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Addendum

Document Title:	Addendum to Site-Specific Sampling and Analysis Plan for Phase II ESA ADQ Cleaners - Astoria, Oregon
Addendum Number:	1
Prepared by:	Stantec Consulting Services Inc. 601 SW 2nd Avenue, Suite 1400 Portland, Oregon 97204
Date:	March 4, 2025

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INTRODUCTION

This Sampling and Analysis Plan (SAP) Addendum has been prepared on behalf of Clatsop County, Oregon by Stantec Consulting Services Inc. (Stantec) for additional field sampling and associated laboratory analyses to be performed at the ADQ Cleaners property (aka Astoria Dry Cleaning) located at 823 West Marine Drive in Astoria, Oregon (hereinafter referred to as "Property", **Figure 1**). The project is being performed using a U.S. Environmental Protection Agency (EPA) Brownfield Assessment Grant (BF-02J17201).

The work plan described in this SAP Addendum expands on a previous Site-Specific SAP (Stantec, 2024) and Phase II Environmental Site Assessment (ESA) completed at the Property by Stantec (Stantec, 2025). The scope of work described in this SAP Addendum will be conducted in accordance with the project-wide Quality Assurance Project Plan (QAPP) approved by the EPA on April 20, 2023 (Stantec, 2023).

2024 PHASE II ESA

In 2024, Stantec completed a Phase II ESA of the Property comprised of soil, groundwater, vapor, and air sampling. Previous sample locations are listed below and shown on **Figures 2 and 3**.

- Soil and/or groundwater samples were collected from seven borings (ADQ-GP01 through ADQ-GP07).
- Three sub-slab vapor samples (ADQ-SSV01 through ADQ-SSV03) were collected from beneath the floor slab of the Property building.
- Two soil vapor samples (ADQ-SV01 and ADQ-SV02) were collected from locations outside the building, near the northern and southern Property boundaries.
- One indoor air sample was collected to assess whether volatile organic compounds (VOCs) were migrating from the subsurface and through the building floor slab. A contemporaneous outdoor air sample was also collected to account for the contribution of outdoor air to the indoor air sample.

The ESA conclusions and recommendations are provided below:

- Dry cleaning solvent constituents (predominantly tetrachloroethylene [PCE] and trichloroethylene [TCE]) are present in groundwater and soil vapor at concentrations above Oregon Department of Environmental Protection (DEQ) residential and commercial vapor intrusion risk-based concentrations (RBCs). The highest groundwater concentrations were detected outside the northern Property building door near stormwater catch basin CB-1, which appears to be the source area. Data indicate that groundwater impacts may be migrating to the south-southwest and that concentrations decrease significantly with distance from the suspected source area.
- The groundwater plume likely extends off-site into the W. Marine Drive right-of-way; however, the measured groundwater concentrations in the three borings nearest the Property boundary with

West Marine Drive are below their respective RBCs for groundwater in excavation, indicating that exposure to roadway excavation and construction workers is not a concern.

- The data indicate that the stormwater and sanitary sewer systems may be pathways for preferential contaminant migration away from the source area as lower-level groundwater impacts were detected in GP03 and GP02, which are (presumably) cross-gradient and near the stormwater sewer line. The elevated soil vapor PCE and TCE concentrations detected near the sanitary sewer line outside the southeast corner of the Property building may indicate a secondary localized source area.

- The potential for the sanitary sewer to be a secondary source area is supported by the fact that PCE was detected at a very low concentration in groundwater at GP-01, while the PCE concentration in soil vapor in nearby sample SV02 is relatively high at 18,500 micrograms per cubic meter (µg/m^3).

- While VOCs were detected in groundwater near the eastern Property boundary, suggesting that the stormwater line may be a preferential pathway, the concentrations are well below occupational screening criteria for vapor intrusion, and thus do not present a concern for the Dairy Queen building on the adjacent site to the east.

- VOCs were detected in indoor and outdoor air samples; however, the VOC fingerprint reported in the indoor and outdoor air samples was different than the sub-slab samples, with higher ethylbenzene and xylene concentrations and lower PCE concentrations (no TCE was detected). Ethylbenzene and xylenes were detected in the indoor air sample at concentrations above acute and chronic commercial indoor air RBCs. A small number of paint cans were observed inside the building and were removed prior to sample collection. Ethylbenzene and xylenes are common constituents in paints and may have been historically used by dry cleaner operations for spot treatment. No obvious source of the ethylbenzene/xylenes was observed; however, the detection of these constituents in indoor air at higher concentrations than in outdoor air or sub slab vapor samples suggests an interior source.

- PCE and TCE concentrations in sub-slab vapor and in soil vapor exceed residential and commercial vapor intrusion RBCs. The highest concentrations were detected in SSV02 and SV01, near the suspected primary source area, with lower concentrations detected in the presumed downgradient samples SSV03 and SSV01. Elevated PCE and TCE were detected in SV02 near the southern Property boundary, suggesting a potential secondary source area. Sub-slab vapor PCE concentrations exceed the DEQ vapor intrusion RBC; however, PCE was detected well below its RBC in indoor air. This indicates substantial vapor attenuation is occurring between the subfloor and interior building area.

- VOCs were detected in soil at concentrations below RBCs but above clean fill criteria. The detected concentrations in the deeper intervals may be associated with contaminant migration via the sanitary and/or storm sewers, or with proximity to the smear zone and impacts in groundwater.

Stantec recommended further assessment as described below.

- Additional air sampling to further evaluate vapor intrusion risk and whether removal of ambient sources and stagnant building air will reduce indoor air concentrations of ethylbenzene and xylenes to acceptable levels. Prior to collecting indoor air samples, a thorough inspection of the building should be conducted to identify and remove potential indoor sources of VOCs such as cleaners, paints, and fuels.
- Further sub-slab and soil vapor sampling is recommended to evaluate temporal and spatial variability in the fingerprint and VOC concentrations and further evaluate potential vapor intrusion.
- Further sampling is recommended to evaluate potential offsite groundwater and/or vapor contaminant migration to the southwest toward the right of way, and east toward the adjacent Dairy Queen property.
- Further sampling is recommended to evaluate contaminant concentration changes with distance from storm and sanitary sewers to better understand whether these features are acting as contaminant migration pathways.

CONCEPTUAL SITE MODEL

The Conceptual Site Model (CSM) provided in the previous Phase II ESA completed by Stantec (Stantec 2025) including screening levels will be used for this supplemental investigation.

PRE-FIELD WORK ACTIVITIES

Prior to subsurface work at the Property, Stantec will contact the Utility Notification Center and requested a public underground utility locate. Additionally, a private geophysical contractor will be contracted to explore sample locations for subsurface utilities before boreholes are advanced.

Stantec will update the Site-Specific Health and Safety Plan prepared for prior field sampling activities to describe field sampling activity safety protocols to be followed during the project.

SUPPLEMENTAL PHASE II ESA SCOPE OF WORK

INDOOR AIR AND VAPOR SAMPLING

Indoor air, sub-slab vapor, and vapor sample collection are described in this section. The samples will be collected in the late winter/early spring, when weather and subsurface conditions are most likely to contribute to vapor intrusion. Prior to sampling, the Property building will be thoroughly inspected for potential sources of VOCs and semi-volatile organic compounds (SVOCs) such as paints and cleaners. These materials will be inventoried and removed. The indoor air samples and sub-slab vapor samples will be collected while the HVAC system is operating to represent building conditions during future occupancy. The HVAC system will be activated at least 48 hours prior to sample collection. Indoor air and vapor sampling methods outlined in the previous SAP will be followed.

Indoor Air Sampling

Two indoor air samples will be collected (**Figure 2**). Indoor air sample ADQ-AS1 will be collected in the western area of the building to evaluate:

- whether removal of ambient sources and stagnant building air will reduce indoor air concentrations of ethylbenzene and xylenes to acceptable levels;
- temporal variance in VOC concentrations in this area compared to previous indoor air sample results;
- the potential for intrusion of PCE vapors which were previously detected at elevated concentrations in sub-slab vapor (SSV03) and soil vapor (SV02); and
- the potential that the sanitary sewer line is acting as a secondary source and contributing to vapor intrusion.

A second indoor air sample (ADQ-AS2) will be collected near the location of previous sub-slab vapor sample SSV02 where the highest PCE and TCE concentrations have been detected in sub-slab vapor. This data will allow for evaluation of a worst-case vapor intrusion scenario as well as spatial variation of VOCs in indoor air when compared to ADQ-AS1.

The samples will be collected at a height of approximately 6 feet above the floor using a 6-liter Summa™ canister equipped with a laboratory-certified flow controller, set to collect a time-integrated sample over an approximately 8-hour period to mimic the anticipated daily exposure of future commercial building occupants. During sampling, the pressure gauge on the flow controller will be monitored periodically to ensure the vacuum in the canister decreases evenly over time, indicating proper operation. The sampling will cease when the vacuum is approximately 5 inches of mercury (Hg).

A contemporaneous outdoor air sample will be collected to evaluate the contribution of outdoor air to the indoor air samples. This outdoor sample will be collected using the same method as the indoor samples and will be collected from the same location as the previous Phase II ESA sample, outside the northern area of the building.

Both the indoor and outdoor air samples will be submitted to Pace Analytical National under chain-of-custody protocols for analysis of VOCs by EPA Method TO-15 selected ion monitoring (SIM).

Sub-Slab Vapor Sampling

Sub-slab vapor and soil vapor sampling will be conducted to evaluate temporal and spatial variability in detected VOC concentrations, and further evaluate potential vapor intrusion on and off the Property (**Figure 2**). Sub-slab vapor and soil vapor sampling will be conducted on the same day and as indoor air sampling and in accordance with the procedures described in the SAP (Stantec 2024).

One sub-slab vapor sample (SSV04) will be collected in the western area of the building near the sanitary sewer line which was identified as a potential secondary source area in the previous Phase II ESA. This sample data will be used to evaluate:

- whether VOCs detected in indoor air samples may be associated with vapor intrusion from a localized subsurface source such as the sanitary sewer line; and
- temporal variability in sub slab VOC concentrations below the western area of the building compared to those VOCs detected at SSV03 during the previous Phase II ESA.

A second sub-slab vapor sample (SSV05) will be collected in the eastern area of the building near previous sub-slab sample SSV02 to:

- evaluate temporal variance in sub-slab VOC concentrations in this area; and
- evaluate spatial variability of VOCs in indoor air.

Soil Vapor Sampling

Two soil vapor samples will be collected. Sample SV03 will be collected near the eastern Property boundary to evaluate vapor migration/intrusion offsite to the east. The sample will be collected near the storm sewer lines to evaluate vapors from both groundwater and the storm sewer. Sample SV04 will be collected between the Property building and the storm sewer to evaluate spatial variability in VOC concentrations with distance from the storm sewer lines. The data from these samples will be used to assess whether the storm sewer line may represent a secondary vapor source.

GROUNDWATER SAMPLING

Boreholes for grab groundwater sample collection will be advanced using a direct push drill rig operated by an Oregon licensed driller subcontracted by Stantec. Groundwater sampling methods described in the original SAP will be followed. Soil cores will be continuously screened using a photoionization detector (PID) and observed for staining or odors during boring advancement. One or more soil samples may be collected and submitted for laboratory analysis of VOCs based on field observations.

Two grab groundwater samples will be collected to further evaluate potential for offsite migration of groundwater impacts into the West Marine Drive right of way. Groundwater sample ADQ-GP08 will be collected near the southwestern corner of the Property near the location of previous boring ADQ-GP06 to confirm previously identified concentrations and/or to evaluate temporal variation in potential groundwater migration offsite to the W. Marine Drive right of way. Sample ADQ-GP09 will be collected near the southeastern corner of the Property to evaluate migration offsite to the W. Marine Drive right of way and evaluate groundwater conditions near the storm sewer line.

A third groundwater sample (ADQ-GP10) will be collected between the Property building and the storm sewer line to evaluate spatial variability in VOC concentrations in groundwater with distance from the storm sewer. This data will be used to assess whether the storm sewer line may represent a secondary source of groundwater impacts. Proposed groundwater sample locations are shown on **Figure 2**.

Quality Assurance

Quality assurance procedures including QA/QC sampling, sample handling, field documentation, data validation, and removal of investigation-derived waste described in the project-wide QAPP and project-specific SAP will be followed for this scope of work.

REPORTING

Following receipt of final laboratory analytical results, Stantec will prepare a written Supplemental Phase II ESA report documenting the investigation and sample results. The report will be submitted to Clatsop County and the DEQ. The report will include, at a minimum, the following:

- A description of Supplemental Phase II ESA activities;
- Figures illustrating sampling locations;
- A CSM;
- Analytical data summary tables;
- Comparison of analytical data to applicable screening levels;
- Data validation memorandum;
- Recommendations for further assessment and/or cleanup; and
- Deviations from the procedures and plans described in this SAP.

Attachments:

Figure 1 – Property Location Map
Figure 2 – Historical Groundwater and Soil Vapor Results
Figure 3 – Proposed Sampling Locations

LIMITATIONS

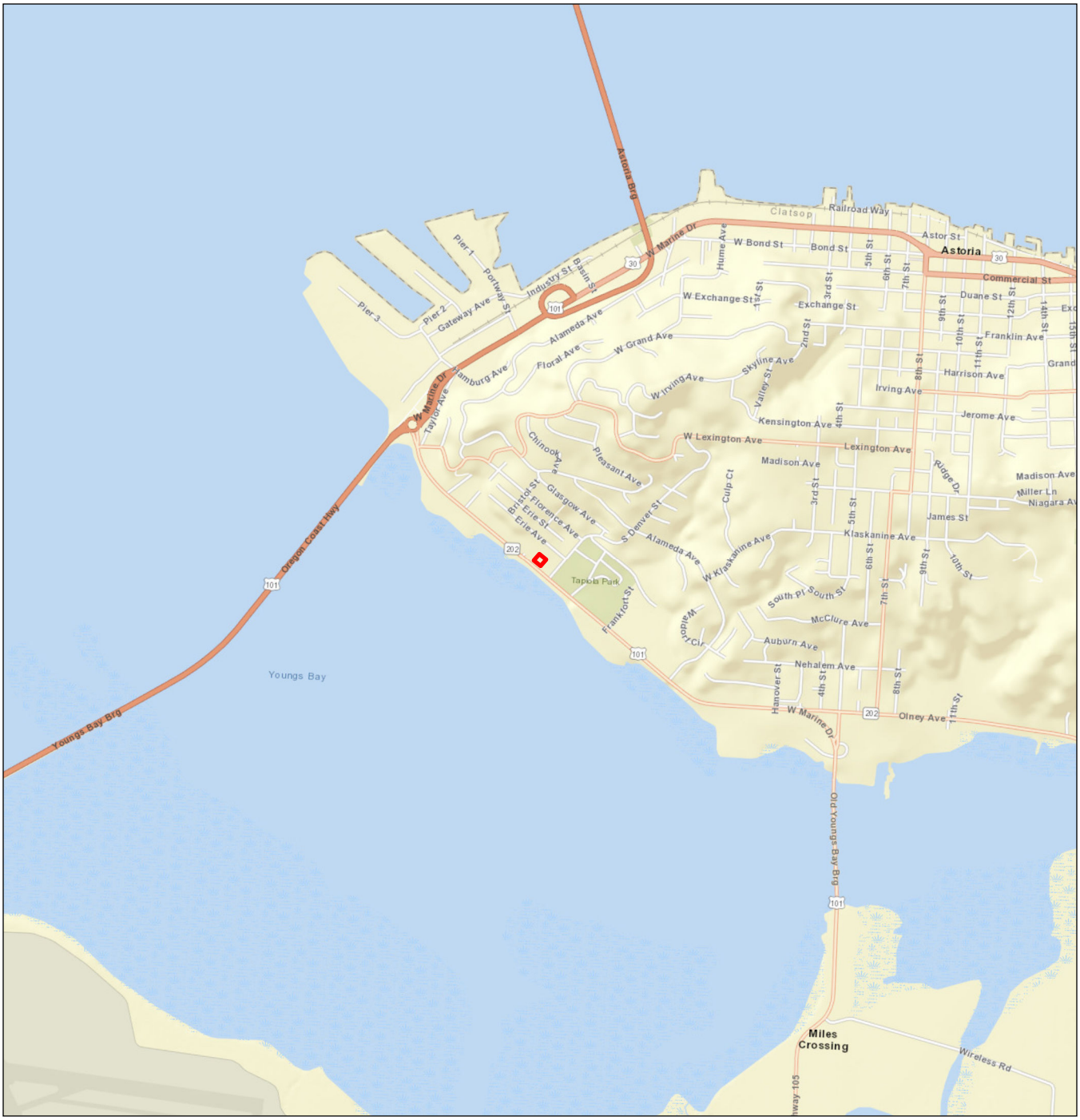
This document was prepared by Stantec for Clatsop County. The material in it reflects Stantec's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this SAP, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Stantec accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this SAP.

REFERENCES

Stantec 2023. Master Quality Assurance Project Plan (Revision 0) Clatsop County EPA Brownfield – Community Wide Assessment Grant. Cooperative Agreement No. BF-02J17201. March 6, 2023.

Stantec 2024. Site-Specific Sampling and Analysis Plan for Phase II Environmental Site Assessment Revision 1; August 12, 2024.

Stantec 2025. Phase II Environmental Site Assessment, Revision 1. February 7, 2025.



Property Boundary

0 1,200 2,400 Feet

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1:24,000

Notes

1. Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet

2. Background: County of Clark, WA, Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, USFWS, Bureau of Land Management, State of Oregon GEO, State of Oregon, Esri, HERE, Garmin, NGA, USGS, U.S. Forest Service

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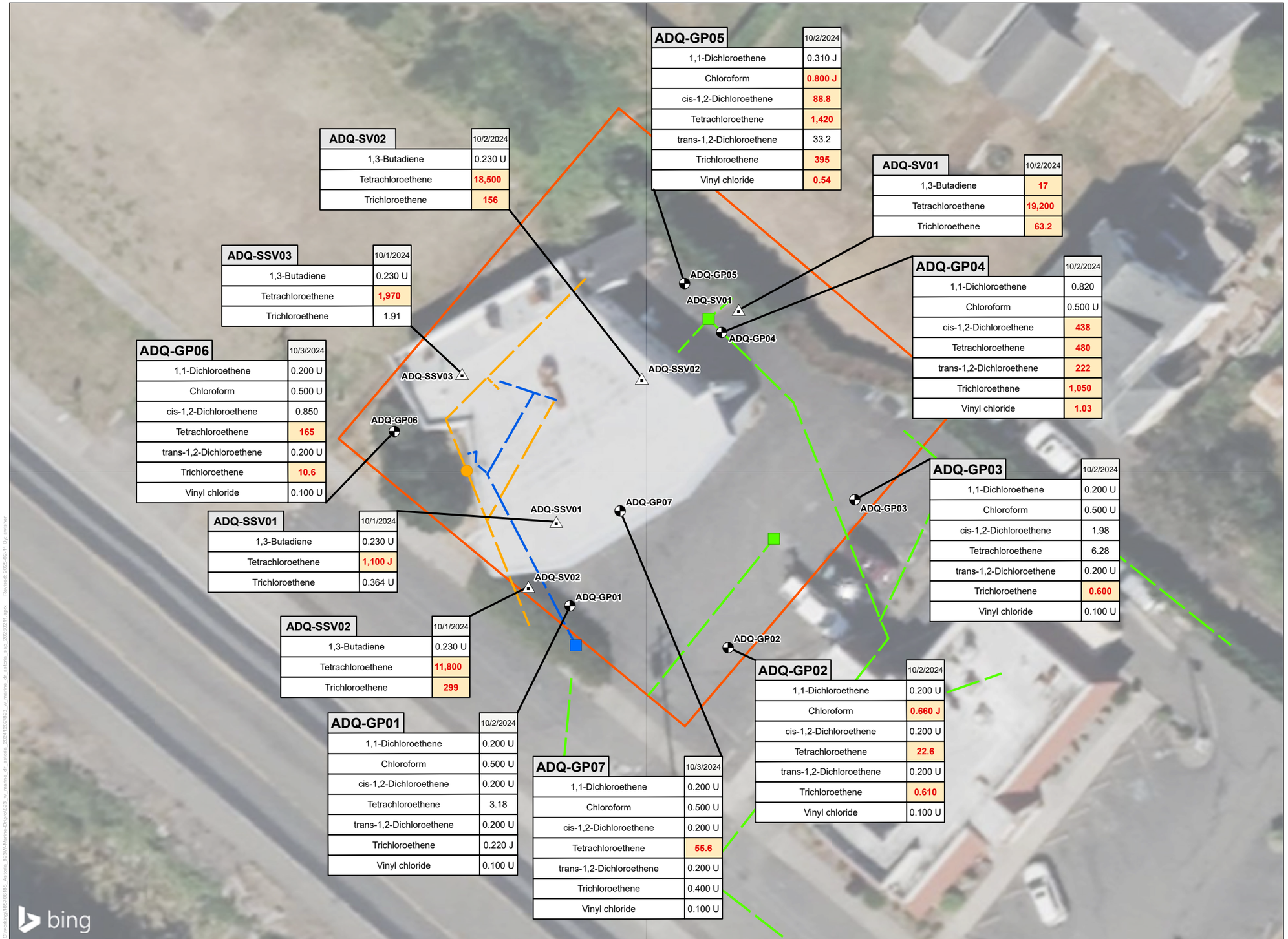
Project Location
823 West Marine Drive
Astoria Oregon

Client/Project 185706185
Clatsop County
Phase II Environmental Site Assessment
Sampling and Analysis Plan

Title
Property Location Map

Figure No.
1



ADQ-SV02	10/2/2024
1,3-Butadiene	0.230 U
Tetrachloroethene	18,500
Trichloroethene	156

ADQ-GP05	10/2/2024
1,1-Dichloroethene	0.310 J
Chloroform	0.800 J
cis-1,2-Dichloroethene	88.8
Tetrachloroethene	1,420
trans-1,2-Dichloroethene	33.2
Trichloroethene	395
Vinyl chloride	0.54

ADQ-SV01	10/2/2024
1,3-Butadiene	17
Tetrachloroethene	19,200
Trichloroethene	63.2

ADQ-SSV03	10/1/2024
1,3-Butadiene	0.230 U
Tetrachloroethene	1,970
Trichloroethene	1.91

ADQ-GP04	10/2/2024
1,1-Dichloroethene	0.820
Chloroform	0.500 U
cis-1,2-Dichloroethene	438
Tetrachloroethene	480
trans-1,2-Dichloroethene	222
Trichloroethene	1,050
Vinyl chloride	1.03

ADQ-GP06	10/3/2024
1,1-Dichloroethene	0.200 U
Chloroform	0.500 U
cis-1,2-Dichloroethene	0.850
Tetrachloroethene	165
trans-1,2-Dichloroethene	0.200 U
Trichloroethene	10.6
Vinyl chloride	0.100 U

ADQ-SSV01	10/1/2024
1,3-Butadiene	0.230 U
Tetrachloroethene	1,100 J
Trichloroethene	0.364 U

ADQ-GP03	10/2/2024
1,1-Dichloroethene	0.200 U
Chloroform	0.500 U
cis-1,2-Dichloroethene	1.98
Tetrachloroethene	6.28
trans-1,2-Dichloroethene	0.200 U
Trichloroethene	0.600
Vinyl chloride	0.100 U

ADQ-SSV02	10/1/2024
1,3-Butadiene	0.230 U
Tetrachloroethene	11,800
Trichloroethene	299

ADQ-GP01	10/2/2024
1,1-Dichloroethene	0.200 U
Chloroform	0.500 U
cis-1,2-Dichloroethene	0.200 U
Tetrachloroethene	3.18
trans-1,2-Dichloroethene	0.200 U
Trichloroethene	0.220 J
Vinyl chloride	0.100 U

ADQ-GP07	10/3/2024
1,1-Dichloroethene	0.200 U
Chloroform	0.500 U
cis-1,2-Dichloroethene	0.200 U
Tetrachloroethene	55.6
trans-1,2-Dichloroethene	0.200 U
Trichloroethene	0.400 U
Vinyl chloride	0.100 U

ADQ-GP02	10/2/2024
1,1-Dichloroethene	0.200 U
Chloroform	0.660 J
cis-1,2-Dichloroethene	0.200 U
Tetrachloroethene	22.6
trans-1,2-Dichloroethene	0.200 U
Trichloroethene	0.610
Vinyl chloride	0.100 U

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- 2024 Stantec Soil/Groundwater Sample Location
- 2024 Stantec Soil Vapor Sample Location
- Catch Basin
- Sewer Cleanout
- Water Meter
- Concentration Exceeds Screening Level
- Approximate Property Boundary

	Chronic Vapor Intrusion Soil Vapor RBC - Residential	Chronic Vapor Intrusion Soil Vapor RBC - Commercial
1,3-Butadiene	3.1	14
Tetrachloroethene	360	1,600
Trichloroethene	16	100

Oregon DEQ Vapor Intrusion Risk-Based Concentrations

	A	B	C	D
1,1-Dichloroethene	280	1,100	300	1,300
Chloroform	0.22	1.0	1.4	5.9
cis-1,2-Dichloroethene	36	140	430	1,800
Tetrachloroethene	12	49	29	130
trans-1,2-Dichloroethene	360	1,400	180	750
Trichloroethene	0.49	2.0	2.1	13
Vinyl chloride	0.027	0.066	0.20	3.3

Oregon DEQ Groundwater Risk-Based Concentrations

A: Volatilization to Outdoor Air RBC - Residential
B: Volatilization to Outdoor Air RBC - Occupational
C: Chronic Vapor Intrusion RBC - Residential
D: Chronic Vapor Intrusion RBC - Commercial

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Notes:
1. Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet
2. Background: © 2025 Microsoft Corporation © 2025 Maxar ©CNES (2025) Distribution Airbus DS
3. Groundwater results expressed as micrograms per liter
4. Air results expressed as micrograms per cubic meter
5. Additional volatile organic compounds not included in this table were reported as non-detect for all samples
6. J = The result is an estimated value
7. U = Not detected above the reported value

Project Location
823 West Marine Drive
Astoria Oregon

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Clatsop County
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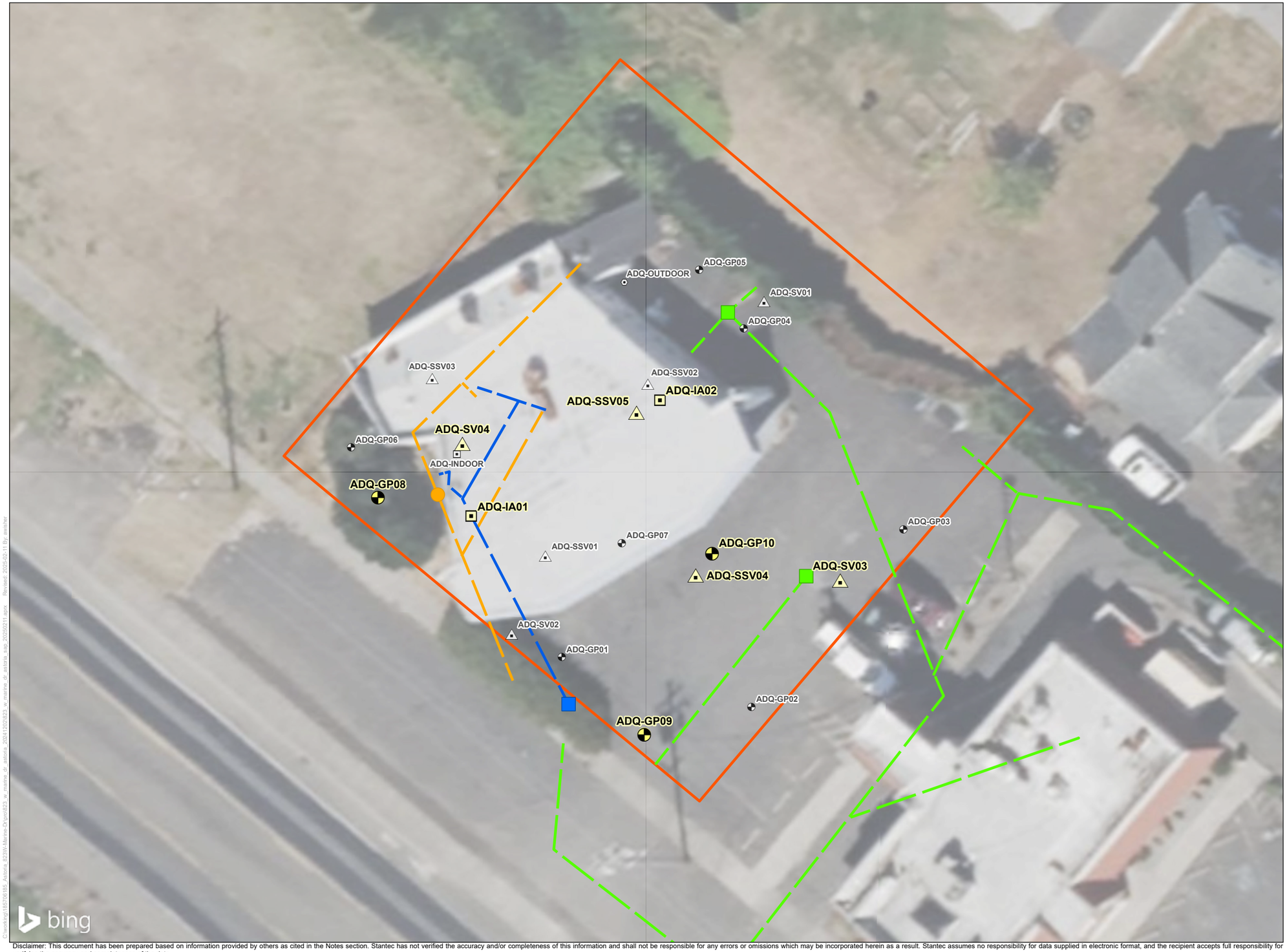
Sampling and Analysis Plan

Title
Historical Groundwater and Soil Vapor Sampling Results

Figure No.
2



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- Proposed Soil Vapor Sample Location
- Proposed Soil/Groundwater Sample Location
- Proposed Ambient Indoor Air Sample Location
- Proposed Outdoor Ambient Air Sample Location
- 2024 Stantec Soil Vapor Sample Location
- 2024 Stantec Soil/Groundwater Sample Location
- 2024 Ambient Indoor Air Sample Location
- 2024 Stantec Outdoor Ambient Air Sample Location
- Catch Basin
- Sewer Cleanout
- Water Meter
- Approximate Property Boundary

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Notes:
1. Coordinate System: NAD 1983 StatePlane Oregon North FIPS 3601 Feet
2. Background: © 2025 Microsoft Corporation © 2025 Maxar ©CNES (2025) Distribution Airbus DS

Project Location
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Astoria Oregon

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Clatsop County
Phase II Environmental Site Assessment
Sampling and Analysis Plan

Title
Proposed Sampling Locations

Figure No.
3