023	<0.00089
51	0.00087	<0.00098
56	0.033	<0.00085
56	0.032	<0.00083
61	**0.088**	<0.0011

Depth	PCE	TCE
5	**0.39**	<0.03
15	**0.34**	<0.03
25	**1.2**	<0.03
35	**4.2**	<0.03

Depth	PCE	TCE
64-66	<0.0011	<0.0011
74-76	<0.0013	<0.0013
84-86	<0.0011	<0.0011
94-96	<0.0011	<0.0011
104-106	<0.0012	<0.0012

PENTHOUSE/SCC PROPERTY

BUILDING

PH-SB-2 PH-SB-3 PH-SB-4 PH-SB-5 PH-SB-6 PH-SB-7 PH-SB-8 PH-SB-9 PH-SB-10 PH-SB-11 PH-SB-12 PH-SB-13 PH-SB-14 PH-SB-15

B-16

MW24S MW24D MW25I MW25S MW25D MW-17 MW-18 MW-26 MW-29 MW-31

SCC-1 SCC-2

B3 B4 B5 B6 B7 B8 C3 C4 C5 C6 C7 C8 D3 D4 D5 D6 D7 D8 E3 E4

JUNCTION BOXES ATX OUT IN

STORM DRAIN

RAINIER AVENUE SOUTH

PCU 700-1

CONDENSER C-7

COOLING TOWER C-7

BLOWER

LIQUID GAC

VAPOR GAC

LEGEND

- SOIL BORING ADVANCED 2010
- MW-26 EXISTING MONITORING WELL
- MW-26 EXISTING MONITORING WELL TO BE ABANDONED
- E3 ERH ELECTRODE (5'-50') (QTY. 9)
- C8 ERH ELECTRODE (40'-85') (QTY. 3)
- B6 ERH ELECTRODE (5'-85') (QTY. 5)
- B5 ANGLED ELECTRODE (5'-50') (QTY. 3)
- C6 TEMPERATURE MONITORING POINT (QTY. 3)
- EXTENT OF COCS IN GROUNDWATER ABOVE SITE PSL
- CONFIRMATION MONITORING WELL (QTY. 9)
- AREA OF HEATING INFLUENCE
- AREA OF DEEP HEATING INFLUENCE

N

0' 15' 30'

DRAFT

Not Approved for Construction

TRS Accelerating Value

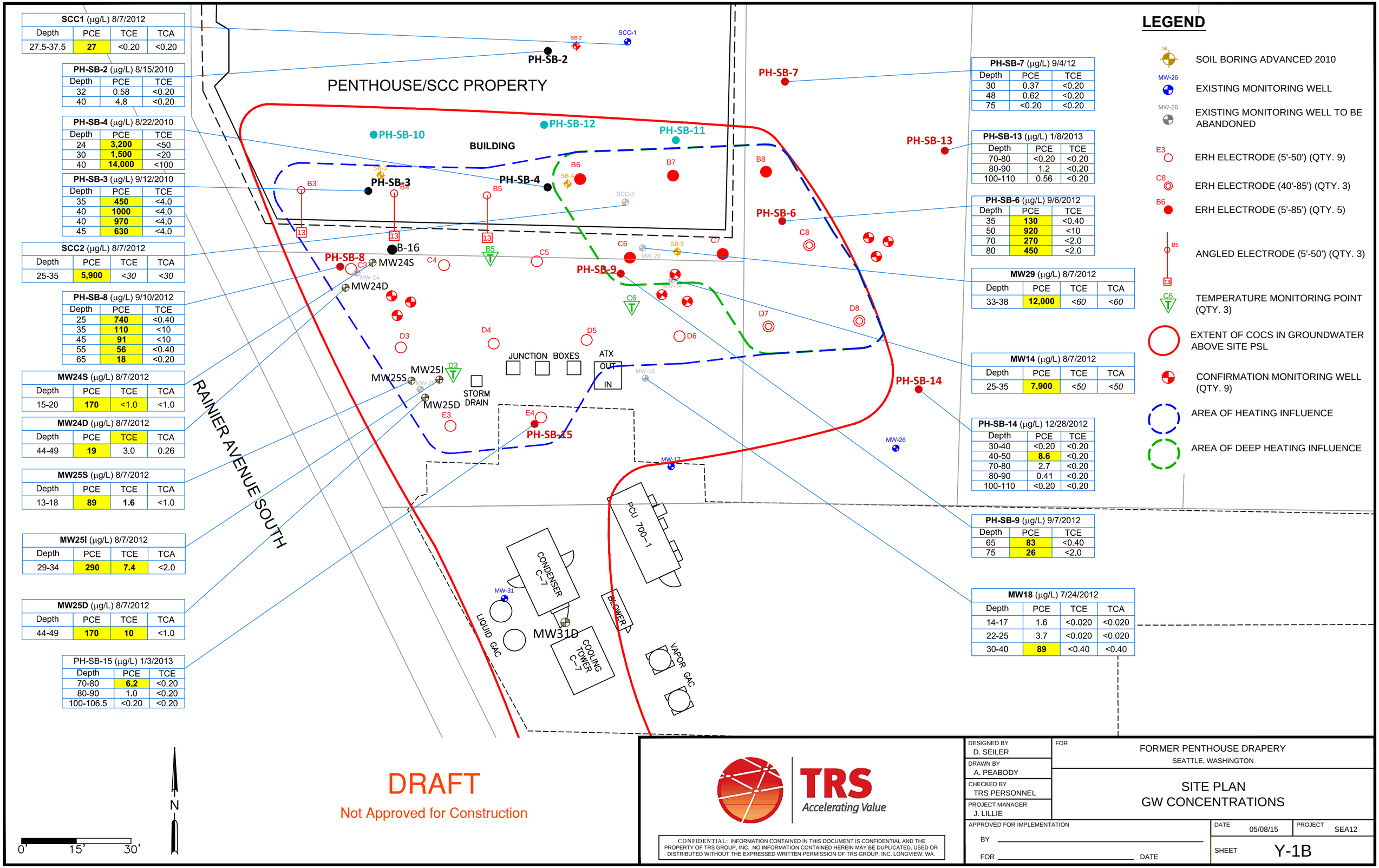
DESIGNED BY D. SEILER
DRAWN BY A. PEABODY
CHECKED BY TRS PERSONNEL
PROJECT MANAGER J. LILLIE

FOR FORMER PENTHOUSE DRAPERY
SEATTLE, WASHINGTON

SITE PLAN
SOIL CONCENTRATIONS

APPROVED FOR IMPLEMENTATION
BY _____
FOR _____ DATE

DATE 05/08/15
PROJECT SEA12
SHEET Y-1A



SCC1 (µg/L) 8/7/2012

Depth	PCE	TCE	TCA
27.5-37.5	**27**	<0.20	<0.20

PH-SB-2 (µg/L) 8/15/2010

Depth	PCE	TCE
32	0.58	<0.20
40	4.8	<0.20

PH-SB-4 (µg/L) 8/22/2010

Depth	PCE	TCE
24	**3,200**	<50
30	**1,500**	<20
40	**14,000**	<100

PH-SB-3 (µg/L) 9/12/2010

Depth	PCE	TCE
35	**450**	<4.0
40	**1000**	<4.0
40	**970**	<4.0
45	**630**	<4.0

SCC2 (µg/L) 8/7/2012

Depth	PCE	TCE	TCA
25-35	**5,900**	*<30*	*<30*

PH-SB-8 (µg/L) 9/10/2012

Depth	PCE	TCE
25	**740**	<0.40
35	**110**	<10
45	**91**	<10
55	**56**	<0.40
65	**18**	<0.20

MW24S (µg/L) 8/7/2012

Depth	PCE	TCE	TCA
15-20	**170**	**<1.0**	<1.0

MW24D (µg/L) 8/7/2012

Depth	PCE	TCE	TCA
44-49	**19**	3.0	0.26

MW25S (µg/L) 8/7/2012

Depth	PCE	TCE	TCA
13-18	**89**	**1.6**	<1.0

MW25I (µg/L) 8/7/2012

Depth	PCE	TCE	TCA
29-34	**290**	**7.4**	<2.0

MW25D (µg/L) 8/7/2012

Depth	PCE	TCE	TCA
44-49	**170**	**10**	<1.0

PH-SB-15 (µg/L) 1/3/2013

Depth	PCE	TCE
70-80	**6.2**	<0.20
80-90	1.0	<0.20
100-106.5	<0.20	<0.20

PH-SB-7 (µg/L) 9/4/12

Depth	PCE	TCE
30	0.37	<0.20
48	0.62	<0.20
75	<0.20	<0.20

PH-SB-13 (µg/L) 1/8/2013

Depth	PCE	TCE
70-80	<0.20	<0.20
80-90	1.2	<0.20
100-110	0.56	<0.20

PH-SB-6 (µg/L) 9/6/2012

Depth	PCE	TCE
35	**130**	<0.40
50	**920**	<10
70	**270**	<2.0
80	**450**	<2.0

MW29 (µg/L) 8/7/2012

Depth	PCE	TCE	TCA
33-38	**12,000**	*<60*	*<60*

MW14 (µg/L) 8/7/2012

Depth	PCE	TCE	TCA
25-35	**7,900**	*<50*	*<50*

PH-SB-14 (µg/L) 12/28/2012

Depth	PCE	TCE
30-40	<0.20	<0.20
40-50	**8.6**	<0.20
70-80	2.7	<0.20
80-90	0.41	<0.20
100-110	<0.20	<0.20

PH-SB-9 (µg/L) 9/7/2012

Depth	PCE	TCE
65	**83**	<0.40
75	**26**	<2.0

MW18 (µg/L) 7/24/2012

Depth	PCE	TCE	TCA
14-17	1.6	<0.020	<0.020
22-25	3.7	<0.020	<0.020
30-40	**89**	<0.40	<0.40

LEGEND

- SOIL BORING ADVANCED 2010
- EXISTING MONITORING WELL
- EXISTING MONITORING WELL TO BE ABANDONED
- ERH ELECTRODE (5'-50') (QTY. 9)
- ERH ELECTRODE (40'-85') (QTY. 3)
- ERH ELECTRODE (5'-85') (QTY. 5)
- ANGLED ELECTRODE (5'-50') (QTY. 3)
- TEMPERATURE MONITORING POINT (QTY. 3)
- EXTENT OF COCS IN GROUNDWATER ABOVE SITE PSL
- CONFIRMATION MONITORING WELL (QTY. 9)
- AREA OF HEATING INFLUENCE
- AREA OF DEEP HEATING INFLUENCE

DRAFT

Not Approved for Construction

TRS Accelerating Value

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	TRS PERSONNEL
PROJECT MANAGER	J. LILLIE
APPROVED FOR IMPLEMENTATION	BY _____ FOR _____ DATE

FOR FORMER PENTHOUSE DRAPERY
SEATTLE, WASHINGTON

SITE PLAN
GW CONCENTRATIONS

DATE 05/08/15 | PROJECT SEA12

SHEET Y-1B

DRAFT

Not Approved for Construction

BUILDING

300' OF FENCE

WOOD POSTS WITH VINYL CLAD CHAIN LINK (SEE SHEET M-4 FOR DETAILS)

EXISTING 26 kV OVERHEAD LINES

EXISTING POLE

P(OH)

MAN GATE

TRUCK GATE

CONCRETE BARRIERS

(2) 4" CONDUIT
26 kV UG FEEDER

750 kVA PAD-MOUNTED TRANSFORMER BY SCL

DISTANCE TO TERMINAL POLE 150'

26kV, 3 PHASE, O/H LINE BY SCL

POLE BY SCL 50' POLE WITH BUCK ARM (15 FEET SOUTH OF EXISTING POLE)

POLE BY SCL 30' GUY POLE WITH SIDEWALK BRACE AND ANCHOR

TERMINAL POLE BY SCL

METERING CABINET AND SERVICE DISCONNECT

(3) 4" CONDUIT
480 V SECONDARY

MW24S
MW24D
MW25I
MW25S
MW25D
MW31D

JUNCTION BOXES

ATX
OUT
IN

STORM DRAIN

PCU 700-1

CONDENSER C-7

BLOWER

LIQUID GAC

VAPOR GAC

COOLING TOWER C-7

AVENUE SOUTH

N

TRS Accelerating Value

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	TRS PERSONNEL
PROJECT MANAGER	J. LILLIE

FOR: FORMER PENTHOUSE DRAPERY
SEATTLE, WASHINGTON

ELECTRICAL SERVICE

APPROVED FOR IMPLEMENTATION

BY _____

FOR _____ DATE _____

DATE 05/08/15

PROJECT SEA12

SHEET Y-1C

DRAFT

Not Approved for Construction

PENTHOUSE/SCC PROPERTY

BUILDING

RAINIER AVENUE SOUTH

B3 B4 B5 B6 B7 B8

C3 MW24S C4 C5 C6 C7 C8

MW24D

D3 D4 D5 D6 D7 D8

JUNCTION BOXES

ATX OUT IN

MW25I MW25S MW25D

STORM DRAIN

E3 E4

PCU 700-1

CONDENSER C-7

BLOWER

LIQUID GAC

MW31D

COOLING TOWER C-7

VAPOR GAC

N

0' 15' 30'

Legend

- E3 — ERH ELECTRODE (5'-50') (QTY. 9)
- C8 — ERH ELECTRODE (40'-85') (QTY. 3)
- B6 — ERH ELECTRODE (5'-85') (QTY. 5)
- B5 / 13 — ANGLED ELECTRODE (5'-50') (QTY. 3)
- C6 T — TEMPERATURE MONITORING POINT (QTY. 3)
- EXTENT OF COCS IN GROUNDWATER ABOVE SITE PSL
- CONFIRMATION MONITORING WELL (QTY. 6)
- TRENCH
- 1" CHEMICAL HOSE (4' SECTIONS)
- 1.5" CPVC (1 WELL)
- 2" CPVC (2 WELLS)
- 3" CPVC (3 WELLS TO 5 WELLS)
- 4" CPVC (6 WELLS TO 8 WELLS)
- 6" CPVC ~~(9 WELLS TO 20 WELLS)~~
- 1.5" 0.020 SLOTTED CPVC PIPE (5' LENGTHS)

TRS Accelerating Value

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	TRS PERSONNEL
PROJECT MANAGER	J. LILLIE

FOR: FORMER PENTHOUSE DRAPERY, SEATTLE, WASHINGTON

VAPOR RECOVERY PIPING

APPROVED FOR IMPLEMENTATION

BY _____

FOR _____ DATE

DATE 05/08/15

PROJECT SEA12

SHEET Y-2

DRAFT

Not Approved for Construction

D3

D6

JUNCTION BOXES

ATX

OUT

IN

D3

STORM DRAIN

E3

E4

45 ELBOW ANGLED FOR ELEVATION CHANGE

GRADE CHANGE SEE SHEET Y-8

6" FLANGE WITH 4" PVC REDUCER BUSHING

45 ELBOW ANGLED FOR ELEVATION CHANGE

8" FLANGE

INLET

PCU 700-1

OUTLET

OUT

IN

CONDENSER C-7

BLOWER

LIQUID GAC

COOLING TOWER C-7

MAKEUP WATER

VAPOR GAC

MAN GATE

TRUCK GATE

Legend

- E3 — ERH ELECTRODE
- C6 T — TEMPERATURE MONITORING POINT
- 1" PVC
- 4" PVC FLEXIBLE HOSE
- 4" CPVC
- 4" PVC
- 6" CPVC

N

0' 8' 16'

TRS Accelerating Value

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	TRS PERSONNEL
PROJECT MANAGER	J. LILLIE

FOR

FORMER PENTHOUSE DRAPERY

SEATTLE, WASHINGTON

EQUIPMENT PIPING

APPROVED FOR IMPLEMENTATION

BY _____

FOR _____ DATE

DATE 05/08/15

PROJECT SEA12

SHEET Y-3

DRAFT

Not Approved for Construction

PENTHOUSE/SCC PROPERTY

BUILDING

RAINIER AVENUE SOUTH

MW24S

MW24D

MW25I

MW25S

MW25D

MW31D

STORM DRAIN

JUNCTION BOXES

ATX

OUT

IN

PCU 700-1

CONDENSER C-7

BLOWER

COOLING TOWER C-7

LIQUID GAC

VAPOR GAC

300' OF FENCE

WOOD POSTS WITH VINYL CLAD CHAIN LINK (SEE SHEET M-4 FOR DETAILS)

MAN GATE

TRUCK GATE

Legend

- TEMPERATURE MONITORING POINT (3)
- THERMOCOUPLE WIRE
- 18/2 SOW POWER SUPPLY WIRE
- ETHERNET WIRE
- TMP FIELD BOX
- SOLENOID FIELD BOX

N

0' 15' 30'

TRS Accelerating Value

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	TRS PERSONNEL
PROJECT MANAGER	J. LILLIE
APPROVED FOR IMPLEMENTATION	BY _____ FOR _____ DATE

FOR FORMER PENTHOUSE DRAPERY
SEATTLE, WASHINGTON

FIELD BOX AND ETHERNET PLAN

DATE 05/08/15 | PROJECT SEA12

SHEET Y-4

DRAFT

Not Approved for Construction

PENTHOUSE/SCC PROPERTY

BUILDING

RAINIER AVENUE SOUTH

B3 B4 B5 B6 B7 B8

C1 C2 C3 C4 C5 C6 C7 C8

D3 D4 D5 D6 D7 D8

E3 E4

MW24S

MW24D

MW25I

MW25S

MW25D

MW31D

JUNCTION BOXES

ATX OUT IN

STORM DRAIN

PCU 700-1

CONDENSER C-7

BLOWER

LIQUID GAC

COOLING TOWER C-7

VAPOR GAC

MAN GATE

TRUCK GATE

300' OF FENCE

WOOD POSTS WITH VINYL CLAD CHAIN LINK (SEE SHEET M-4 FOR DETAILS)

Legend

- 1" PVC DRIP PIPE
- TMP FIELD BOX
- SOLENOID FIELD BOX
- 18/2 SOW CABLE
- TRENCH

N

0' 15' 30'

TRS Accelerating Value

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	TRS PERSONNEL
PROJECT MANAGER	J. LILLIE
FOR	FORMER PENTHOUSE DRAPERY SEATTLE, WASHINGTON
	DRIP
APPROVED FOR IMPLEMENTATION	BY _____ FOR _____ DATE
DATE	05/08/15
PROJECT	SEA12
SHEET	Y-5

DRAFT

Not Approved for Construction

LEGEND

ELECTRONIC SIGNAL

ELECTRICAL CABLE

PROCESS LINE LABELING
SEE SHEET P-2 FOR DESCRIPTION

SOLENOID

BALL VALVE

BUTTERFLY VALVE

SAMPLE PORT

CHECK VALVE

SELF-CONTAINED
PRESSURE REGULATOR

SPIGOT

BACKFLOW PREVENTER

FLANGE

PIPING SPEC. # CHANGE

PUMP

BLOWER

ROTARY LOBE BLOWER

DIAPHRAGM PUMP

COMPRESSED AIR FILTER

HEATER COIL

COMPUTER OPERATED MONITORING,
DATA COLLECTION AND CONTROLS

HARDWIRE CONTROLS

PI	PRESSURE INDICATOR
PCV	PRESSURE CONTROL VALVE
PSL	PRESSURE SWITCH LOW
FE	FLOW ELEMENT
FI	FLOW INDICATOR
FQI	FLOW QUANTITY INDICATOR
FT	FLOW TRANSMITTER
FQI	FLOW QUANTITY INDICATOR
LI	LEVEL INDICATOR
LSH	LEVEL SWITCH HIGH
LSHH	LEVEL SWITCH HIGH-HIGH
LSL	LEVEL SWITCH LOW
LSLL	LEVEL SWITCH LOW-LOW
TAH	TEMPERATURE ALARM HIGH
TE	TEMPERATURE ELEMENT
TSL	TEMPERATURE SWITCH LOW
TI	TEMPERATURE INDICATOR
TSH	TEMPERATURE SWITCH HIGH
YC	CONTROLLER
T	THERMOCOUPLE
CS	CARBON STEEL
CPVC	SCH 40. CPVC PIPE
PEX	PEX TUBING
FCV	FLOW CONTROL VALVE

P&ID LINE COLORS

SOFTENED/POTABLE/CLEAN WATER

PROCESS WATER

AIR

STEAM

AIR/STEAM MIX

SOLVENT/CHEMICALS

BLOWDOWN

COMPUTER OPERATED CONTROLS

HARDWIRE CONTROLS

NOTES

1. THIS IS AN ALL INCLUSIVE LEGEND SHEET. NOT ALL SYMBOLS WILL APPEAR ON EACH SHEET.

TRS Accelerating Value

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	NOT APPROVED
PROJECT MANAGER	TRS PERSONNEL
APPROVED FOR CONSTRUCTION	BY _____ DATE _____

FOR
FORMER PENTHOUSE DRAPERY
SEATTLE, WASHINGTON

LEGEND
PROCESS AND INSTRUMENTATION DIAGRAMS

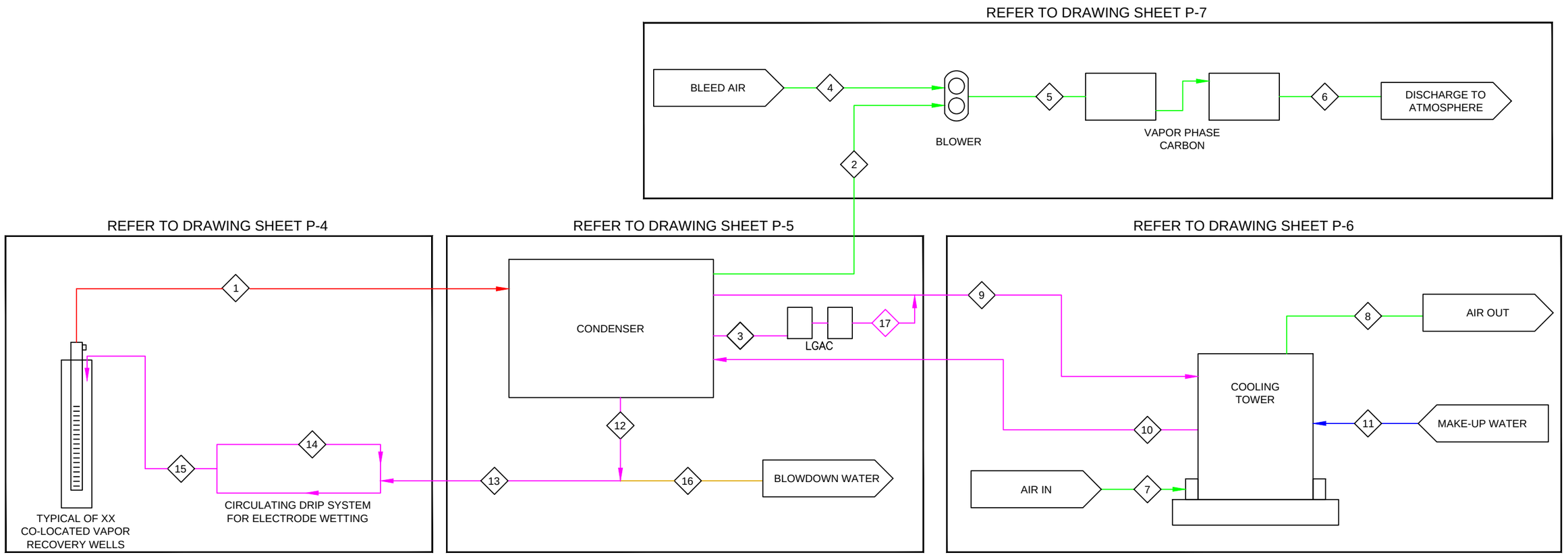
DATE 03/16/15

PROJECT SEA12

SHEET P-1

DRAFT

Not Approved for Construction



P&ID LINE COLORS

- SOFTENED/POTABLE/CLEAN WATER
- PROCESS WATER
- AIR
- STEAM
- AIR/STEAM MIX
- SOLVENT/CHEMICALS
- BLOWDOWN
- COMPUTER OPERATED CONTROLS
- HARDWIRE CONTROLS

TRS Accelerating Value

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	NOT APPROVED
PROJECT MANAGER	TRS PERSONNEL
FOR	FORMER PENTHOUSE DRAPERY SEATTLE, WASHINGTON

PROCESS FLOW DIAGRAM

APPROVED FOR CONSTRUCTION

BY _____

DATE _____

DATE 11/10/14

PROJECT SEA12

SHEET P-2

DRAFT

Not Approved for Construction

Process Stream	Location	Air		Water Vapor		Water		CVOCs		Temperature		Pressure
Description	#	(lb/min)	(scfm)	(lb/min)	(scfm)	(lb/min)	(gpm)	(lb/min)	(ppm)	°C	°F	(Δ from barometric)
Extracted air and steam from vapor recovery system	1	28	370	11.3	241	3	0.4	5.78E-04	2.19	76	169	2" Hg Vac
Discharge air from condenser after steam removal	2	28	370	0.8	16	0	0	5.77E-04	3.48	30	86	5" Hg Vac
Condensate discharge from condenser to LGAC	3	0	0	0	0	13.8	1.7	4.9E-07	0.04	30	86	20 psig
Condensate discharge after LGAC	17	0	0	0	0	13.8	1.7	2.5E-08	1.8E-03	30	86	20 psig
Bleed air to rotary lobe blower	4	4	50	0	1	0	0	0	0	25	77	N/A
Discharge air from rotary lobe blower	5	32	420	0.81	17	0	0	0.001	3.08	60	140	1 psig
Discharge from carbon vessels	6	32	420	0.81	17	0	0	5.8E-06	0.03	35	95	N/A
Cooling air into cooling tower	7	2250	30,000	31.60	672	0	0	0	0	25	77	N/A
Air exhaust from cooling tower	8	2250	30,000	18	393	0	0	4.7E-07	3.6E-05	11	52	N/A
Recirculation water from condenser to cooling tower	9	0	0	0	0	4981	598	4.9E-07	9.9E-05	11	52	10 psig
Recirculation from cooling tower to condenser	10	0	0	0	0	4998	600	2.5E-08	5.0E-06	8	47	12 psig
Make-up water for cooling tower from potable source	11	0	0	0	0	4	0.5	0	0	20	68	50 psig
Water for drip system and blowdown	12	0	0	0	0	31	3.7	1.5E-10	5.0E-06	20	68	12 psig
Water to drip recirculation system	13	0	0	0	0	6	0.7	2.9E-11	5.0E-06	20	68	12 psig
Moving water in drip recirculation system	14	0	0	0	0	83	10	4.1E-10	5.0E-06	20	68	70 psig
Drip water to electrodes	15	0	0	0	0	5.8	0.7	2.9E-11	5.0E-06	20	68	70 psig
Blowdown water	16	0	0	0	0	25	3.0	1.2E-10	5.0E-06	20	68	70 psig

NOTES

1. LOCATION INDICATED IN THIS TABLE CORRESPOND TO THE LOCATION NUMBERS PROVIDED ON SHEET P-2.

TRS Accelerating Value

DESIGNED BY D. SEILER
DRAWN BY A. PEABODY
CHECKED BY NOT APPROVED
PROJECT MANAGER TRS PERSONNEL

FOR FORMER PENTHOUSE DRAPERY
SEATTLE, WASHINGTON

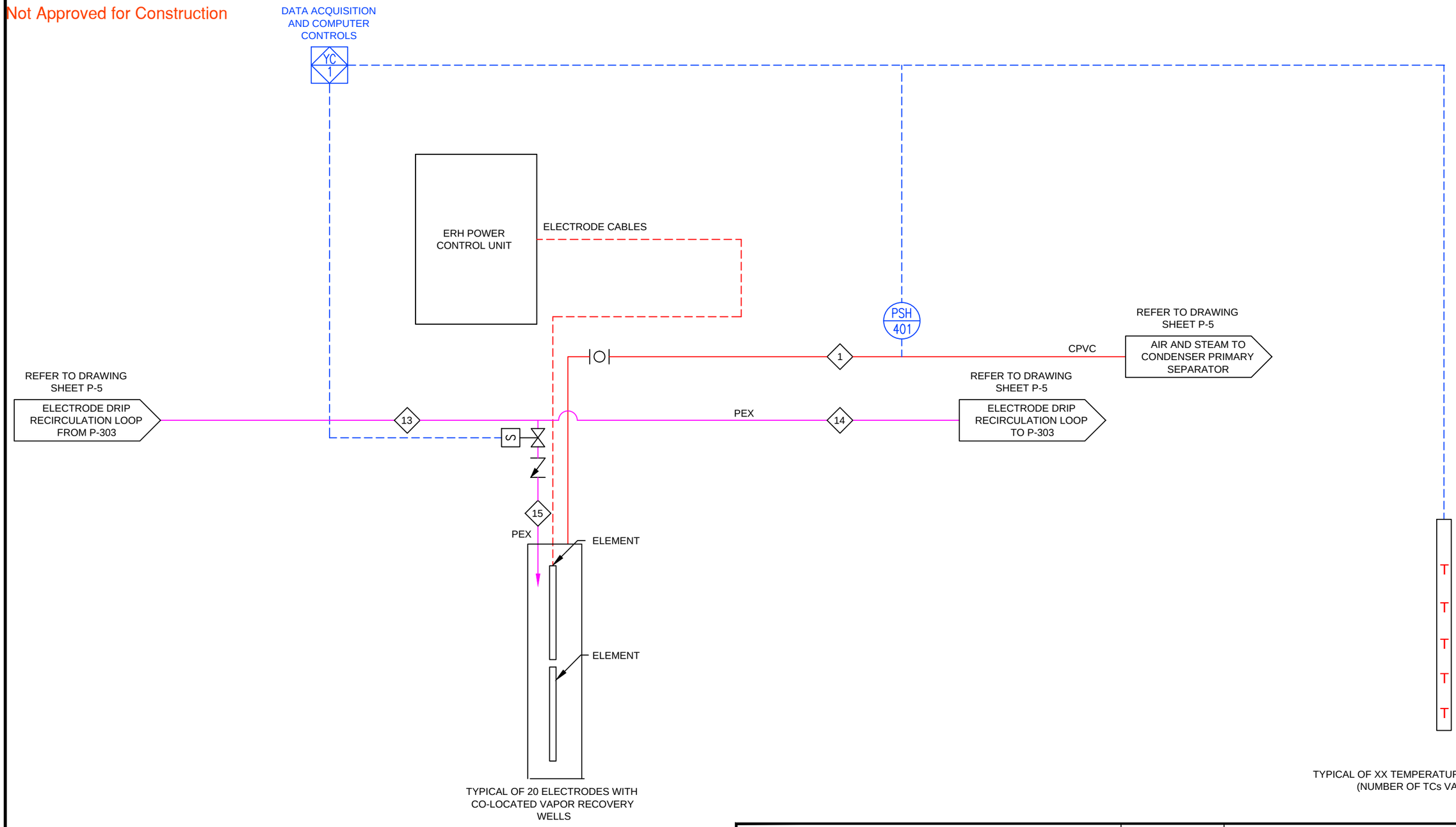
PROCESS FLOW MASS BALANCE

APPROVED FOR CONSTRUCTION
BY _____
DATE _____

DATE 03/16/15
PROJECT SEA12
SHEET P-3

DRAFT

Not Approved for Construction



TYPICAL OF 20 ELECTRODES WITH CO-LOCATED VAPOR RECOVERY WELLS

TYPICAL OF XX TEMPERATURE MONITORING POINTS (NUMBER OF TCs VARIES BY ZONE)

NOTES

1. SEE THE ELECTRODE AND TEMPERATURE MONITORING POINT DETAILS FOR MORE INFORMATION ON THEIR CONSTRUCTION.

2. PSH-401 WILL SHUT DOWN THE PCU IN THE EVENT OF A LOW FIELD VACUUM (LESS THAN 2" H_20).

TRS Accelerating Value

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	NOT APPROVED
PROJECT MANAGER	TRS PERSONNEL
APPROVED FOR CONSTRUCTION	BY _____ DATE _____

FOR

FORMER PENTHOUSE DRAPERY

SEATTLE, WASHINGTON

FIELD PROCESS AND INSTRUMENTATION DIAGRAM

DATE	12/02/14
PROJECT	SEA12
SHEET	P-4

DRAFT

Not Approved for Construction

CONDENSER SKID

REFER TO DRAWING SHEET P-4

AIR AND STEAM FROM VAPOR RECOVERY

1

CPVC — 8" CS

V-501

PRIMARY SEPARATOR

TE 501

TI 501

PI 501

COOLING WATER OUT

AIR AND CONDENSED STEAM OUT

HEAT EXCHANGER

STEAM AND AIR

COOLING WATER IN

WATER LEVEL EQUALIZATION LINE

AUTOMATED CONTROLS AND SHUTDOWNS

YC 2

TSH 502

TI 502

PI 502

V-502

SECONDARY SEPARATOR

LSHH 501

LSH 501

LSL 501

TE 503

FT 503

FE 503

YC 1

DATA ACQUISITION AND COMPUTER CONTROLS

2

6" CS — PVC

REFER TO DRAWING SHEET P-7

COOLED AIR TO BLOWER

REFER TO DRAWING SHEET P-6

9

COOLING WATER TO COOLING TOWER

17

LGAC–2

LGAC–1

REFER TO DRAWING SHEET P-6

COOLING WATER FROM COOLING TOWER

10

P-501

DRIP LINE AND BLOWDOWN

STRAINER

P-502

FILTER

3

FQI 504

12

PI 508

FILTER

PI 509

13

P–503

REFER TO DRAWING SHEET P-4

TO DRIP SYSTEM

FI 510

PCV 509

PI 509

BLADDER TANK

V–503

TI 509

14

REFER TO DRAWING SHEET P-4

FROM DRIP SYSTEM

FQI 508

YC 2

YC 1

FQI 509

SEE NOTE 2

TE 510

TI 510

S

N.C.

16

BLOWDOWN

NOTES:

1. LSHH-501 WILL SHUT DOWN THE VAPOR RECOVERY BLOWER AND POWER TO THE ELECTRODES.
2. TSH-502 WILL SHUT DOWN THE VAPOR RECOVERY BLOWER. TEMPERATURE SET POINT IS 140°F.
3. PROCESS LINE 9 SPLITS WITH HALF THE TOTAL FLOW (PROCESS LINE 9A) GOING TO EACH COOLING TOWER (SEE P-6).
4. THE HEAT EXCHANGER IS ASME 2 RATED.

TRS Accelerating Value

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	NOT APPROVED
PROJECT MANAGER	TRS PERSONNEL
APPROVED FOR CONSTRUCTION	BY _____ DATE _____

FOR FORMER PENTHOUSE DRAPERY

SEATTLE, WASHINGTON

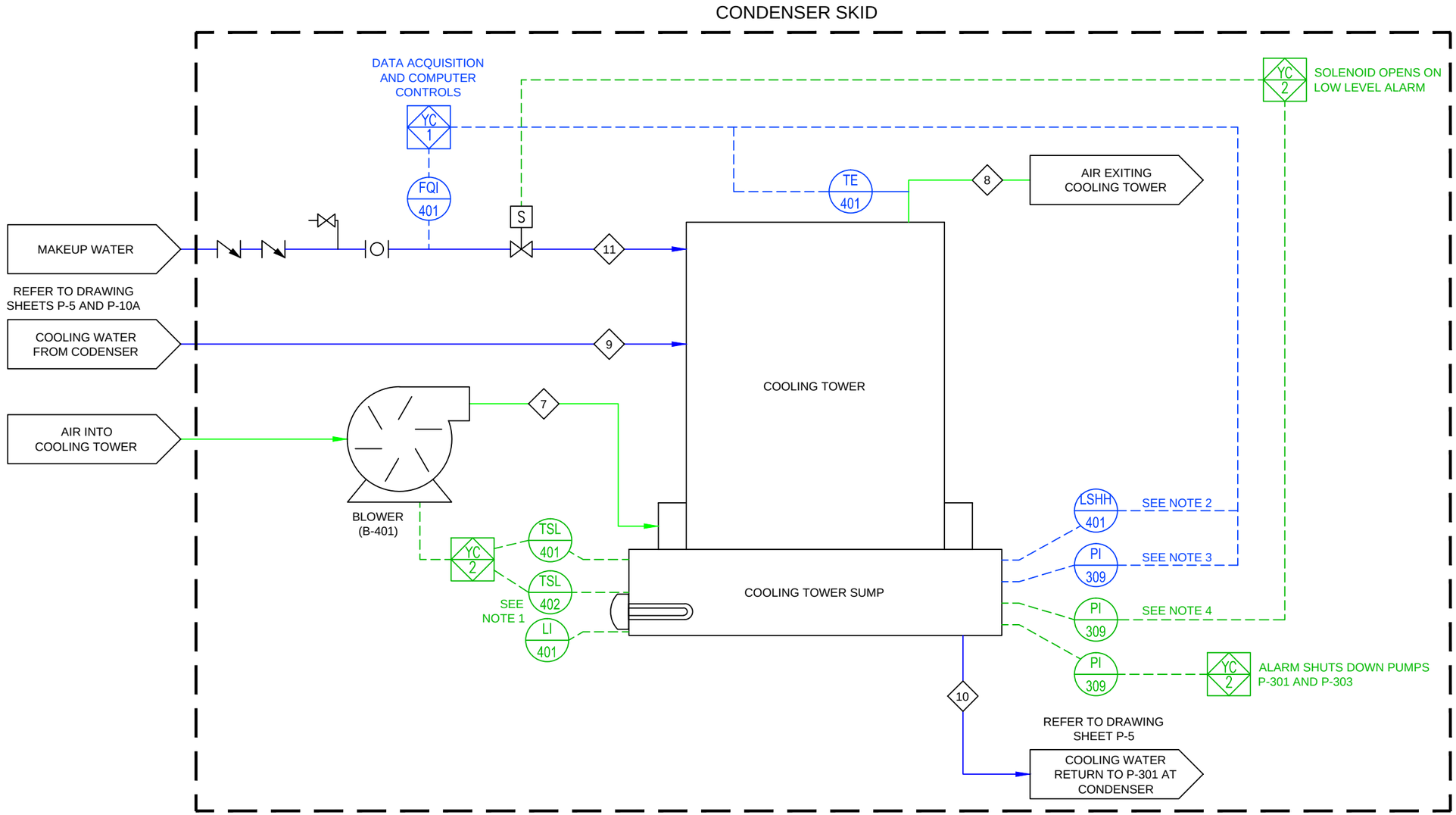
CONDENSER PROCESS AND INSTRUMENTATION DIAGRAM

DATE 03/16/15 | PROJECT SEA12

SHEET P-5

DRAFT

Not Approved for Construction



NOTES

1. TSL-601 AUTOMATICALLY SHUTS DOWN THE COOLING TOWER FAN AT 45° F. TSL-602 TURNS ON AN IMMERSION HEATER IN THE COOLING TOWER SUMP.
2. LSHH-601 SHUTS DOWN SYSTEM
3. LSH-601 OPENS BLOWDOWN SOLENOID AT CONDENSER.
4. LSL-601 MUST BE AT LEAST 2 FEET ABOVE PUMP INTAKE.
5. POTABLE MAKEUP WATER IS SUPPLIED TO THE COOLING WATER SUMP TANK AT AN AVERAGE RATE OF 3-5 GPM IN 30 SECOND INCREMENTS.
6. PROCESS LINE 7 SPLITS WITH HALF THE TOTAL FLOW (PROCESS LINE 7A) GOING TO EACH COOLING TOWER (SEE P-2).
7. PROCESS LINE 8 IS THE COMBINATION OF PROCESS LINES 8A (ONE FROM EACH COOLING TOWER, SEE P-2).
8. PROCESS LINE 9 SPLITS WITH HALF THE TOTAL FLOW (PROCESS LINE 9A) GOING TO EACH COOLING TOWER (SEE P-2)

TRS Accelerating Value

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	NOT APPROVED
PROJECT MANAGER	TRS PERSONNEL
APPROVED FOR CONSTRUCTION	BY _____ DATE _____

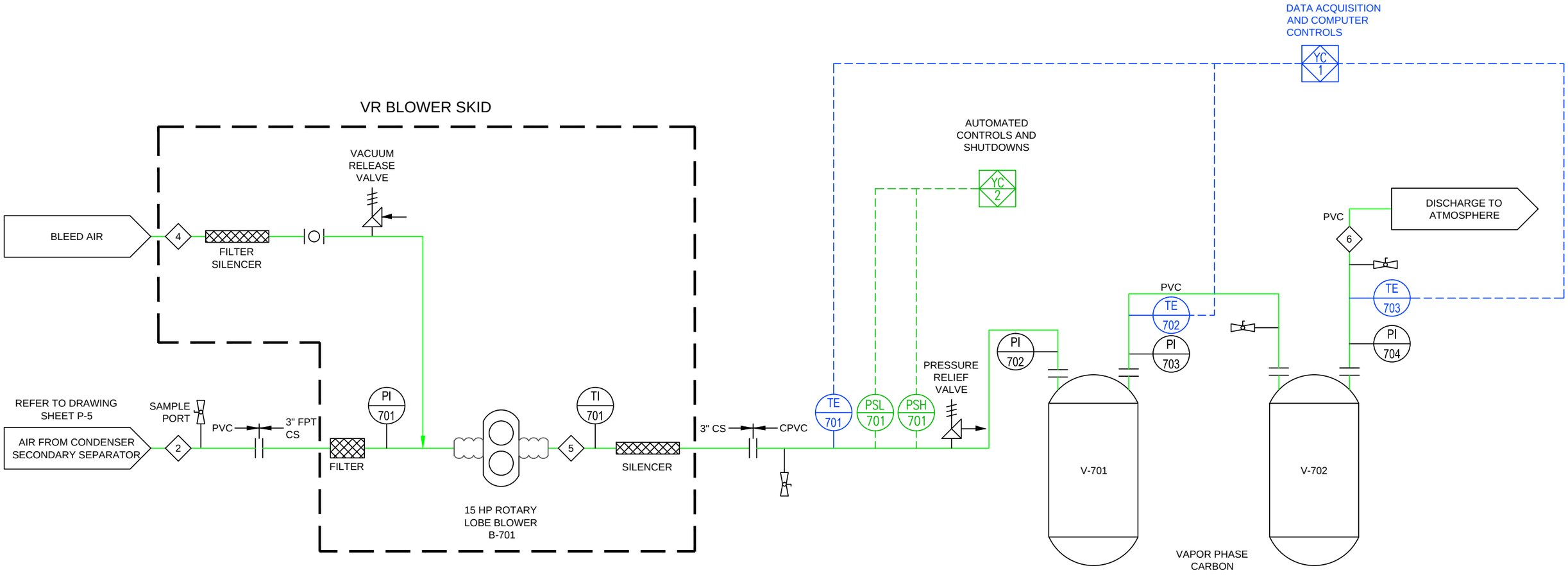
FOR: FORMER PENTHOUSE DRAPERY, SEATTLE, WASHINGTON

COOLING TOWER PROCESS AND INSTRUMENTATION DIAGRAM

DATE	12/01/14
PROJECT	SEA12
SHEET	P-6

DRAFT

Not Approved for Construction



NOTES

1. PSH-701 AND PSL-701 WILL SHUT DOWN THE BLOWER IN THE EVENT OF A HIGH OR LOW BLOWER DISCHARGE PRESSURE. PSL-701 WILL HAVE A SET POINT OF 1" WC AND PSH-701 WILL HAVE A SET POINT OF 2 PSIG.

TRS Accelerating Value

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	NOT APPROVED
PROJECT MANAGER	TRS PERSONNEL
APPROVED FOR CONSTRUCTION	BY _____ DATE _____

FOR FORMER PENTHOUSE DRAPERY
SEATTLE, WASHINGTON

VAPOR TREATMENT PROCESS AND INSTRUMENTATION DIAGRAM

DATE	03/16/15
PROJECT	SEA12
SHEET	P-7

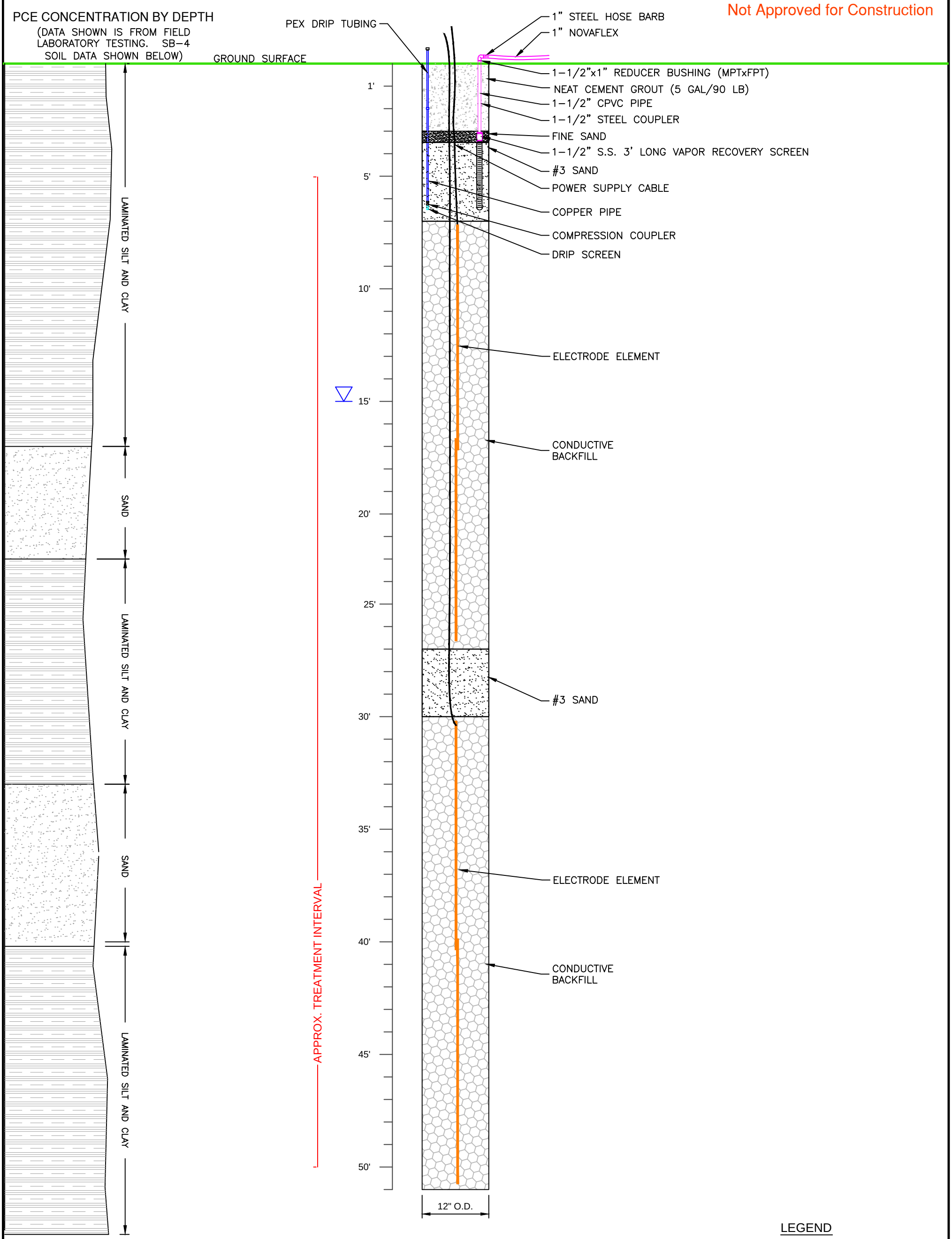
ELECTRODE (TYPICAL OF 9)

DRAFT

Not Approved for Construction

PCE CONCENTRATION BY DEPTH

(DATA SHOWN IS FROM FIELD LABORATORY TESTING. SB-4 SOIL DATA SHOWN BELOW)



LEGEND

▽ GROUNDWATER ELEVATION

TRS Accelerating Value

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	TRS PERSONNEL
PROJECT MANAGER	J. LILLIE
FOR	FORMER PENTHOUSE DRAPERY SEATTLE, WASHINGTON

ELECTRODE DETAIL

APPROVED FOR CONSTRUCTION

BY _____

DATE _____

DATE 02/18/15

PROJECT SEA12

SHEET M-1

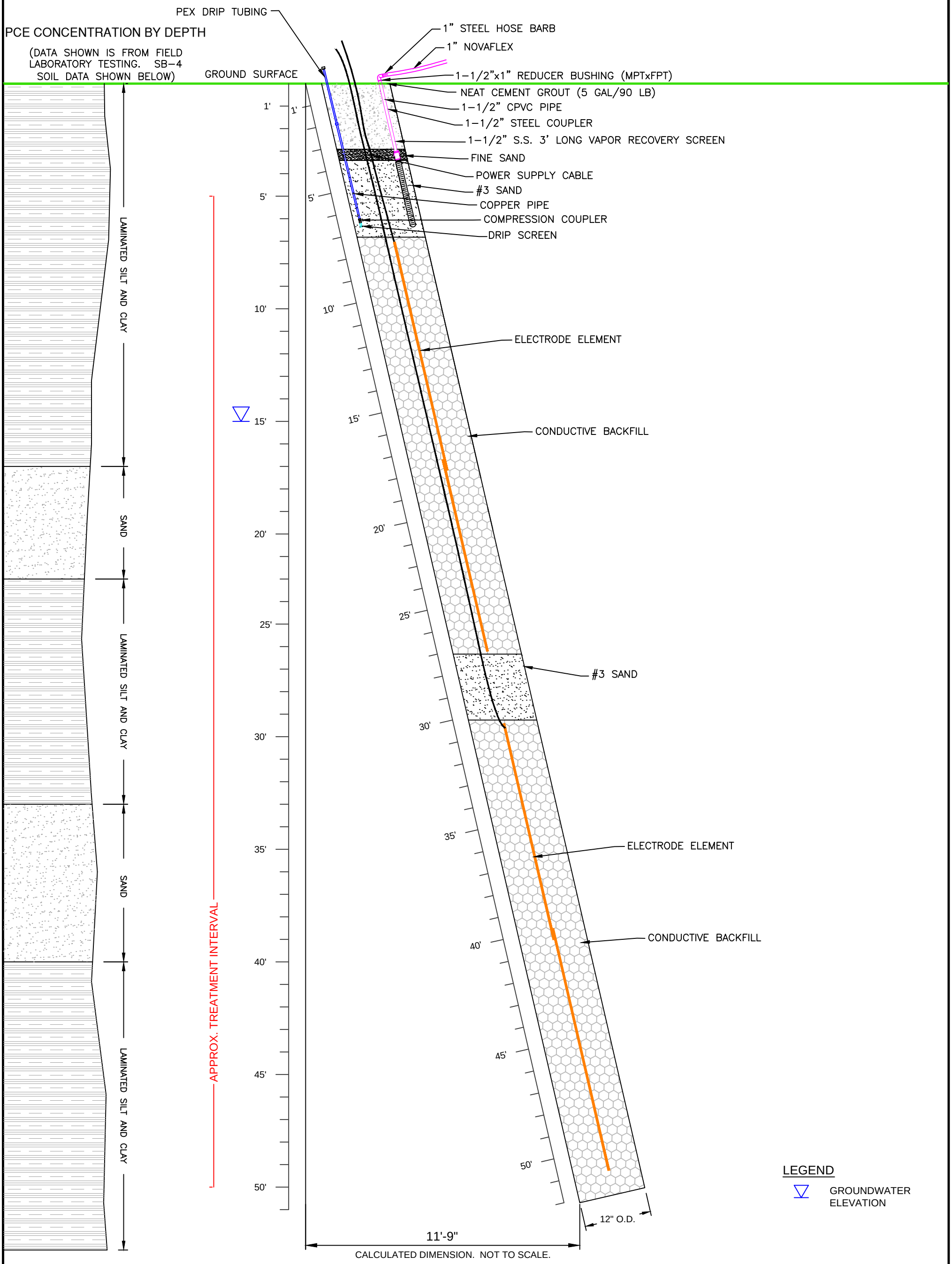
DRAFT

Not Approved for Construction

13° ANGLED ELECTRODE (TYPICAL OF 3)

PCE CONCENTRATION BY DEPTH

(DATA SHOWN IS FROM FIELD LABORATORY TESTING. SB-4 SOIL DATA SHOWN BELOW)



LEGEND

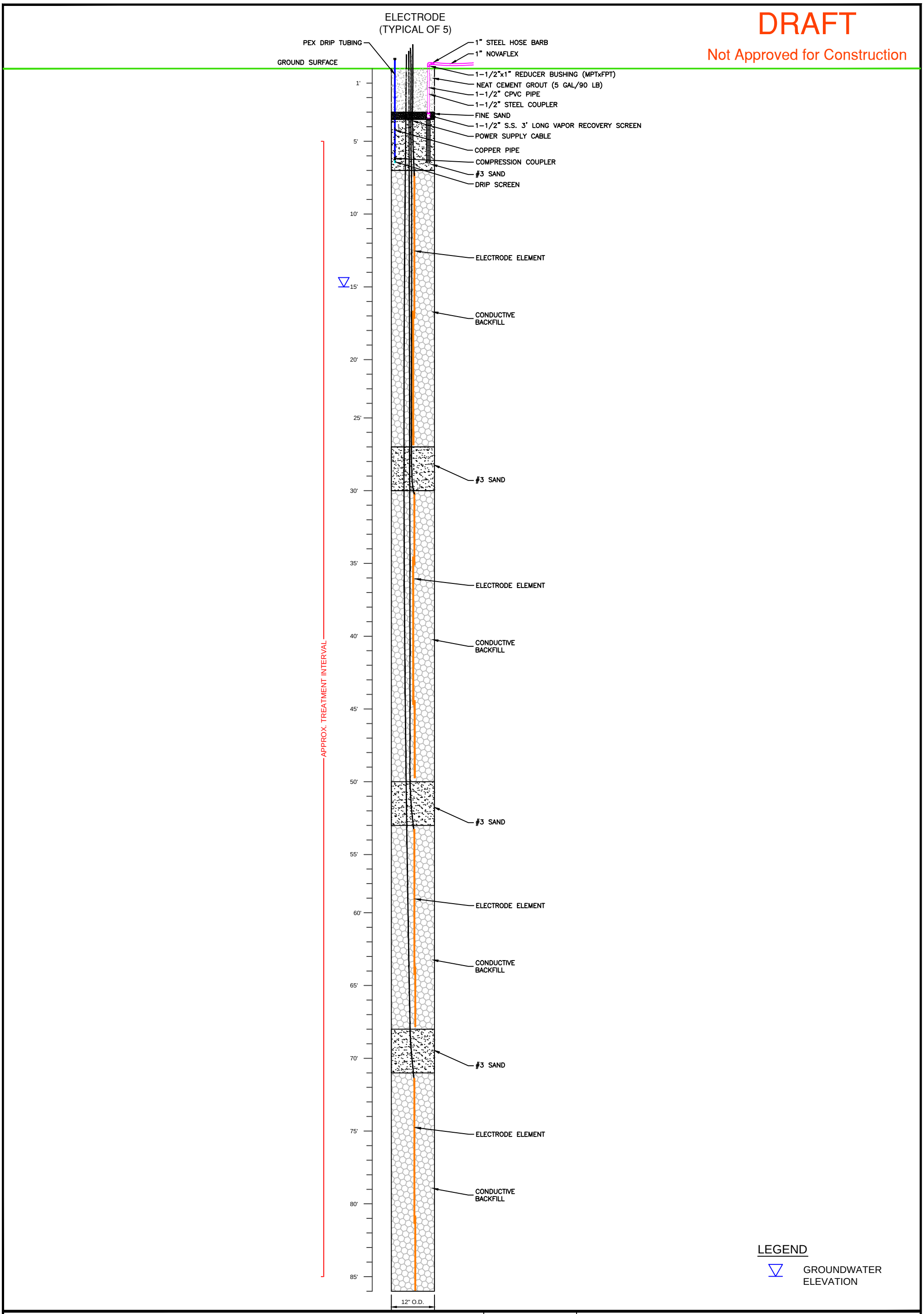
▽ GROUNDWATER ELEVATION

TRS Accelerating Value

DESIGNED BY D. SEILER	FOR FORMER PENTHOUSE DRAPERY, SEATTLE, WASHINGTON
DRAWN BY A. PEABODY	
CHECKED BY TRS PERSONNEL	13° ANGLED ELECTRODE DETAIL
PROJECT MANAGER J. LILLIE	
APPROVED FOR CONSTRUCTION BY _____ DATE _____	DATE 02/18/15 · PROJECT SEA12 · SHEET M-2

DRAFT

Not Approved for Construction



LEGEND

▽ GROUNDWATER ELEVATION

TRS Accelerating Value

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	TRS PERSONNEL
PROJECT MANAGER	J. LILLIE
APPROVED FOR CONSTRUCTION	BY _____ DATE _____

FOR FORMER PENTHOUSE DRAPERY
SEATTLE, WASHINGTON

ELECTRODE DETAIL

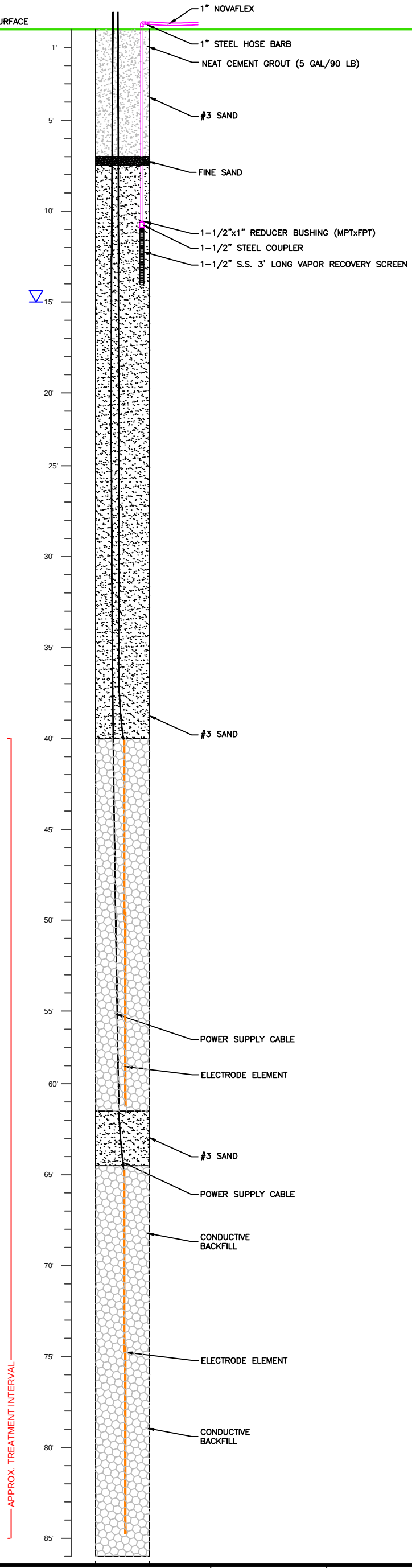
DATE 02/18/15 | PROJECT SEA12

SHEET M-3

DRAFT

Not Approved for Construction

ELECTRODE
(TYPICAL OF 3)



LEGEND

▽ GROUNDWATER ELEVATION

TRS Accelerating Value

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	TRS PERSONNEL
PROJECT MANAGER	J. LILLIE
FOR	FORMER PENTHOUSE DRAPERY SEATTLE, WASHINGTON

ELECTRODE DETAIL

APPROVED FOR CONSTRUCTION

BY _____

DATE _____

DATE 02/18/15

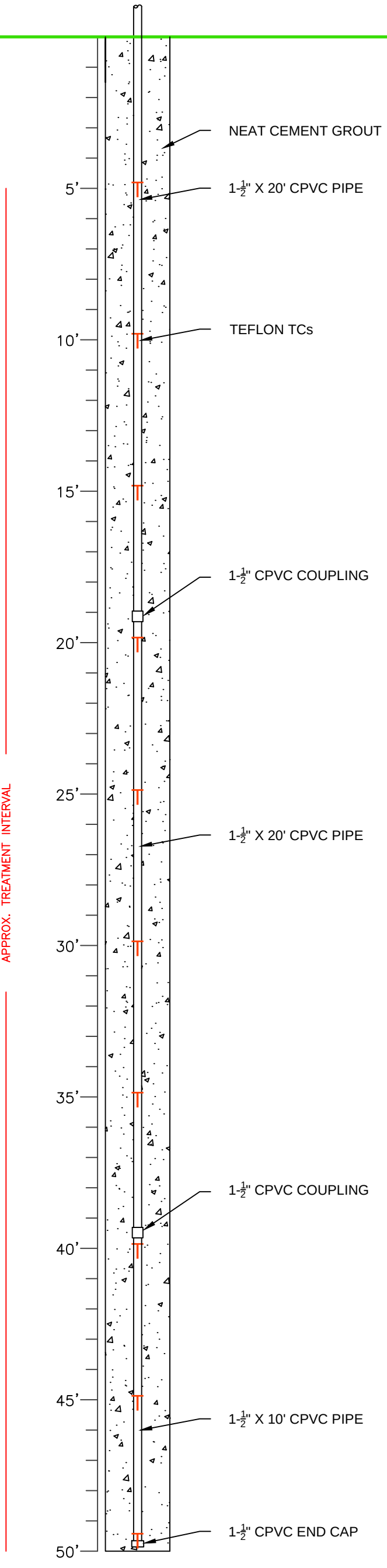
PROJECT SEA12

SHEET M-4

DRAFT

Not Approved for Construction

TMP
(TYPICAL OF 3)



APPROX. TREATMENT INTERVAL

LEGEND

GROUNDWATER ELEVATION

TRS Accelerating Value

DESIGNED BY D. SEILER	FOR FORMER PENTHOUSE DRAPERY, SEATTLE, WASHINGTON
DRAWN BY A. PEABODY	
CHECKED BY TRS PERSONNEL	TEMPERATURE MONITORING POINT DETAIL
PROJECT MANAGER J. LILLIE	
APPROVED FOR CONSTRUCTION BY _____ DATE _____	DATE 02/18/15 / PROJECT SEA12
	SHEET M-5

DRAFT

Not Approved for Construction

TO 26 KV OVERHEAD
LINES ON 22nd AVE. So.

ELECTRICAL SERVICE
PROVIDED BY SEATTLE
CITY LIGHT (SCL)

POLE MOUNTED CT'S AND PT'S
FOR METERING BY SCL

H1 H3 H2 H4
X4 X2 X3 X1

26 kV

480 volt

750 KVA PAD-MOUNTED
TRANSFORMER
DESIGN AND INSTALL
BY SEATTLE CITY
LIGHT (SCL)

(3) 4" PVC CONDUITS WITH
(3) 600 KCM TYPE THHN
CONDUCTORS PER CONDUIT

1,400 AMP CIRCUIT BREAKER
ADJUSTABLE TRIP (1200 - 1600 AMPS)
AIC 50,000 AMPS AT 480VAC

MAIN
CONTACTOR

VARIABLE
VOLTAGE
OUTPUT

40 AMP
CIRCUIT BREAKER

25 AMP
CIRCUIT BREAKER

PCU 700
SUPPLIED BY TRS
SERVICE REQUIREMENTS:
480 VAC
850 AMPS MAX FULL LOAD AMPS
3 PHASE
NO NEUTRAL REQUIRED
BLOWER AND CONDENSER BONDED
TO PCU GROUNDING BUS

300 AMP CABLE
PROTECTORS

SUPPLY CABLES TO
ELECTRODES

20 ELECTRODES
HEATING LOAD - 700 kW

#6 AWG SOW (4 CONDUCTOR)

#8 AWG SOW (4 CONDUCTOR) MINIMUM

480 V, 60 A

20A MS3 OL3 — 10 HP — COOLING TOWER FAN MOTOR

8A MS4 OL4 — 3 HP — RECYCLE WATER PUMP

3A MS5 OL5 — 1.5 HP — CONDENSATE PUMP

3A MS6 OL6 — 1.5 HP — GEAR PUMP

20A MS7 — HTR — 3 kW IMMERSION HEATER

10A — H1 H3 H2 H4 / X4 X2 X3 X1 — 480 V / 120 V — CONDENSER CONTROL POWER

10A — H1 H3 H2 H4 / X4 X2 X3 X1 — 480 V / 240 V — CB-20A — CONDENSER FREEZE PROTECTION

ERH CONDENSER
SUPPLIED BY TRS
(31 FLA)

MS8 OL7 — 15 HP

CB-6.3A — H1 H3 H2 H4 / X4 X2 X3 X1 — 480 V / 120 V

CB-6A MS9 OL8 — 1/4 HP

ERH BLOWER 15 HP
SUPPLIED BY TRS
(25 FLA)

TRS Accelerating Value

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	TRS PERSONNEL
PROJECT MANAGER	J. LILLIE

FOR
FORMER PENTHOUSE DRAPERY
SEATTLE, WASHINGTON

PRIMARY SERVICE ONE-LINE DIAGRAM

APPROVED FOR CONSTRUCTION
BY
DATE

DATE 02/16/15
PROJECT SEA12
SHEET E-1