

Urban Environmental Partners Ilc

April 22, 2024

Groundwater Compliance Monitoring Plan Cleaners #1 (Woodmont) – VCP Project ID: XN0012

To: Mr. Frank Winslow, WA Ecology – Expedited VCP

From: John Funderburk & Roy Kuroiwa P.E., Urban Environmental Partners Ilc

CC: Mr. Jonathan Tran, Rainier Pacific Properties

RE: **Groundwater Compliance Monitoring Plan**
26112 Pacific Hwy South, Seattle, WA
VCP Project ID: SN0012

Introduction and Purpose

This Groundwater Compliance Monitoring Plan (CMP) was prepared by Urban Environmental Partners Ilc (UEP) on behalf of Rainier Pacific Properties for the above referenced Site (Figure 1). This CMP memo was prepared in general accordance with the Focused Feasibility Study and Cleanup Action Plan (FS/CAP, 11/4/21). Additional specifics on the required monitoring details, including frequency and analyses for each event, is also based on the Groundwater Remediation Plan for Cleaners #1 (Injection Plan, 2022) and Ecology’s Opinion on Proposed Cleanup (i.e., No Further Action (NFA) Likely letter) transmitted on December 7, 2021.

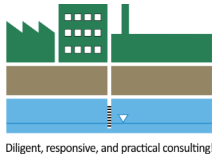
This CMP memo specifies the general field and laboratory methods and data quality objectives that will be used to locate, collect, and chemically analyze groundwater performance and confirmation samples at the Site following the implementation of insitu groundwater cleanup activities described in the Remedial Investigation Report (RI, 2/12/21) an Focused Feasibility Study and Cleanup Action Plan (FS/CAP, 11/4/21).

In accordance with the Site’s NFA Likely letter (Ecology, 12/07/21), this plan describes the required Groundwater Compliance Monitoring Plan to ensure the effectiveness of the cleanup action implementation. This plan will also be an exhibit to the Site’s Environmental Covenant.

In accordance with Ecology’s NFA Likely letter, completing the two insitu cleanup elements along with recording an Environmental Covenant that includes exhibits for VI and groundwater compliance monitoring will result in Ecology issuing the Site an NFA determination.

Project Background

The Site RI Report details CVOC impacts in soil and groundwater beneath the Site that are the result of dry-cleaning operations between approximately 1990 and 2001. The primary source area appears to be below the former dry-cleaning machine and a lateral sewer line to the south and east. The



Urban Environmental Partners llc

Contaminants of Concern (COCs) for the Site include PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, and VC. No ongoing chlorinated solvent releases from the former dry cleaner are occurring at the Site.

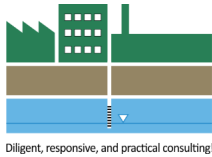
Based on the results of previous investigations, the lateral extent of CVOC contamination in groundwater appears to be limited to the area beneath the former dry-cleaning machines, extending to the east/southeast in relation to groundwater flow paths (Figure 2). The known CVOC groundwater plume is bound by several compliance wells.

Since 1998, several remedial investigations and interim cleanup measures have been implemented to address contamination at the Site. As detailed in the UEP RI and summarized in the UEP Focused FS, the remaining CVOC impacts at the Site, as recently confirmed during 2019 and 2021 VI sampling and groundwater investigations, include (see Figure X):

- Soil Source Area 1 – CVOC contaminated soil above cleanup levels remain below the bakery (former cleaners) floor.
- CVOC Impacted Groundwater Downgradient of the Source Area – Defined and delineated by several monitoring wells, a roughly 600-square foot footprint and 15 to 20-foot thick, shallow groundwater plume contains residual CVOC impacts from Source Areas 1 and 2.
- Indoor Air Quality in the Former Cleaners #1 Shop – Recent VI sampling confirms that indoor air is protective of human occupancy. Nevertheless, Source Area 1 remains as a potential source for VI and indoor air impacts.

In June 2022, UEP implemented a groundwater remediation plan that included:

1. Implementation of In-situ Chemical Oxidation (ISCO) to treat shallow, impacted soil and groundwater in Source Area 1 which involved the injection of reactive chemical oxidants (in this case sodium permanganate known as RemOx™ manufactured by Carus Remediation Company) into the environment for rapid and complete contaminant destruction (where the oxidant reaches the contaminant). The use of RemOx™ establishes a sustained oxidation condition for the CVOCs in a uniquely non-corrosive condition with minimal heat and pressure.
1. Creation of a permeable reactive barrier wall (PRB) at the downgradient edge of the dissolved groundwater plume as shown on Figure 2. The permeable reactive barrier wall (PRB) was constructed with two techniques of insitu degradation: (a) sulfidated micro-sized zero valent iron (S-MicroZVI™) is an engineered chemical reduction agent designed to provide an optimal source of micro-scale (< 5.0 microns) zero valent iron into the saturated zone. The chemical reaction caused by the ISCR solution is an abiotic reaction that chemically promotes the destruction of the chlorinated solvents in groundwater; and (b) enhanced anaerobic bioremediation or degradation that is accelerated by adding a proprietary mixture of anaerobic microbes, called Bio-Dechlor Inoculum (BDI Plus™) and 3-D Microemulsion® or 3-DME, a fermentable carbon source, to the impacted area.



Urban Environmental Partners llc

Shallow Soil and Hydrogeology Conditions. Previous environmental investigations have shown the Site to be underlain with approximately 3 feet of fill, followed by moist fine grained sandy silt with variable gravel content to approximately 6-8 feet bgs, then wet gravelly sand with silt to the maximum depth explored of 24 feet bgs. Depth to groundwater ranged from 2.30 feet to 5.05 feet below the top of the monitoring well casings. The calculated groundwater elevations ranged from 94.76 to 95.74 feet above an arbitrary benchmark of 100' at MW-1. Calculated groundwater elevations indicate a predominant flow direction to the east/southeast at a gradient of 0.007 feet per foot.

Groundwater Performance Monitoring Plan

Groundwater performance monitoring is planned for the treated plume area as shown on Figure 2. Four Ecology-approved wells MW1/1R, -2, -3 and -10 will be monitored to evaluate the progress and effectiveness (i.e., performance) of insitu treatment of groundwater within the source and downgradient plume areas.

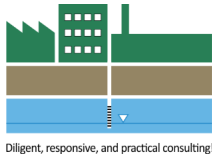
As shown on Table 1, an initial four rounds of post-treatment monitoring will be performed using four Ecology-approved wells to establish the effectiveness of initial and ongoing insitu treatment, followed by annual sampling until Year 5 (2028), for a total of 6 sampling events before end of Year 5. Following Year 5, performance monitoring will be terminated (this schedule anticipates static or declining conditions, e.g., attenuation, in the treatment zone along with continued attainment of CULs in the COPC wells) unless Ecology determines that additional monitoring is appropriate, such as annual or biennial monitoring. A post 5-Year monitoring schedule will be determined during each 5-Year Review event. Performance monitoring wells consist of:

- MW-1/1R: located just within and downgradient of the source area and ISCO injection area. MW-1R was installed to provide more effective monitoring as MW-1 recovery is poor and often purges dry during sampling. This well monitors the effectiveness of permanganate injection and progress of source reduction.
- MW-2: located between the ISCO injection area and the downgradient ISCR permeable reactive barrier (PRB), this location is not expected to immediately measure any impacts from insitu treatment.
- MW-3: located just upgradient of the PRB, this well is expected to see some, but limited attenuation impacts due to ISCR injection.
- MW-10: located just upgradient of and within the PRB, this well is expected to see attenuation impacts due to ISCR injection.

Occasionally some analytes (nitrate and sulfates, BOD and COD) that measure the progress of enhanced biodegradation will be collected. A sampling and analysis matrix and schedule is provided as Table 2.

Groundwater Confirmation Monitoring Plan

An initial four rounds of post-treatment monitoring (Table 1) will be performed to confirm that conditional points of compliance (CPOC) wells are below Site CULs. Then CPOC wells will be sampled two times during the following 5-year period, and finally one time during the third 5-year period. This monitoring schedule



Urban Environmental Partners llc

may be changed by Ecology (e.g., reduced, terminated or increased), depending on the results and review performed during each 5-Year Review event.

The Site COPC wells include MW-6, -9 and -11.

Contingency Groundwater Plan

The ongoing performance of groundwater treatment by injection as described in this plan will be evaluated in accordance with the post-injection Compliance Monitoring events. If a change is suspected or determined in the wells, The three CPOC wells (MW-6, -9, -11) are indicators if or when a shift or change to the shallow groundwater conditions has occurred (e.g., increasing or declining concentrations, shifting plume location) or the contaminated plume is moving toward the property line. Currently all confirmation monitoring wells contain CVOC concentrations in groundwater below the applicable CULs or laboratory reporting limits (UEP, Monitoring Report, 2024).

The following groundwater contingency plan will be triggered if one of these three wells contain a CVOC concentration in groundwater at greater than half the groundwater CULs. At that point, the following contingency program will be followed. In all cases, Ecology will be contacted immediately with the elevated groundwater data point.

Level 1 – Groundwater sample is greater than half the CVOC CUL:

1. Evaluate the sampling event records and look for anomalies. Ensure that the sampling event was performed in accordance with acceptable practices and procedures.
2. Resample the subject monitoring well(s) and report the results to Ecology.
3. If the result is at or below half the CUL, proceed with routine frequency of groundwater monitoring, as detailed above in the CMP.
4. If above, evaluate additional groundwater treatment actions, beginning with the technologies used in this injection plan. Meet with Ecology to discuss a recommended plan and next steps.

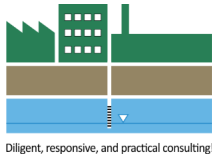
Level 2 – Groundwater sample is greater than the CVOC groundwater CULs:

1. Evaluate the sampling event records and look for anomalies. Ensure that the sampling event was performed in accordance with acceptable practices and procedures.
2. Resample the subject monitoring well(s) and report the results to Ecology.
3. If the results above CULs are confirmed, meet with Ecology and consider additional steps, including additional and more frequent sampling at the well; installing additional, downgradient on-site wells; and performing a contingent cleanup action injection in and around the well.

Sampling and Analysis Plan

Groundwater Sampling. Groundwater well purging and sampling will follow applicable EPA and Ecology guidance for low flow sampling techniques. This includes:

- Measure and record static water level to the nearest 0.01 foot.



Urban Environmental Partners llc

- Use the EPA Low-Flow Groundwater Sampling Procedure (EPA, 2010b). Purge groundwater at a low rate (~100 to 200 mL/min).
- Monitor the discharge water for temperature, pH, and specific conductance and record the data.
- Sampling may begin after three consecutive field parameter measurements (temperature, specific conductance, and pH) measured at not less than a 2-minute interval are stable.
- All water samples will be collected from the pump discharge lines directly into the appropriate sample containers. Collect samples in the appropriate containers according to laboratory specifications.

Analytical Laboratory Testing. Analytical testing methods are provided in Tables 2 and 3. Sample container requirements and storage conditions are provided in the Table 3. Sampling containers will be fully filled to minimize head space and will be appropriately labeled and stored prior to shipment or delivery to the laboratory.

Sample container type, preservation, or quantity is provided in Table 3 and may be adjusted to meet laboratory analytical requirements, or updates in EPA analytical methods. Additional container volume required for quality assurance purposes will be as required by the laboratory.

Schedule. The frequency of performance groundwater monitoring for the treatment area is twice a year, then once per year until confirmation sampling begins, as described in Table 1.

Once started, confirmation groundwater sampling will occur at the CPOC wells each quarter until four consecutive quarters are below the Site CULs or two consecutive rounds are below the LDLs.

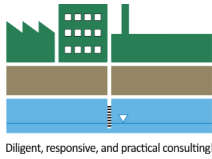
Documentation and Reporting. Sampling documentation includes filling out field logs during sampling and chain of custody forms for sample handling. Annual or biennial reports will include a data table with tabulated lab results for all performance and compliance wells, and the supporting lab analysis certificates. If appropriate, the report will include a summary of trends and groundwater conditions over time, including progress and performance of the enhanced biodegradation area in the treatment zone.

5-Year Reporting and Review. A 5-Year Review Report will be submitted to Ecology summarizing the prior 5-year compliance monitoring results. The report review, as suggested by Ecology, will occur around the first quarter of 2029, and approximately every five years after. During each review milestone and with input from the client and their consultant, Ecology may determine the need (or not) for a change in the groundwater compliance monitoring schedule and scope (e.g., reduced, terminated or increased), depending on the previous monitoring results.

Figures

Figure 1 – Site Location Plan

Figure 2 – Groundwater Compliance Monitoring Plan



Urban Environmental Partners llc

Tables

Table 1 – Groundwater Compliance Monitoring Plan and Schedule

Table 2 – Compliance Monitoring Plan and Testing Matrix

Table 2 – Analytical Methods and Sample Handling Detailsp

**Table 1 – Compliance Monitoring Events and Schedule
Cleaners #1**

Event Name:	Sampling Event Episode:							
	Year 1	Year 1	Year 2	Year 3	Year 4	Year 5	Years 5-10	Years 10-15
Groundwater Treatment by ISCO and ISCR Injection – 6/9/22								
Performance Groundwater Monitoring (MW-1/R, MW-2, MW-3 and MW-10)								
Events #1 and #2	10/1/22	12/30/22						
Event #3			7/19/23					
Event #4				1/9/24				
Event #5				~May '24				
Event #6					✓			
Event #7						✓		
5-Year Review							✓	✓
Compliance Groundwater Monitoring (MW-6, MW-9 and MW-11)								
Events #1 #2			7/19/23	1/9/24				
Event #3				~May '24				
Event #4				~Sept '24				
Ongoing Compliance							✓✓	✓
Compliance Soil Gas and Indoor Air Monitoring								
Event #1	12/30/22							
Event #2		3/21/23						
Event #3 and #4				~May '24		~Nov ' 28		
Ongoing Compliance							✓	✓
5- Year Review Report								
Report and Review with Ecology						~Feb '29	✓	✓

Optional, Ecology will determine after Event #3. Not optional, perform next event in May 2024.

✓ - sampling event performed during this period.

Table 2 – Compliance Monitoring Plan and Testing Matrix

Well Network	Compliance Monitoring Phase		
	Baseline Sampling	Performance Monitoring	Confirmation Monitoring
ISCR Performance Monitoring Wells – Source Area 1 MW-1 and MW-1R	<u>Single Event</u> <ul style="list-style-type: none"> • CVOCs • T/D Iron, Nitrate and Manganese • COD and BOD • Dissolved Gasses • Field Water Parameters 	<u>Varies¹</u> <ul style="list-style-type: none"> • CVOCs • Manganese • Field Water Parameters • Permanganate 	N/A
ISCO Performance Monitoring Wells – Reactive Barrier MW-2, MW-3 and MW-10		<u>Varies¹</u> <ul style="list-style-type: none"> • CVOCs • T/D Iron and Nitrate • COD and BOD • Dissolved Gasses • Field Water Parameters 	
Compliance Monitoring Wells MW-6, MW-9 and MW-11	<u>Single Event</u> <ul style="list-style-type: none"> • CVOCs • T/D Iron, Nitrate and Manganese • COD and BOD • Dissolved Gasses • Field Water Parameters 	N/A	<u>Varies¹</u> <ul style="list-style-type: none"> • CVOCs • Dissolved Gasses • Field Water Parameters

1 See Table 1 – Compliance Monitoring Events and Schedule for details

Table 3 – Analytical Methods and Sample Handling Details

Analyses	Analytical Method	Water Sample Container	Preservation	Max Holding Time
CVOCs including: PCE, TCE, DCE and VC	EPA Method 8260C	3 x 40 mL VOA vial	Cool, 4°C, HCL, pH <2	14 days preserved
Nitrate, sulfate	Method SM 4500	500 mL HDPE (poly)	Cool, 4°C	2 days
Biological Oxygen Demand	Method 405.1	1 x Liter HDPE (poly)	Cool, 4°C, H ₂ SO ₄ , pH <2	48 hours
Chemical Oxygen Demand	Method 410.4	500 mL HDPE (poly)	Cool, 4°C, pH <2	28 days
Total and Dissolved Iron and Manganese	Method SM 3500	500 mL HDPE (poly)	Cool, 4°C	Analyze ASAP
Dissolved Gases: Methane, ethane, ethene, and CO₂	Xx	3 x 40 mL VOA vial	Cool, 4°C	14 days
Volatile Organic Compounds (VOCs) - BTEX only	Xx	2 x 40 mL VOA vial	Cool, 4°C, HCL, pH <2	14 days
Sodium Permanganate	Colorimetric Chart	2 x 40 mL VOA vial	N/A	Field measurement during sampling
Water Quality Parameters: pH, DO and ORP	YSI Multiparameter Meter	N/A	N/A	Field measurement during sampling

LEGEND

--- PROPERTY BOUNDARY

DOLLAR TREE
26100 PACIFIC HIGHWAY SOUTH

GROCERY OUTLET
26104 PACIFIC HIGHWAY SOUTH

ESTAFETA
(SHIPPING LOGISTICS)

FORMER CLEANERS
TENANT SPACE

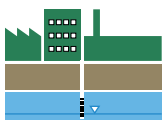
PASTALERIA Y
PANADERIA
(BAKERY)

EL PARRAL
(MEXICAN RESTAURANT)

RITE AID
PHARMACY

N

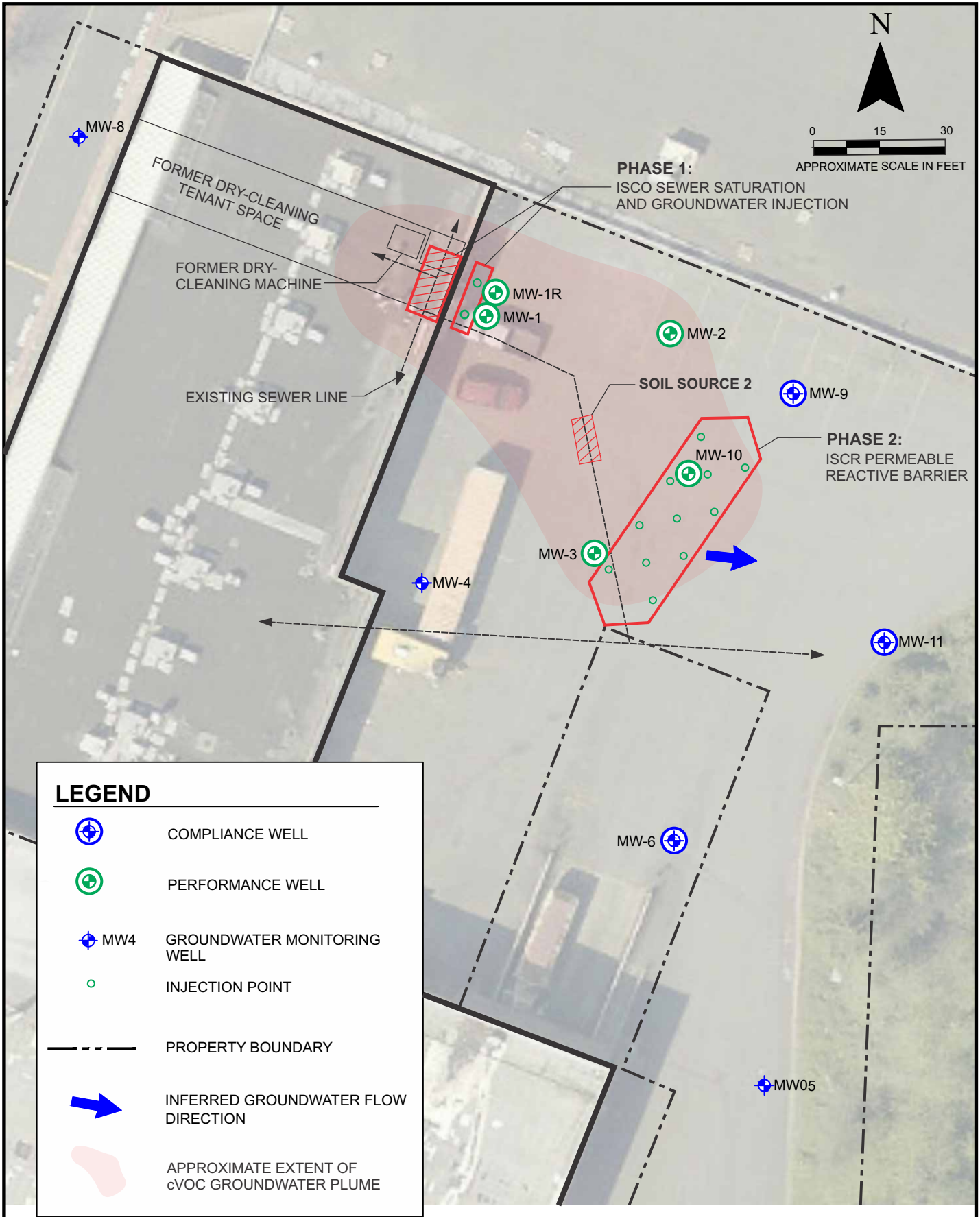
NOT TO SCALE










**Urban
Environmental
Partners llc**
Diligent, responsive, and practical consulting!

**Cleaners #1
26112 Pacific Highway South
Kent, WA 98144**

**Figure 1
Site Plan**



LEGEND

-  COMPLIANCE WELL
-  PERFORMANCE WELL
-  MW4 GROUNDWATER MONITORING WELL
-  INJECTION POINT
-  PROPERTY BOUNDARY
-  INFERRED GROUNDWATER FLOW DIRECTION
-  APPROXIMATE EXTENT OF cVOC GROUNDWATER PLUME



Urban Environmental Partners llc
Diligent, responsive, and practical consulting!

26112 Pacific Highway South
Kent, WA 98144

Figure 2
Groundwater Compliance Monitoring Plan